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Feasibility Study for Early Removal of HEU from CPP-651-Phase II

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SUMMARY

This report develops and evaluates different strategies for early removal of SNM from the CPP-651 vault via comparisons of resource-loaded schedules and cost and risk information. Preliminary Phase I removal strategies (INEL/EXT-97 Rev-1) were developed in early 1997 via a systems engineering approach. This effort identified local HEU management concerns and national post cold war issues to help assure an integrated programmatic solution that benefits the DOE complex and the INEEL. Phase II maintained this systems engineering focus to analyze detailed schedules, identify critical path resource issues, and ultimately provide a recommended plan for early removal of the CPP-651 SNM. Provided current assumptions do not change, implementation of this proposed course of action will (a) expedite the consolidation of SNM across the DOE complex and at the INEEL, (b) promote disposition of about 2.4 MT of HEU to LEU feed stock, and (c) improve local and offsite planning and communication. Overall cost-effectiveness for the complex is assumed and can be validated as soon as the estimated receiver costs are verified.

Completion of Phase II has provided: (a) a resource-loaded base case, (b) options for expediting the removal of SNM from CPP-651 (the preferred option is identified), and (c) the tools and planning software to provide continued support for this program.

Removal of SNM from CPP-651 within the proposed 10-year window required developing a plan that integrated specific tasks to minimize risk, cost, time, receipt issues at receiver locations (i.e., Oak Ridge 10 SST shipments per year from the INEEL),[a] and retain future operational flexibility to insure the greatest probability of success. Guided by these criteria, we produced our base case which is summarized by the following actions:

- Continue to collect missing data and resolve package certification issues
- Dry mill and blend denitrator product (UO_3) with depleted uranium (UO_3) in a sealed can to < 20% enrichment (LEU threshold) until the HEU blending site (e.g., SRS) has enough storage vault capacity to accept ICPP HEU (dry blending is terminated as soon as HEU shipments are made to the receiver)
- Ship 27 kg of Rocky Flats HEU (U_3O_8) to SRS as soon as possible
- Utilize ANL-W resources for timely storage and/or dispositioning of VYCOR Glass, ANL-E materials, and JANUS material.

a . IAEA programs were not considered in this study.

The base case empties CPP-651 within the 10-year window with a high probability of success (low shipper/receiver risk) and requires no additional personnel. This plan is similar to that identified in Phase I as the preferred option, but it does not yield the schedule reduction (2001) that was believed to be possible in Phase I. Resource loading of the proposed plan demonstrated that the reduced schedule identified in Phase I could not be achieved with existing staff.

Systems engineering was used to develop and evaluate four options/strategies for accelerating removal of SNM (see Figure EX-1). A simplistic overview of the program activities for each option can be summarized as **preparation, packaging/shipping, tasks outside CPP-651,** and **tasks inside CPP-651**. There is a limit on how many personnel can work effectively in CPP-651 and similarly there is a limit to the number of personnel working on preparation tasks. Thus, selection of extra personnel was done in a strategic manner. The following strategies utilized incremental adjustments in resources in one or both of these areas to resolve critical path issues for expediting the removal of SNM from CPP-651. They are characterized as follows:

Option A—Base case plus transfer negotiation team (TNT):

A dedicated team of about four experienced personnel are formed to resolve shipper/receiver issues and assist with related preparation paperwork for all inventory items.

Option B—Ship-as-is plus TNT:

The TNT is implemented to resolve shipper/receiver issues, but none of the SNM is processed or conditioned at ICPP.

Option C—Base case plus TNT and a dedicated crew:

The TNT and nine additional ICPP personnel are added to the CPP-651 operations to produce the equivalent of four days of packaging operations per week.

Option D—Ship as-is-plus TNT and a dedicated crew:

The TNT and nine additional ICPP personnel are added to CPP-651 operations to produce the equivalent of four days of packaging operations per week.

The schedule impact, programmatic cost, and risk of these proposed options are summarized in Table EX-1 along with the referenced base case and the current funding. The current funding will not provide closure of CPP-651 until January 30, 2009. It also does not support conditioning of the denitrator product which further jeopardizes successful removal of this inventory item. Thus, all comparisons are made against the base case and not the current budget. Figure EX-2 presents a graphic display of the schedules. This data indicates that significant gains in shortening the schedule are possible if additional experienced staff can be allocated to the program or if the scope of work is reduced.

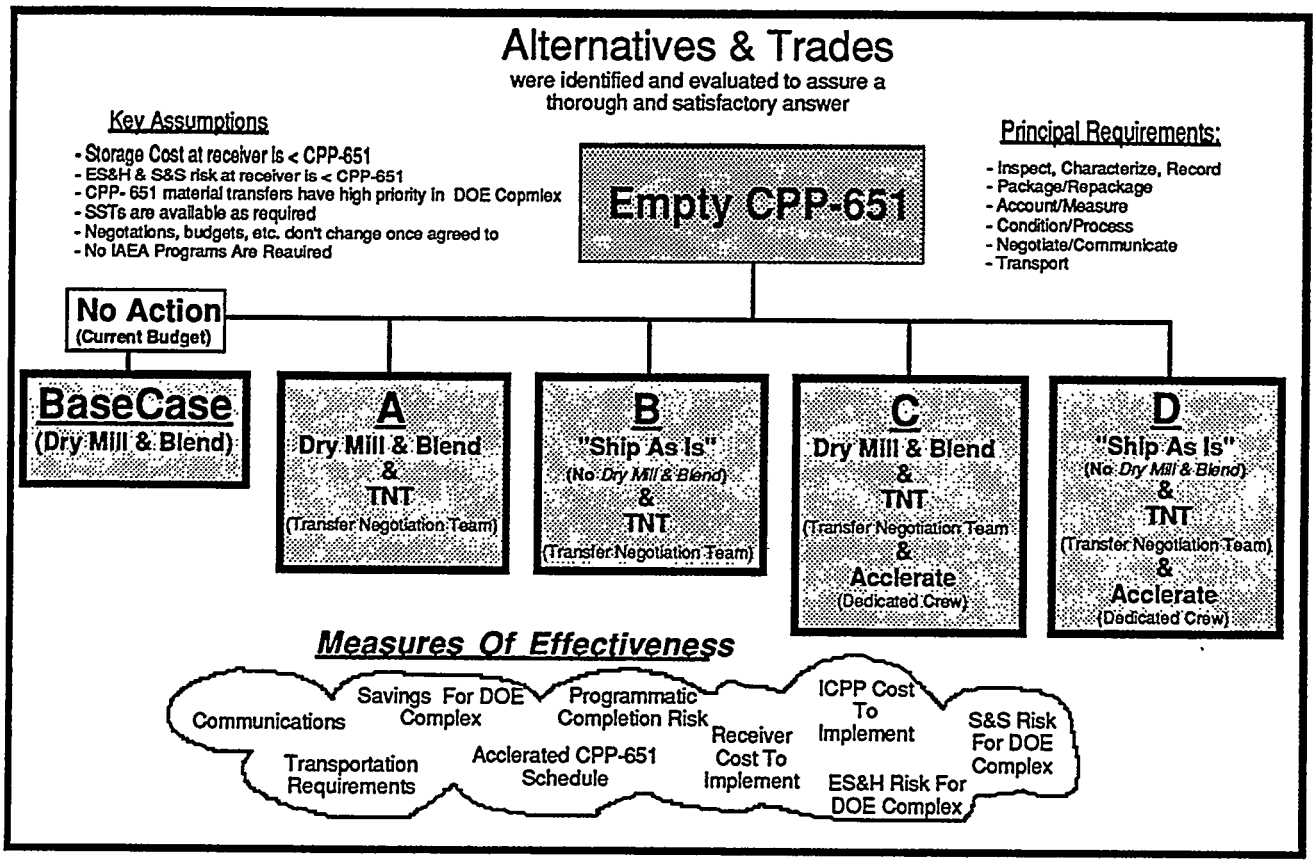

Figure EX-1. Development of alternate schedule.

Table EX-1. Schedule impact, costs, and risk of the proposed options.

	New Staff (FTEs)	ICPP Safeguards & Security Costs ($ M) Until 9/11/06 (b)	Surveillance & Maintenance Costs ($M) For CPP-651 Until Empty (c)	Transfer Cost To Remove Material From CPP-651 ($ M)	Total Cost - Options Are Benchmarked Against Base Case ($ M)	Savings (Base Case Cost Minus Option Cost)	Receiver Acceptance (10 Is HIGH Risk)	Completion Date	Reduced Base Case Schedule By ( ) Months
Current Budget (a)	0	$100.1	$6.3	$3.4	$109.7	($19.0)	10 +	30-Jan-09	-29
(Ship As Is - Existing Staff)									
Base Case	0	$79.0	$5.1	$6.6	$90.7	$0.0	3	11-Sep-06	0
(Dry Blend - Existing Staff)									
Option A	4	$76.0	$4.4	$8.6	$89.0	$1.7	3	18-Jun-05	15
(Dry Blend + TNT)									
Option B	4	$71.6	$3.5	$6.2	$81.3	$9.4	10	2-Sep-03	37
(Ship As Is + TNT)									
Option C	13	$71.6	$3.5	$10.3	$85.4	$5.3	2	4-Sep-03	37
(Dry Blend + TNT + Crew)									
Option D	13	$68.1	$2.8	$7.3	$78.2	$12.5	9	27-Mar-02	54
(Ship As Is + TNT + Crew)									
(a) Costs for "current budget" do not terminate until the facility is empty (1-30-09)									
(b) S&S costs for ICPP are estimated to be $8.7 M/year. This decreases to $6.3 M/year after the SNM is removed from CPP-651.									
(c) S&M costs for CPP-651 are estimated to be $0.5 M/year. This decreases to $0 M/year after the SNM is removed from CPP-651.									

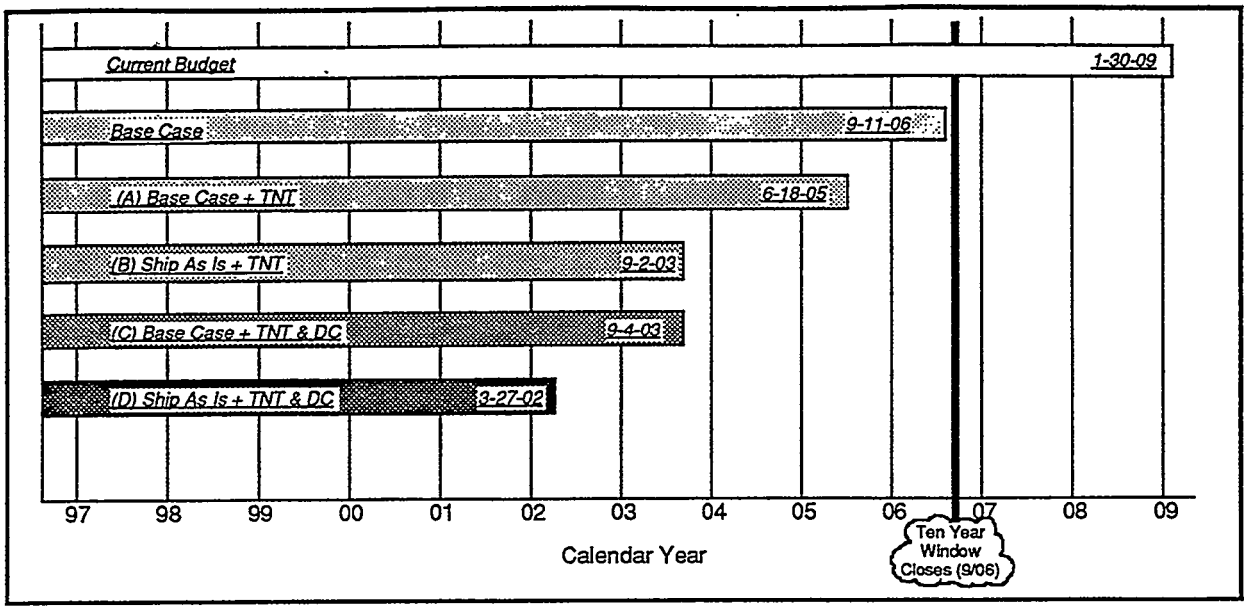

Figure EX-2. Schedule comparisons.

Based on these results it appears that: (a) additional personnel are cost-effective; Option A and Option C pay for the personnel and still save $1.7 and $5.3M respectively and (b) ship-as-is saves the most time and money, but its probability of success is too low. Per DP's request to provide a successful ASAP schedule, the team concluded that Option C is to be the best choice.

Option C represents the best strategy for quickly removing SNM from CPP-651 because it will:

- Reduce the 10-year schedule by 37 months.
- Balance reliance of onsite and offsite resources and their transitioning process capabilities and budgets.
- Help assure success because the denitrator product is converted to a more user friendly form relative to storage and/or site-specific processing capabilities.
- Eliminate the utilization/restart of ICPP aqueous production purification systems.
- Require minimal ICPP conditioning (same as the base case) and only a small increase in funding. These expenditures ($2.7M for GPP construction tanks) are recovered and exceeded by reduced schedule.
- Produce incremental ES&H and security risks that do not appear to be significant.
- Require minimal new dedicated staffing (13 FTEs) and their cost is recovered and exceeded by the savings that result from the reduced schedule.
- Provide a blend of synergistic ICPP operations that utilize a common operational area and concept (dry glovebox operations) rather than different processes for each inventory item.

When approved by DOE, these ICPP HEU management plans will become an integrated part of a much larger post cold war transition program to disposition excess (HEU) (proliferation reduction) and promote consolidation of SNM to fewer locations at the INEEL and across the DOE complex. The changes that have occurred across the DOE complex since the start of this study are significant and are likely to continue. Thus, the value of having this planning capability (resource data, offsite contacts, and the planning software) is strategic to success. Maintaining this capability will require periodic updating and publishing of the results, e.g., MMP. Ownership, funding, and control of this responsibility will be key to the continued planning success. Regularly scheduled communications/ contacts with the offsite receivers is another important success factor that is built

into Option C. This information will also improve the remaining decisionmaking prior to finalizing commitments, schedules, and expending funds.

Successful early removal of SNM from CPP-651 will make this facility available for other support roles which (e.g., dispositioning of ^{239}Pu or storage ^{233}U) should be evaluated as part of a national stewardship and materials management planning process.

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ACRONYMS

AL	aluminum
ANL-E	Argonne National Laboratory-East
ANL-W	Argonne National Laboratory-West
B&W	Babcock and Wilcox
BAPL	Bettis Atomic Power Laboratory
CPP	Chemical Processing Plant
CPP-651	Unirradiated Fuel Storage Facility
CSMO	Central Scrap Management Office
DC	dedicated crew
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy, Idaho Operations
DOT	Department of Transportation
DP	Defense Program
EA	environmental assessment
EIS	environmental impact statement
EM	Environmental Restoration and Waste Management
ES&H	environmental, safety, and health
FAST	Fluorinel Dissolution Process and Fuel Storage
FDP	Fluorinel Dissolution Process
FTE	full-time employee
FY	fiscal year
GEFAST	a standard used in the Fast Facility
HEU	high-enriched uranium
IAEA	International Atomize Energy Agency

ICPP	Idaho Chemical Processing Plant
IFSF	Irradiated Fuel Storage Facility
INEEL	Idaho National Engineering and Environmental Laboratory
KAPL	Knolls Atomic Power Labs
kg	kilogram
LANL	Los Alamos National Laboratory
LEU	low-enriched uranium
LLW	low-level radioactive waste
LMITCO	Lockheed Martin Idaho Technologies Company
LWBR	light water breeder reactor
MBA	Material Balance Area
MD	material dispositioning
MMP	Materials Management Plan
mr/hr	millirem/hour
MT	metric tons
NE	nuclear energy
NEPA	National Environmental Policy Act
NFS	Nuclear Fuel Services
NN	nuclear nonproliferation
NR	Naval Reactors
NRC	U.S. Nuclear Regulatory commission
OR	Oak Ridge
ORR	operational readiness review
PO	policy office
P&T	packaging and transportation

PPU	potential programmatic use
PWR	pressurized water reactor
R	roentgen
R&D	research and development
RAL	Remote Analytical Laboratory
RAMPAC	Radioactive Materials Packaging
ROD	Record of Decision
RW	Civilian Radioactive Waste Management
S/R	shipper/receiver
SNF	spent nuclear fuel
SNM	special nuclear material
SRS	Savannah River Site
SST	safe secure transport
TNT	Transfer Negotiation Team
TRIGA	Training, Research, Isotope Production Built by GA
TVA	Tennessee Valley Authority
UFSF	Unirradiated Fuel Storage Facility
U.S.	United States
UNC	United Nuclear Corporation
WAC	waste acceptance criteria

Feasibility Study for Early Removal of HEU from CPP-651

1. INTRODUCTION

A two-phase feasibility study was initiated in late 1996 to identify a way to expedite the removal of SNM from the CPP-651 vault. The first phase of this study provided preliminary information that appeared promising, but needed additional detailed planning and evaluation to validate the concepts and conclusions. The focus of Phase II was to provide the validation via resource-loaded schedules and more detailed cost estimates.

Section 1 describes the purpose and objectives of the Phase II tasks and the programmatic drivers that influence related CPP-651 high-enriched uranium (HEU) management issues. Section 2 identifies the evaluation criteria and methodology and the transfer issues and barriers preventing shipment. Section 3 provides site-specific background information for the CPP-651 facility and the Idaho National Engineering and Environmental Laboratory (INEEL) and describes the development of the basic material removal schedule, the proposed base case plan for removal of SNM, and the proposed HEU material management/shipping issues and strategies. Section 4 identifies the proposed options for accelerated removal of SNM and how they were evaluated via detailed scheduling, resource histograms, and cost analysis. Section 5 summarizes principal tasks for implementing this plan and other related HEU CPP-651 management issues that require continued planning efforts to assure successful implementation of this proposed early removal strategy.

1.1 Purpose/Objective

Defense Programs (DP) requested that SNM be removed from the CPP-651 vault as soon as feasible, but no later than 10 years. The base case schedule is shown in Table 1.1-1. The purpose of this report is to complete Phase II tasks and thereby provide DOE-ID with:

(a) A base case detailed schedule that confirms that CPP-651 can be emptied in 10 years or less (2006) with the existing resources and funds.

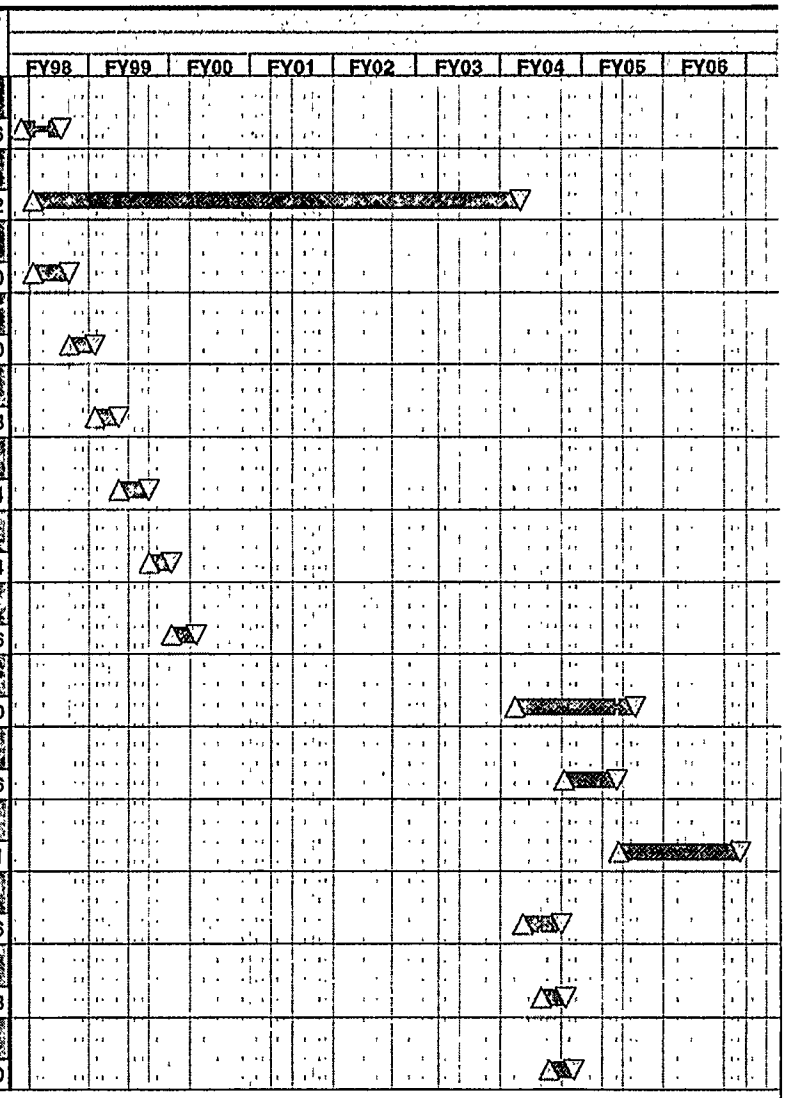
(b) An accelerated plan/schedule for early removal of all DP special nuclear material (SNM).

(c) The planning tools that will continue to provide detailed cost and schedule information for future CPP-651 management issues.

The objective of the Phase II effort was to confirm preliminary observations and strategies for the early removal of SNM via detailed resource loading, schedule building, and risk and cost analysis. In addition to early removal, the planning process also focused on achieving low risk for issues related to ES&H, security, shipment of product, and identification of HEU management strategies that would significantly reduce costs for CPP-651, the INEEL, and the nation. Cost savings at the national level cannot be validated until shipper/receiver negotiations and related receiver costs are finalized. However, most cases appear to be cost-effective.

Table 1.1-1. Base case schedule.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
+ LANL Material					
	178	25NOV97	21MAY98	2,964.00	159,385.76
+ Denitrator Material -Dry Blending					
	2,173	22JAN98	03JAN04	38,744.00	4,621,152.72
+ ANL-W Material					
	161	22JAN98	01JUL98	1,308.00	76,376.70
+ Custom Material					
	113	02JUL98	22OCT98	1,313.00	76,446.90
+ U. of Wisconsin					
	108	26OCT98	10FEB99	747.00	43,168.88
+ GEFAST Material					
	134	11FEB99	24JUN99	1,095.00	63,416.14
+ U. of Washington					
	102	28JUN99	07OCT99	772.00	40,308.34
+ Rocky Flats Material - Ship As Is					
	108	11OCT99	26JAN00	1,214.00	63,532.76
+ PWR Material					
	539	01DEC03	22MAY05	3,446.00	182,329.30
+ PWR (1 full assembly)					
	240	07JUL04	03MAR05	1,174.00	66,302.46
+ Fluorinel Material					
	553	08MAR05	11SEP06	8,354.00	545,747.81
+ VYCOR Glass Material					
	177	05JAN04	29JUN04	634.00	578,801.56
+ Janus Material					
	114	29MAR04	20JUL04	883.00	46,334.88
+ ANL-E Material					
	102	10MAY04	19AUG04	936.00	48,762.60



Project Start 01JUL97
Project Finish 11SEP06
Data Date 01OCT97
Run Date 21AUG97

Early Bar
Progress Bar
Critical Activity

COMP.BASE

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
BASE CASE SCHEDULE - DRY BLENDING
SUMMARIZED BY MATERIAL TYPE

Phase II efforts utilized Phase I background information, goals, evaluation criteria, and management strategies and continued to develop in more detail the scope of HEU disposition activities. It identified programmatic assumptions that address known HEU management issues, developed summary level schedules and milestones, and addressed budget and resource requirements. Some of these related requirements, issues, and activities (national and local levels) are still evolving as the DOE complex continues to transition into the post cold war era (e.g., remediation of related HEU management vulnerabilities and disposition of excess HEU). This report addresses these issues as well as we currently understand them and formulates an initial strategy for implementation of the Phase II plan.

1.2 Programmatic Drivers

1.2.1 National Issues and Programs

The end of the cold war created a legacy of weapons-capable fissile material. Global stockpiles of this material threaten national and international security through potential proliferation of nuclear weapons and could result in environmental safety and health consequences if material is not properly stored, handled, and managed. Demonstrating a commitment to nonproliferation, the President of the United States (U.S.) announced on March 1, 1995, that approximately 200 metric tons (t) of U.S. fissile material is excess to national security needs. Currently a total of approximately 174 t of HEU have been declared excess to national security needs. Much of this material and the 500 metric tons of HEU purchased from Russia will be disposed via fabrication into low-enriched uranium (LEU) reactor fuel (see Figure 1.2-1).

Unirradiated and non-SNF nuclear materials consist primarily of fuel in active programs and HEU that has been declared excess to national security needs. Since many of these materials are weapons-usable materials, programmatic decisions have been made for managing excess HEU that reduce their proliferation threat. These decisions are documented in *The Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* DOE/EIS-0240, June 1996, which provides the programmatic driver for managing materials discussed in the LMITCO *Material Management Plan* (MMP). The preferred option in this Record of Decision (ROD) is to blend most (85%) HEU down to low enrichment levels (< 5%) for use in commercial reactors; remaining HEU (estimated at 15%) will be blended to 0.9% for disposal as low-level radioactive waste (LLW). Historically, DOE has authorized the use of some HEU for other programmatic uses, such as fuel for research reactors. A small fraction (about 10%) of the 174 t recently declared excess has been reserved for such uses. Initially, HEU inventories must be identified and prioritized for down blending, including both weapons and nonweapons materials. Most surplus materials can be down blended efficiently. Some will be difficult to down blend for reactor fuel because of impurities or isotopic composition. However, the entire surplus inventory will be down blended for nonproliferation. Priority may be given to certain surplus materials to alleviate safety, environmental, and security concerns. The HEU inventory in CPP-651 is included in the 85% that will be down blended to LEU. None of the CPP-651 HEU was considered to be candidate material for an IAEA program. If feasible, addition of such a program would require new funding and additional time.

HEU from Lockheed Martin Idaho Technology Company (LMITCO) programs that meets receivers' criteria will be transferred to either the Oak Ridge Y-12 Plant (for recycle and treatment) or shipped to SRS for dilution to off-spec commercial reactor-grade LEU for irradiation in the TVA reactors. Some CPP-651 materials will require treatment prior to implementing proposed disposition options. Requirements to transfer HEU to Y-12 are found in the *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above The Maximum Historical Storage Level at Y-12 Oak Ridge,*

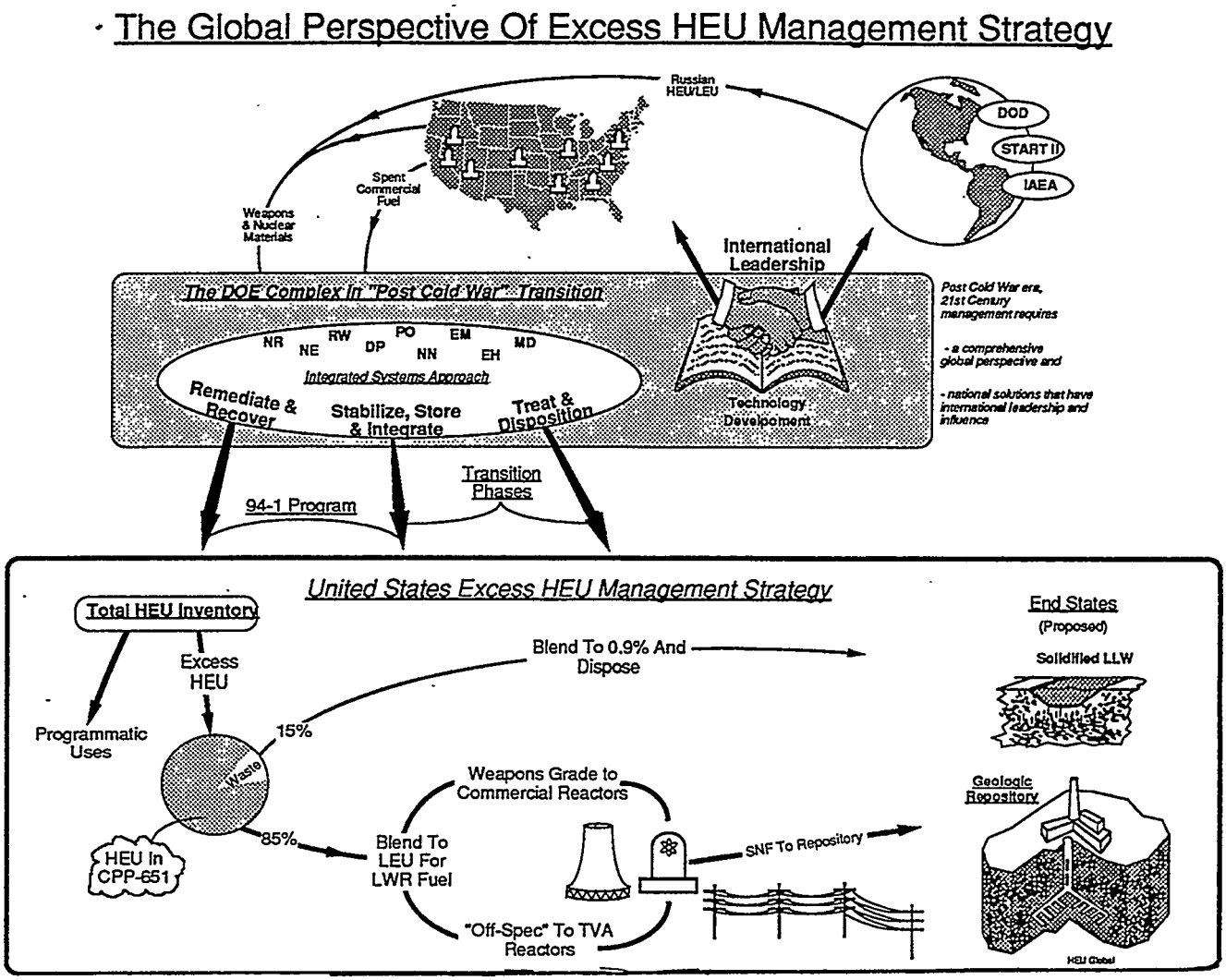


Figure 1.2-1. The global perspective of excess HEU management strategy.

Tennessee (Y-12 EA) (DOE/EA-0929, September 1994). This environmental assessment (EA) states that the DOE will consolidate HEU from other DOE sites at Y-12. This also requires that the material to be shipped must be acceptable to the receiver. These receiver requirements are being modified to assure stability of product forms, receipt of product information that is important to dispositioning options, and other related accountability information to maintain high quality security programs.

The President's announcement concerning excess fissile materials signaled a change in national priorities and resulted in significant changes in missions of many DOE sites. DOE sites with historical missions of weapons production began the transition to downsized stockpile maintenance sites and/or environmental cleanup sites. In addition to excess weapons material taken from the stockpile, weapons site cleanup activities are expected to yield additional quantities of excess SNM materials. The impact of this transition is very significant.

For example, the amount of inventory that must be dispositioned exceeds any past experience. Dispositioning via dilution cannot occur in a timely manner at Oak Ridge alone. Thus, multiple dilution sites must be utilized to reduce HEU proliferation risk in a timely manner (< 10 years). This large inventory also presents new shipping issues in terms of volume (shipments / year), availability of SSTs, winter weather restrictions, and priority (who gets to ship first). All these new programmatic challenges come at a time when many of the management systems and product packages face significant aging and safety-related issues. These problems have been recently documented in the HEU Vulnerability Assessment. Collectively these issues have created a significant degree of uncertainty for processing and consolidating HEU throughout the DOE complex. As previously mentioned, much of this excess material has potential commercial value as nuclear reactor fuel. DOE recognized the need for increased coordination among affected sites and an integrated disposition process in order to reduce overall operation and management costs and to provide a timely return to the U.S. Treasury.

1.3 Assumptions

The following paragraphs provide a listing of assumptions and conditions that were made to bound the scope of this feasibility study.

(1) Uranium oxide (U_3O_8 and UO_3) and uranium metal are assumed to be acceptable physical forms for interim storage of HEU.

(2) The study shall consider ICPP future mission activity from 1997 to 2035 (40 years) and will be integrated with other planning documents such as the EM 10-year plan, National SNF plan, etc.

(3) The remaining lifetime of CPP-651 is assumed to be 30 years (2025).

(4) It is assumed that the HEU EIS disposition strategy of dilution to 0.9% ^{235}U will meet or exceed any federal repository WAC (waste acceptance criteria) for unirradiated fissile material.

(5) Removal of HEU from the INEEL is consistent with the intent of the agreement with the State of Idaho.

(6) HEU treatment processes at ICPP that require line item funding will be accelerated to help shorten the schedule and reduce costs. (No line items were identified that impact this report.)

(7) Use and or restart of existing INEEL facilities and equipment to condition HEU for offsite transfer is consistent with the focus of the 94-1 Implementation Plan.

(8) Existing federal and state regulations will be enforced.

(9) Any waste generated from the ICPP HEU conditioning options will be processed via existing INEEL/ICPP systems.

(10) Recoverable HEU material will be declared to CSMO and will be shipped to a location designated by them.

(11) A near-term schedule has been negotiated with Y-12. Successful completion of negotiated transfers is assumed even though some degree of uncertainty remains. These operations are dependent upon Y-12's ability to receive and store material and the INEEL's ability to complete shipper/receiver (S/R) agreements and secure sufficient funding and personnel to accomplish packaging and transportation (P&T).

(12) The primary facility for managing inactive HEU at the INEEL is the Unirradiated Fuel Storage Facility (UFSF) (CPP-651). Fuel categories presently approved for storage in the unirradiated fuel storage facility are designated in LMITCO technical standard 4.8A1. Various types of materials are stored in specific containers and configurations for safety and control.

(13) HEU transport to Y-12 will be accomplished in approved vehicles using certified containers. A full SST shipment is assumed to be 40 to 48 drums per truck and will be determined by the transport index. This assumption is for 55-gallon DOT 6M drums; other size containers will dictate different loading limits.

(14) Combination of various HEU fuel materials being shipped in the same transport will be determined by transport index, container compatibility, drum sizes, and any other pertinent conditions.

(15) No DOT 6M drums will be returned from Y-12 for re-use.

(16) The schedules for the base case and options assume funding will be made available to support projected activities and transfers.

(17) Startup of the ICPP RAL custom processing will require only a readiness assessment; completion of an operational readiness review is not factored in.

(18) SNM at other ICPP locations, such as the unirradiated light water breeder reactor (LWBR) fuel in CPP-749, is not included in the scope of this study.

(19) ICPP HEU oxides can be dry blended with LEU in a manner that will satisfy security- and safety-related concerns for interim storage. Final and complete blending if required will occur via aqueous operations at proposed DOE HEU dilution sites.

(20) Offsite shipments are any shipments outside of ICPP; this includes shipping to ANL-W.

(21) If necessary, it will be possible to obtain state approval to ship in existing containers between CPP and Argonne National Laboratory-West (ANL-W). It is assumed this would be accomplished by temporarily closing the public access to the State highway between the facilities.

(22) HEU material shipped to ANL-W will be conditioned and returned to Y-12.

(23) Waste from ANL-W processing will be dispositioned via their management programs.

(24) Additional funding for offsite conditioning or storage is not included in the scope of this study except for the Vycor glass that is to be sent to ANL-W.

(25) SRS can accept HEU after the second quarter of 2002 and LEU as soon as ICPP can ship.

(26) The proposed dry blending strategy to achieve LEU status (< 20% ^{235}U enriched) is acceptable.

(27) Dry blended LEU can be charged to the SRS dilution train without unpackaging.

(28) Rocky Flats material can be shipped to SRS prior to 2000.

(29) Transfer of CPP-651 SNM to other sites does not increase security and ES&H risks for the DOE complex.

(30) This study does not address receiver costs that may result at other facilities.

(31) None of the material in CPP-651 is or will be placed under an IAEA program.

(32) Parka fuel transfers from CPP-603 will not need to utilize the CPP-651 facility. Funding for Parka fuel transfers is assumed to come from DP.

(33) SNM material in CPP-651 that has potential program use is a small inventory that is assumed to be transferred to other customers before the end of the base case schedule. This material was not included in the scope of this study.

(34) Storage costs for LEU (dry blended denitrator product) are assumed to be very low and have not been included in this study.

(35) Specific security sampling and measurement issues cannot be addressed until a detailed milling and dry blending process design is developed.

2. EVALUATION CRITERIA AND METHODOLOGY

The objective of the study was to develop a detailed resource-loaded plan for moving all SNM material out of CPP-651 as quickly as possible. The assumptions are that transfer of the material to another site is cost-effective and promotes reduced safety and proliferation risks. Each category of material in CPP-651 has its own set of properties and issues that impact the ability to ship it to another customer. These properties and issues along with a recommended strategy for getting material moved will be discussed in detail in Section 3. This section discusses evaluating proposed solutions on an individual basis and how individual solutions were integrated and evaluated to provide an optimized plan. This process employed the following principal steps for Phase I:

- Understand local and national programmatic and policy drivers at the shipping and receiving sites
- Establish criteria (such as cost, schedule, safety, and security) for evaluating options based on these drivers
- Analyze issues preventing materials from being shipped and establish general barrier categories
- Develop a set of preferred options for these general categories using criteria to rank order of preference
- Analyze materials individually; identify key issues; and establish preferred options
- Integrate individual options and evaluate each possible combination to select best proposal.

The process was expanded to include the following additional steps for Phase II:

- Review safety-related issues in more detail for each of the proposed strategies
- Negotiate commitments and schedule options with offsite receivers
- Identify resources and costs for proposed activities
- Develop conceptual related design information for any equipment or facility modification to enhance cost and schedule estimates
- Develop detailed schedules of different enveloping strategies
- Identify critical path issues in the detailed schedule and provide additional resources to improve the schedule
- Balance reduced schedule time with cost and probability of success.

2.1 Program and Policy Drivers

National programmatic HEU management drivers were previously discussed in Section 1.2. The *Lockheed Martin Idaho Technologies Company Materials Management Plan* has included these issues in

developing plans to remove nuclear material from CPP-651. Requirements to transfer HEU to Y-12 are found in *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above The Maximum Historical Storage Level at Y- 12 Oak Ridge, Tennessee*. This environmental assessment (EA) states that the DOE intends to consolidate HEU from other DOE sites at Y-12. In addition, removal of all nuclear material from CPP-651 by 2006 is another DOE-ID directive and DOE Defense Programs mandate. Furthermore, the ROD from the *Disposition of Surplus Highly Enriched Uranium Programmatic Environmental Impact Statement*, has directed that the HEU be diluted to LEU to reduce its proliferation risk. Most of this diluted inventory will be fabricated into LEU fuel for commercial power reactors. Off-spec HEU will also be diluted into LEU feedstock for commercial reactor fuel (only TVA reactors would burn off-spec inventory). Other programmatic drivers would include compliance with the agreement signed with the State of Idaho and execution of all proposed shipping tasks in full compliance with all federal and state regulations and policies. Acceptable safety and environmental risks present other policy driven issues.

2.2 Criteria

Criteria fall into two categories: absolute requirements limiting conditions that must be satisfied by any proposed option, and desirable attributes that are used to help rank feasible options. In both Phase I and II of this study the absolute requirements are receiver acceptance, regulatory acceptance, and customer acceptance. Each proposed option must have a receiver willing to accept material. The process of preparing material and shipping it to the receiver must meet all regulatory requirements. Additionally, the plan must be acceptable to the customer (DOE) in terms of cost, schedule, and risk. Those options meeting this test of feasibility were then ranked according to desirable attribute criteria. Criteria used to rank options for each material were an extension of the basic objective. The ideal solution would move material as quickly as possible with lowest cost and risk. Key criteria developed in order of importance are:

- Environmental, safety, and health risk
- Security risk
- Political acceptance
- Supports accelerated schedule
- Cost
- Transportation risk
- Risk of depending on other site to receive
- Existing capabilities
- Other (facilities, infrastructure, scale, packaging).

2.3 CPP-651 Transfer Issues/Barriers

Materials in CPP-651 were analyzed individually to determine issues preventing shipment. This was done during Phase I in a facilitated, interdisciplinary team meeting involving representatives from CPP-651 operations, criticality safety, transportation, security, plant operations, safety analysis, systems

engineering, ICPP technical support, spent fuel, and representatives from ANL-W operations, engineering, and security. The team reviewed the inventory of materials and determined key issues preventing shipment. Issues around each material type are discussed in detail in Section 3. As shown in Figure 2.3-1, these issues were classified into the following primary categories:

- Characterization data or other information issues
- Packaging issues such as shipping containers, product containers, and certification papers
- Product form issues (such as concerning oxide, metal, fabricated fuel, scrap pieces, molds, and fission products radiation fields)
- Offsite receiver issues such as storage space, processing capability, schedules, funding, and remediation of vulnerability issues.

2.3.1 Characterization Data

A detailed inventory of the material stored in CPP-651 was performed in 1995. As part of the inventory radiation readings, characterization data and photographs were obtained. The CPP-651 material inventory is shown in Table 2.3-1. Computational analyses have been performed as part of Phase II to determine if some of the more difficult materials will meet the acceptance criteria for highly enriched uranium fuels into the Y-12 plant. This new information has been made available to the proposed receiving site (the Y-12 plant) for review. In some cases the material meets the acceptance criteria and this will allow shipment and ship dates to be negotiated. However, some materials may require a variance in order to be accepted by the Y-12 plant. If the variance cannot be obtained, then some form of conditioning will be implemented to make the materials acceptable somewhere in the DOE complex.

2.3.2 Packaging

Phase I identified several materials that could not be shipped due to a range of packaging problems. The simplest examples are materials that are too long or otherwise won't fit into readily obtainable and certified shipping containers. Alternative shipping containers were identified that allow shipment without resizing material (i.e., cutting fuel, recanning in smaller cans).

A more complicated packaging issue exists for materials that must be repackaged because the current internal package (i.e., plastic bottle and/or plastic bag) doesn't meet the receivers' acceptance criteria. These materials must be repackaged unless the receivers' acceptance criteria can be renegotiated. Some materials in this category also have shipping container size issues and radiation level issues. These conditions also ultimately require repackaging.

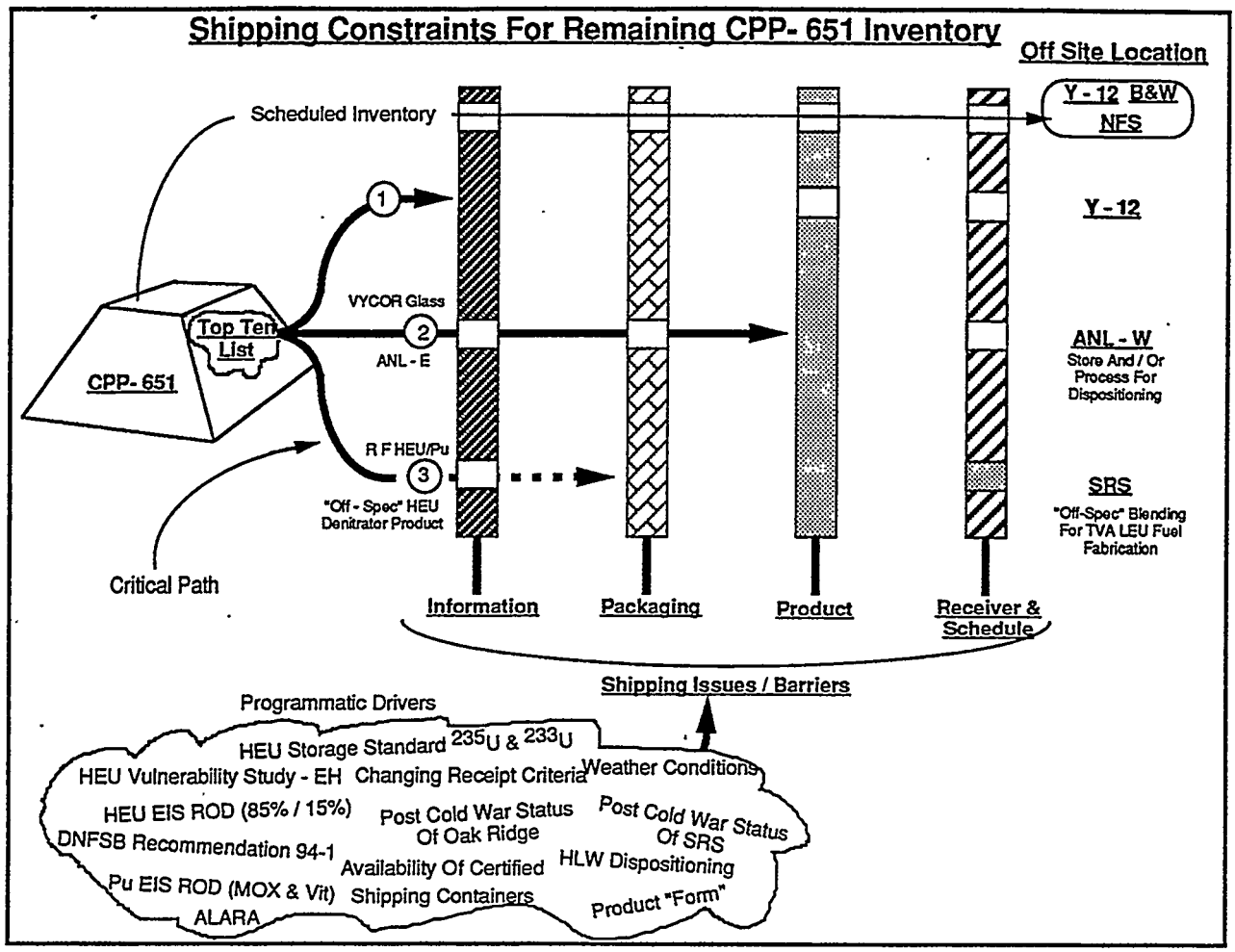


Figure 2.3-1. Shipping constraints for remaining CPP-651 inventory.

Table 2.3-1. Nuclear materials categorization of inventories (as of 9/30/96).

Description	Owner	Category	Sub-category	Quantity (kg U)
Y-12	DP	Inactive material	Potential Program Use	4.494
Custom product reference samples	DP	Inactive material	Potential Program Use	1.583
Denitrator product reference samples	DP	Inactive material	Potential Program use	0.176
LANL	DP	Inactive material	Negotiated	257.475
ANL-W	DP	Inactive material	Negotiated	52.294
Fluorinel	DP	Inactive material	To Be Negotiated	105.237
PWR	DP	Inactive material	To Be Negotiated	86.461
University of Washington	DP	Inactive material	To Be Negotiated	0.459
University of Wisconsin	DP	Inactive material	To Be Negotiated	0.145
GEFAST	DP	Inactive material	To Be Negotiated	1.100
Custom product	DP	Inactive material	To Be Negotiated	82.416
Janus	DP	Inactive material	To Be Negotiated	33.907
Vycor glass	DP	Inactive material	To Be Negotiated	4.394
ANL-W and ANL-E	DP	Inactive material	To Be Negotiated	2.185
Rocky Flats	DP	Inactive material	To Be Negotiated	26.983
Denitrator product	DP	Inactive material	To Be Negotiated	1,687.645
			TOTAL	2,346.287

DP—Defense Program

Negotiated refers to surplus material that can be transferred to another location, has been listed on a scrap declaration, and has been accepted by the central Scrap Management Office (CSMO). In most cases the receiver has been identified or the contract is being bid. Schedules and packaging requirements are either known or being developed.

To Be Negotiated consists of surplus material that has not yet been submitted to CSMO, or material that has not been accepted for transfer pending resolution of issues.

2.3.3 Product Form

Some materials may end up being unacceptable to designated HEU receivers and will require some type of conditioning prior to shipment. This is the result of the abrupt halt to operations at the ICPP at the end of the cold war. These potentially difficult materials were sent to the ICPP because of its unique processing capabilities (e.g., custom dissolution in the multi-curie cell). Now that these process capabilities are shut down, it is not surprising that other sites are not anxious to accept these materials. Material with a very small inventory could be processed via lab-scale equipment in facilities like CPP-684 RAL (Remote Analytical Laboratory). Larger inventories are not feasible because the processing time is too long. Examples of material form issues are HEU with high plutonium concentration, metal alloys containing zirconium, broken glass with embedded uranium metal, and materials with high radiation levels.

2.3.4 Offsite Receivers

A series of issues deals with offsite receivers. In general, success of the plan is totally dependent on timely delivery of all material to each offsite receiver. Any single material that is delayed for any reason could potentially force CPP-651 to be operated longer than planned. This could significantly reduce or even eliminate anticipated cost savings. This puts the ICPP at risk of committing to a plan that may not be supported by other sites if their site-specific funding is reprioritized or other issues arise. Some concerns are related to previous issues discussed. There is a risk that actions taken to get characterization data, repackage materials, and resolve material form issues may end with the receiver rejecting material because their acceptance criteria has continued to change. Even if the receiver has agreed to receive a material, any of several programmatic issues may cause delays in shipments. These include receiver verification of contents prior to shipping (no surprises for receivers), new requirements for information, better accuracy and expanded measurement criteria, availability of safe secure transports (SSTs), availability of storage space in vaults, and programmatic decisions that affect processing schedules. All these issues are further complicated by the relative priority of ICPP compared to other sites and labs shipping to these receivers and other high priority national programs such as dispositioning excess plutonium.

2.4 Methodology

2.4.1 Individual Option Analysis

The base case scenario was developed in the following manner. Phase I developed a set of management/shipment options for each inventory item in CPP-651 and these options were ranked based on judgments of team members as is shown in Table 2.4-1. The next step was to integrate the individual options into a program in order to identify those that generated maximum cost savings and satisfied the absolute requirements. Several assumptions were made that helped form the basis for evaluation:

- Because the HEU Disposition EIS specifies that designated good HEU will be transferred to Y-12 for down blending into commercial fuel, Y-12 should accept anything that they or a contracted fuel fabricator can process

- SRS is specified as a site for down blending off-spec HEU into TVA fuel. SRS or any other off-spec HEU down blending site should accept all off-spec HEU material as long as it can be handled by their existing/planned processes

Table 2.4-1. Material types, barriers and current issues.

Item #	Material	Shipping Barriers: Information	Packaging	Product	Receiver	Options - In Order	Receiver	Cost $K	Schedule Duration Months	Risk	Comments
1a	PWR					1) Repackage and ship in 85 gal 6M drums	B&W/NFS	182	18	Low	Waiting for CSMO to award contract
	Plates					2) Certify Spert boxes and ship	B&W/NFS	90	18	Med	Spert boxes not acceptable
1b	PWR					1) Certify box it is in and ship	B&W/NFS	66	8	Low	Waiting for CSMO to award contract
	Assembly					2) Get certified B&W box and ship	B&W/NFS	65	8	Med	Assembly will not fit in B&W boxes
2	Fluorinel					1) Get longer inner containers & drums, ship	B&W/NFS	546	18	Low	Waiting for CSMO to award contract
						2) Cut long material and ship in 6M drums	B&W/NFS	613	21	Med	No need to cut to fit drums
						2) Get certified B&W box and ship	B&W/NFS	296	21	Med	Drums are easier to obtain than boxes
3	Univ. of					1) Repackage and ship to SRS	SRS	40	4	Low	
	Wash.					2) Repackage and ship to Y-12	Y-12	40	4	Med	Does not meet Y-12 acceptance criteria
						3) ICPP stabilization to oxide, ship	Y-12	56	5	Med	Added cost to process at ICPP
4	Univ. of					1) Repackage and ship to Y-12	Y-12	43	4	Low	Y-12 has agreed to accept material
	Wisc.					2) Repackage and ship to SRS	SRS	43	4	Med	
						3) ICPP stabilization to oxide, ship	Y-12	54	5	Med	Added cost to process at ICPP
5	Custom					1) Repackage into 6M's and DC-1's	Y-12	76	4	Low	
						2) Repackage 4 cans into smaller cans, ship all in 6M's	Y-12	75	8	Med	Assumes repackaging glovebox available
						3) Dry Blend 4 cans, repackage, ship all in 6M's	Y-12/SRS	145	8	Med	Assumes dry blending process available
6	GEFAST					1) Repackage into 6M's and a UN1A2	Y-12	63	5	Low	
						2) Repackage 1 can into smaller cans, ship all in 6M's	Y-12	103	9	Med	Assumes repackaging glovebox available
						3) Dry Blend 1 can, repackage, ship all in 6M's	Y-12	107	9	Med	Assumes dry blending process available
7	Janus					1) Ship in current drum to ANL-W	ANL-W	46	4	Low	Requires NEPA and DP approval
						2) Repackage, ship to Y-12	Y-12	49	4	Low	Does not meet Y-12 acceptance criteria
						3) ICPP stabilization to oxide, ship	Y-12	309	20	Med	Added cost to process at ICPP
8	VYCOR					1) Ship in current drum to ANL-W for processing	ANL-W	579	6	Low	ANL-W has developed process
	Glass					2) ICPP stabilization to oxide, ship	Y-12	241	19	Med	Added cost to process at ICPP
9	ANL-W					1) Repackage and ship to Y-12	Y-12	76	6	Low	Y-12 has agreed to accept material
						2) Ship in current drum to ANL-W	ANL-W	71	6	Low	Requires NEPA and DP approval
						3) ICPP stabilization to oxide, ship	Y-12	114	8	Med	Added cost to process at ICPP
10	ANL-E					1) Ship in current drum to ANL-W	ANL-W	49	4	Low	Requires NEPA and DP approval
						2) ICPP stabilization to oxide, ship	Y-12	95	6	Med	Added cost to process at ICPP
						3) Repackage and ship to Y-12	Y-12	52	4	Med	Does not meet Y-12 acceptance criteria
11	Rocky					1) Repackage and ship as HEU to SRS	SRS	64	4	Low	
	Flats					2) ICPP stabilization to oxide, ship as liquid in RAL	Y-12	234	14	Med	Added cost to process at ICPP
						3) ICPP stabilization to oxide, ship as liquid in new bldg.	Y-12	605	15	Med	Assumes new process bldg. constructed
						4) Dry Blend to <20%, repackage, ship	SRS	414	15	Med	Plutonium in material creates problems
12	Denitrator					1) Dry Blend to <20%, repackage, ship	SRS	4621	72	Low	Fabricate/install dry blend process
						2) Repackage and ship as HEU to SRS	SRS	1679	36	Med	Large risk of slipping schedule
						3) ICPP stabilization to oxide, ship as liquid in new bldg.	SRS	11,554	53	Med	Construct new process building
						4) ICPP stabilization to oxide, ship as liquid in 637, 601.	SRS	4,559	52	Med	Added cost to process at ICPP
						5)Repackage in smaller cans in CPP-651, ship to SRS	SRS	2159	38	Med	Fabricate/install repackaging glovebox

Shaded area denotes a shipping barrier

- If Y-12, ANL-W, and SRS have excess capacity in their storage facilities, there is little or no additional cost to the complex (DP) to store Idaho materials in their facilities while waiting for processing

- All material in CPP-651 must, as a minimum, be repackaged into certified drums for transport

- Because plans are already in place to repackage and transport these materials within the next 10 years, there is no new additional cost for repackaging drums sooner unless expediting removal is less efficient or requires additional drums.

2.4.2 Integration of Options

The final step in developing the Phase I plan was integration of options for individual materials into an overall cost-effective strategy. For example, the denitrator product is the single largest item in the CPP-651 inventory (see Table 2.3-1). The decision to mill and blend with depleted uranium to reduce enrichment is more complicated than the ship-as-is option, but produces a more user friendly product that could be received earlier by SRS. Milling and blending also helped eliminate package size problems, provided for the removal of unwanted plastic material, and reduced high radiation fields for each product can. Aqueous blending will occur via SRS's off-spec blending program and the ICPP dry blend strategy is only proposed as an interim storage mode. Once it was decided to use ICPP operations to dry blend the denitrator product, then inventory remaining was examined to see if any other oxides could utilize this process and avoid implementing another process. In this case, it was decided that the Rocky Flats material may also be considered. However, this strategy is not the preferred option because of the Pu-related contamination control issues for the Rocky Flats inventory. This theme was repeated for other inventory items in an attempt to minimize processing requirements. Since most individual inventory items represent small amounts of HEU, processing them through production-sized equipment via special procedures was usually not cost-effective at any site. Thus, many of these options defaulted to lab-scale operations. Another factor that influenced integration was the INEEL ownership or control of the proposed resolution. If the options were equal relative to cost and risk, then options that provided more local control were selected. By starting with the largest inventories with the most difficult material issues and working back through the other materials, decisions were made to alter options on smaller inventories to take advantage of actions planned for more difficult issues. In many cases, overall cost or schedule risk for an individual material could be reduced. The net result of this process was the base case schedule (see Table 1.1-1) that confirmed the CPP-651 vault could be emptied in less than 10 years.

3. BASE CASE

The following subsections discuss background information and the development of the base case planning scenario. This process was required to (a) demonstrate that the 10-year window could be met and (b) develop enough detailed information to be able to identify the critical path resource issues and better understand how to accelerate the schedule.

3.1 Background to Strategy Development

Uranium inventories in CPP-651 and stored in vaults across the DOE complex are enriched in the isotopes ^{235}U or ^{233}U. These include HEU having a ^{235}U content of greater than 20% by weight or a ^{233}U content greater than 12% by weight or mixtures of the two isotopes. Other HEU inventories include large quantities of relatively pure weapons-grade material, HEU recovered from recycle of irradiated reactor fuel, and additional enriched ^{233}U.

In the defense nuclear complex, HEU has had two primary purposes—for weapons components and as fuel for material production and Naval Nuclear Propulsion reactors. DOE facilities have also provided support services for a wide range of domestic and foreign research reactor programs. Defense-related HEU activities have traditionally centered at the Oak Ridge Y-12 Plant, which is expected to retain interim support for weapon dismantlement, uranium processing and storage, and programs for disposition and use of the fuel value of enriched materials. HEU materials that are directly addressed by the 94-1 program are stored at other sites where conversion and packaging of inventories from former missions are important to overall plans for safe facility restart, operation, and shutdown.

As with plutonium, the U.S. holds large quantities of HEU that are now excess to national security needs. Unlike plutonium, however, this HEU can be isotopically diluted with natural or depleted uranium to produce a material (less than 20% enriched in ^{235}U) that is substantially more resistant to re-enrichment and use in weapons. Thus, near- and long-term stabilization goals emphasize benefits of dilution to low-enriched uranium (LEU) for commercial reactor fuel (see Figure 1.2-1).

DOE's support for long-term management of enriched uranium is influenced by the large quantity of HEU included in the 200 metric tons (MT) of U.S. weapons-grade fissile material that was declared excess to national security needs and up to 500 MT of excess weapons-grade HEU, down blended to LEU, from Russia. Quantities described in the 94-1 program are small compared to these huge process and storage streams, and must be evaluated in the context of the larger program.

Most ^{235}U materials have never been irradiated and contain essentially no ^{236}U or ^{232}U. However, a significant quantity of HEU was recovered by reprocessing HEU fuels from research, production, and Naval reactors. The different isotope composition of this reactor grade HEU affects its potential uses and storage requirements. ^{236}U is a mild nuclear poison that affects production in new fuel and the decay daughters of ^{232}U produce an increased radiation hazard during handling and storage.

3.1.1 Post Cold War Operational Status

The Office of Fissile Material Dispositioning has prepared *A Surplus HEU Disposition Environmental Impact Statement* (DOE/EIS-0240, June 1996), that describes expected environmental impacts of down blending surplus HEU to destroy its weapons capability. The EIS describes various alternatives for blending surplus HEU with low-assay uranium to achieve an LEU product suitable for feed stock for commercial fuel fabrication (< 5%) and well below the weapons-usable enrichment 20% assay.

Four potential down blending sites were identified by DOE in the EIS: Two are DOE sites: the Y-12 Plant in Oak Ridge, Tennessee; and the Savannah River Site (SRS) in Aiken, South Carolina. The other two are commercial facilities: Nuclear Fuel Services (NFS) in Erwin, Tennessee; and Babcock and Wilcox (B&W) in Lynchburg, Virginia.

The Oak Ridge, Tennessee, Y-12 Plant has long been designated as the DOE lead site for managing uranium inventories. It has now been established as lead laboratory for surplus HEU disposition and has been charged with providing options for safe, secure, and environmentally sound management and disposition of surplus HEU. This surplus HEU is currently stored at many sites across the DOE weapons complex (see Figure 3.1-1). The location, general form, and amount of surplus material at various DOE sites is thoroughly documented.

The Savannah River (Westinghouse) Site (SRS) also has the capability to manage uranium inventories. SRS can process AL/HEU materials in their large two canyon operation. Funding for Savannah River is proposed to be cut by 300 million dollars (25% of the total budget) by October 1997 and the Savannah River Site will have a reduction in work force of about 4,000 people. This layoff will impact the sites current 10-year plan by possibly creating the need to consolidate their two canyon operation to one (F-Canyon). If only F-Canyon is open, then plutonium operations would probably be performed first followed by off-spec uranium operations. The startup date (2002) for uranium dilution operations will then be delayed at least two to three years (see Figure 3.1-2).

ANL-W is a nonprofit research laboratory operated by the University of Chicago for the Department of Energy. ANL-W is located about 35 miles west of Idaho Falls, Idaho, on the INEEL. Research at ANL-W is typically focused on large-scale nuclear facility testing and development. ANL-W is currently committed to a three year campaign to process ANL-W material through their electrorefiner. Following completion of the ANL-W material campaign in 2000, the electrorefiner can potentially be used to process other material such as CPP-651 HEU. ANL-W has tested a magnetic separator that is capable of separating the uranium from broken Vycor glass molds. This dry process separation can be used for processing both CPP-651 and ANL-W inventories of Vycor glass molds. ANL-W also has vault space and warehouse space available to potentially store small inventories of CPP-651 material.

3.1.2 ICPP SNM Storage

The purpose of the Unirradiated Fuel Storage Facility (CPP-651) is to provide safe and secure storage for a variety of unirradiated and slightly irradiated fuel materials for subsequent processing or shipment to other facilities for use. Each type of material is handled and stored under specifically approved criteria. A complete listing of CPP-651 inventory is given in Table 2.3-1. Other unirradiated and slightly irradiated materials are stored at other ICPP locations such as CPP-749, CPP-603. Manager of the SNM in these facilities utilizes similar resources and their resource demands have been integrated with the CPP-651 study in that possible interfaces with Parka transfers were evaluated. Since ICPP's mission no longer includes production scale reprocessing, the material stored in the CPP-651 vault must be relocated to other facilities for storage or conditioning. Potential receivers such as Y-12, SRS, and ANL-W have been identified to manage and process the Defense Program SNM currently stored in CPP-651.

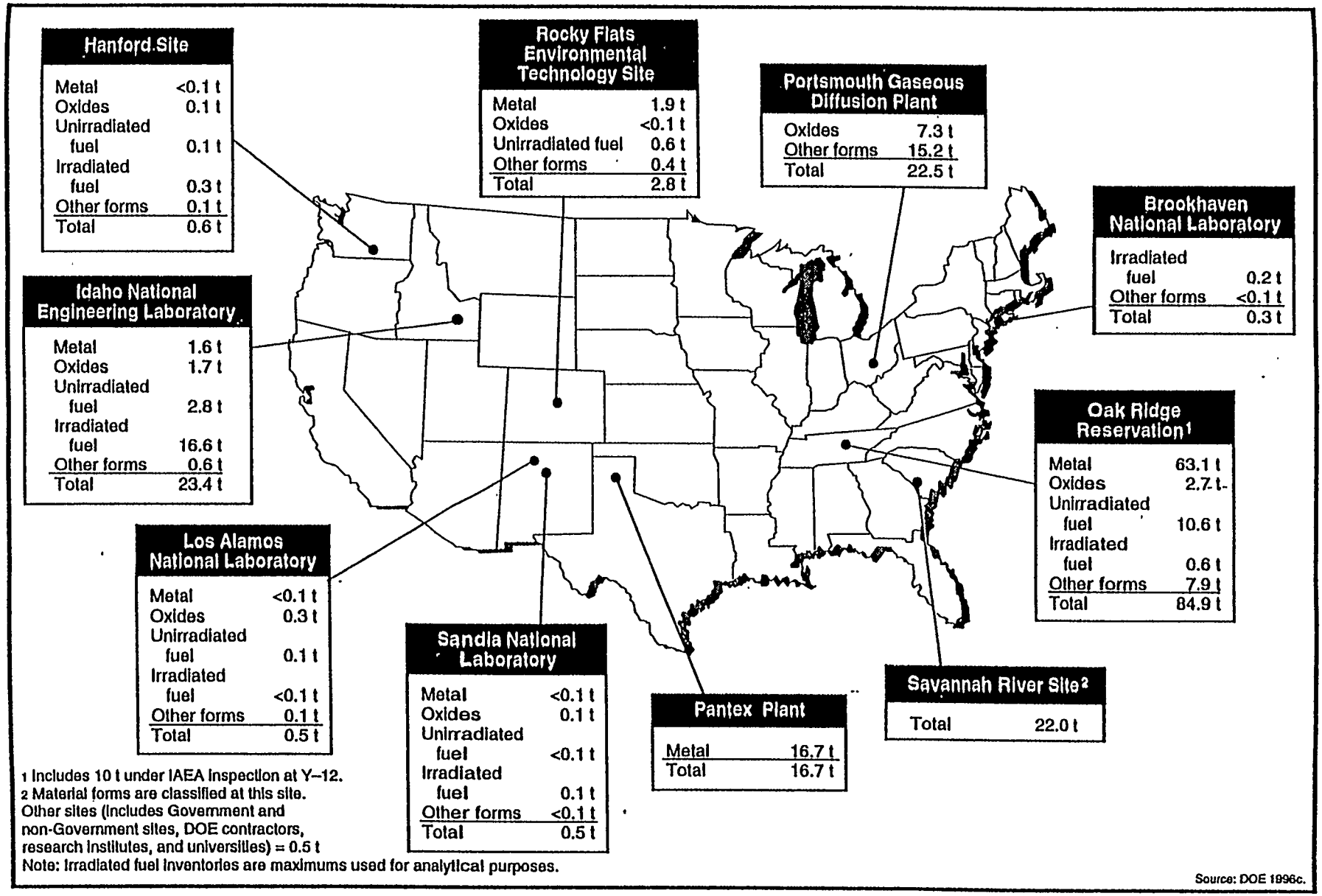
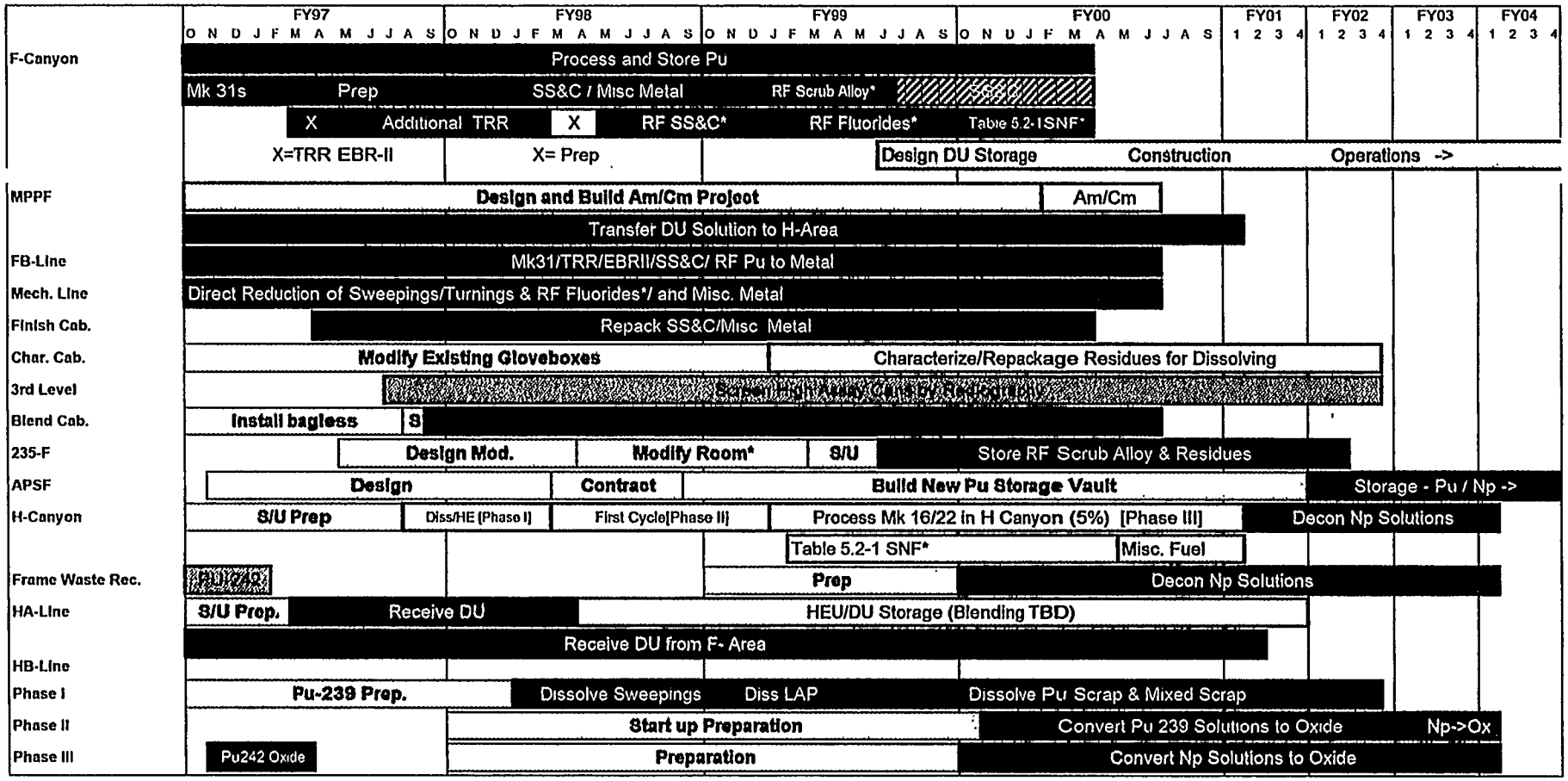


Figure 3.1-1. Locations, forms, and amounts of surplus highly enriched uranium, as of February 6, 1996.

SRS Material Stabilization Phased Canyon Strategy

with F-Canyon Purex Through March 2000 (Includes Existing RF SSC, Scrub Alloy, Fluorides, and Table 5.2-1 SNF)



* Note: NEPA decision required

Figure 3.1-2. Savannah River Two Canyon operations 10-year plan.

CPP-651 is the primary facility for managing inactive HEU at the INEEL. CPP-651 (see Figure 3.1-3) was originally designed for storage of unirradiated fuel materials brought to the ICPP for custom processing. Capacity was later increased to include interim storage of the UO_3 product from ICPP processing operations. As shown in Figure 3.1-4, CPP-651 is a two-compartment inner-vault building approximately 42 feet wide by 45 feet long, surrounded by a reinforced concrete outer shell. The inner vault building is divided into two separate areas—the north and south vaults. Each vault is accessible from the receiving area only. Material in approved shipping or storage packages may be stored by transport index in the North Vault. The North Vault storage area is 25 feet long and 19 feet wide. The South Vault is used to store a wide variety of fissile materials. The outer shell provides a 20 foot wide interior receiving area on the west end for use in receiving and preparing material shipments. Additional storage for ICPP product containers is in storage wells located in the annulus between the facility outer walls and the North and South Vaults. The annulus has 100 storage wells and each well can hold seven containers in a linear array. Shipping and storage packages may also be stored in the north annulus above the storage wells.

The CPP-651 storage facility is not a processing facility, but related repackaging and inspection operations do occur within the facility. Some fuel elements, bundles, and packaged materials are stored in specially designed racks or cabinets that provide geometrically favorable constraints and/or nuclear poison. Other materials are maintained in approved storage packages, principally DOT- or DOE-approved shipping packages. Fuel categories presently approved for storage in the unirradiated fuel storage facility are designated in Table 2.3-1. CPP-651 has a safety limit of 1,500 kg ^{235}U in the south vault and 1,500 kg ^{235}U in the north vault. The actual CPP-651 capacity is physically dependent upon the fuel package configuration; the available space may be filled to capacity before the kilogram limit is reached.

The other two SNM storage locations at ICPP include CPP-603 and CPP-749. The Irradiated Fuel Storage Facility (IFSF) is a nuclear fuel storage facility located in the Fuel Receiving Storage Facility (CPP-603) at the Idaho Chemical Processing Plant (ICPP). The IFSF was constructed at ICPP to provide safe storage for fuels that are potentially chemically reactive with water or industrially hazardous when exposed to the environment. Initially three graphite-based fuels were approved for storage at IFSF: Rover-type fuels, Peach Bottom Core I, and Fort St. Vrain. Several nongraphite fuels such as BER-II and TRIGA were added to the list of fuels approved for storage in the IFSF. The fuel storage area in IFSF contains the carbon steel storage rack that provides both spacing and support for 636 fuel storage canisters, each of which is 18 inches in diameter and 11 feet long. The Dry Fuel Storage Facility (CPP-749) provides storage for chemically reactive fuels that require long term storage and cannot be stored in the CPP-603 basin water. The underground fuel storage area is located within the confines of the ICPP security fence and north of CPP-603, the fuel basin. The storage area covers an area approximately 400 feet by 600 feet. Within that area are underground storage vaults for Peach Bottom fuel and Fermi I Blanket fuel. The vaults are approximately 20 feet deep by 30 inches in diameter. The storage vaults are sealed for containment, security, and inventory control of the spent fuel by welding a steel plate on the top of each vault.

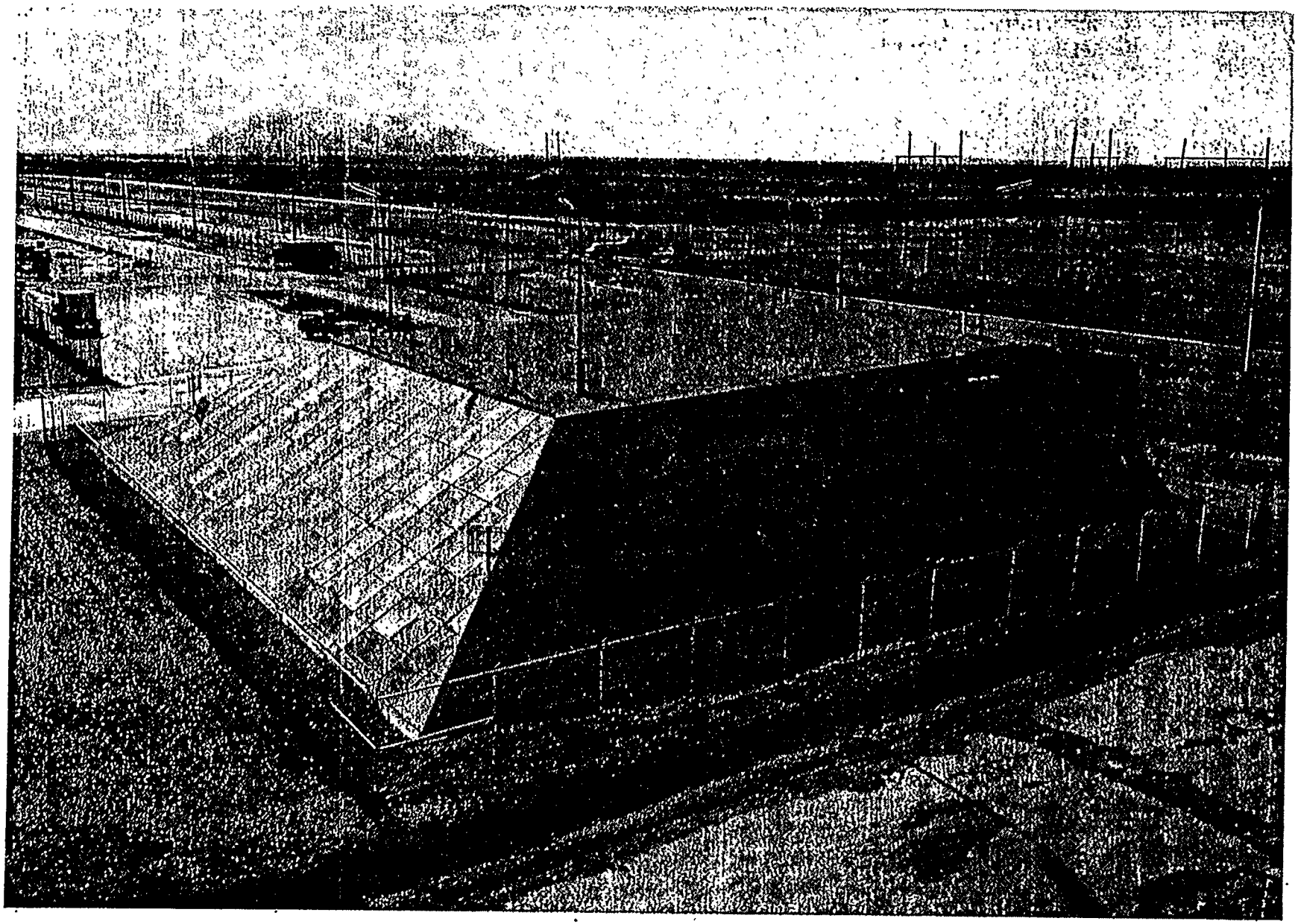


Figure 3.1-3. CPP-651.

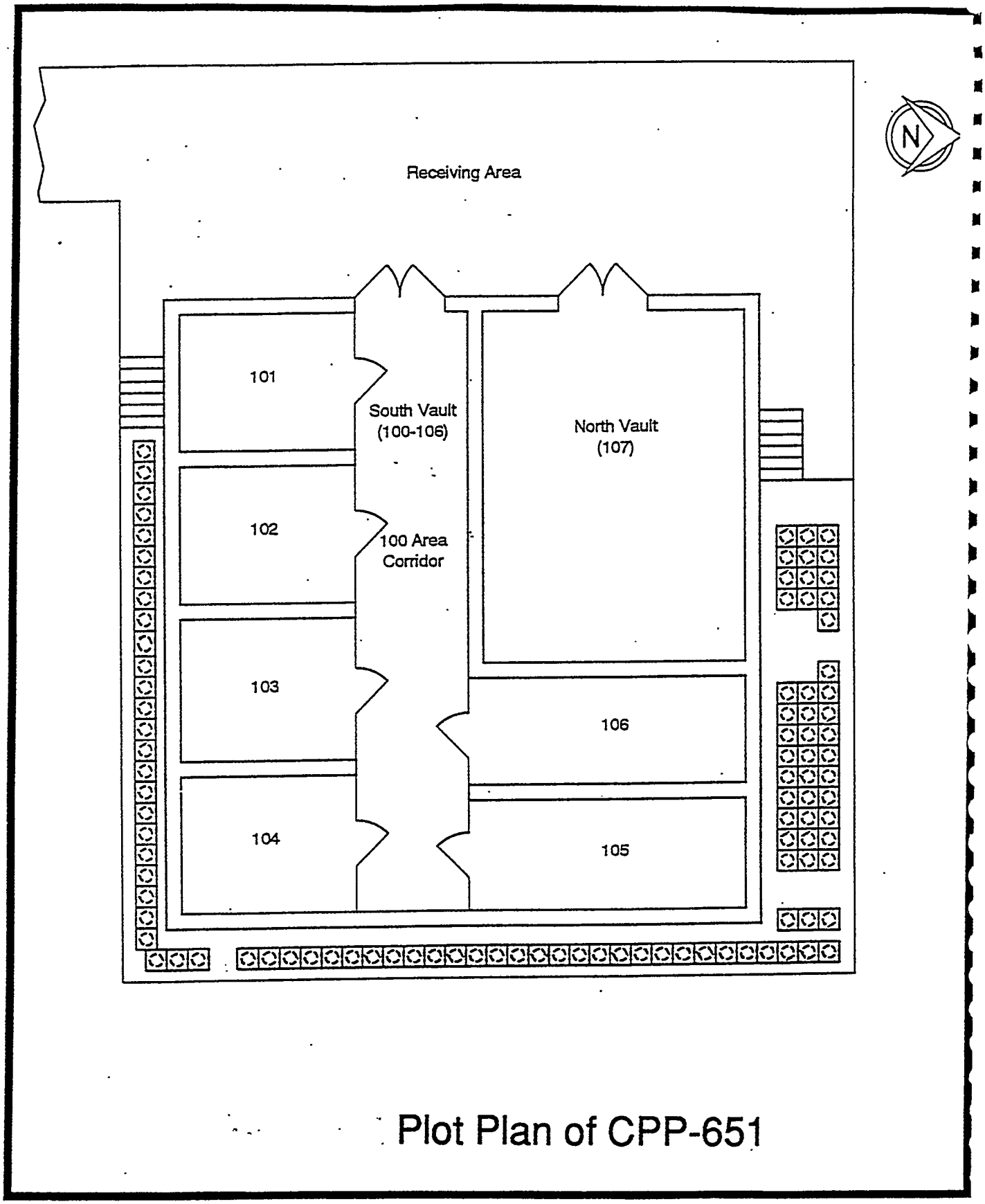


Figure 3.1-4. Plot plan of CPP-651.

3.1.3 CPP-651 Material Management and Categorization

DP has mandated this facility be empty by 2006 and will be secured in stable standby condition. The unused capacity of CPP-651 is available for new missions. The LMITCO *Materials Management Plan* addresses plans in place to remove all nuclear material from CPP-651. Table 1.1-1 shows the base case schedule for SNM removal by 2006.

Materials in CPP-651 are categorized in the MMP by disposition status. In this study, a subset of these materials were further categorized as being a problem or difficult. Each of these are summarized in the following sections.

3.1.3.1 MMP Categorization. Nuclear materials at the INEEL exist in many forms and varying quantities. Each type of material in CPP-651 is handled and stored under specifically approved criteria. Stored materials include fluorinel, PWR, Rocky Flats scrap, ANL scrap, LANL scrap, ICPP denitrator product and product samples, uranium solutions, and miscellaneous fissile material stored in drums. The complete inventory is given in Table 2.3-1.

Material located in CPP-651 is categorized as inactive and has been divided into three management subcategories according to proposed disposition paths and options.

- *Potential Programmatic Use* is material with an optional program need and is being held in reserve pending the outcome of departmental decisions.

- *Negotiated* refers to surplus material that can be transferred to another location, has been listed on a scrap declaration, and has been accepted by the CSMO. In most cases the receiver has been identified or a contract will be bid. Schedules and packaging requirements are either known or being developed.

- *To Be Negotiated* consists of surplus material that has not yet been submitted to the CSMO, or material that has not been accepted for transfer pending resolution of issues.

Material categorization in the MMP was done in order to identify current status of the path forward, while maintaining focus on ultimate disposition of materials. Each kind of material was analyzed individually to determine general information and any issues relative to shipment. Based on the above assumptions, the preferred baseline option for each material type was established to be simply repackage and ship to appropriate site if possible.

3.1.3.2 Material Management. Material that had *potential programmatic use* was not addressed in this report. Fluorinel/PWR material is listed as negotiated but was still included in our list because it has a packaging issue to resolve. All *to be negotiated* material and the fluorinel/PWR were the HEU inventory items in CPP-651 that do not have a complete and funded disposition plan to another site. These 10 materials are fluorinel/PWR, University of Washington and University of Wisconsin, GEFAST, custom product, Janus, Vycor glass, ANL-W, ANL-E, Rocky Flats, and denitrator product. Table 3.1-1 summarizes each material, the initial shipping barriers identified in Phase I and the current status as far as resolution of barriers and proposed receivers per the baseline option.

3.2 Base Case Planning

3.2.1 Phase II Planning

The primary goal of Phase II was to plan and schedule the sequence of material removal activities and take into account not only the schedule of each individual activity, but the potential impact that the activity schedule can have on the material removal schedule as a whole. The Phase II activities focused on identifying and integrating the resources and costs associated with removal of the material from CPP-651. The planning portion consisted of the following main activities:

- Establish project objectives and scope of work
- Delineate project organization/team
- Define the work
- Determine the timing/sequence
- Establish resource requirements/availability
- Establish a cost budget
- Evaluate/analyze the schedule
- List alternatives for shortening schedule.

Define and create a target schedule.

Primavera Project Planner software was used to create the basic material removal schedule with activities, resources, and cost account structure. The planning portion of the Primavera Project Planner software is used to define and coordinate specific activities and work tasks, prepare work schedules, assign and allocate resources to competing activities, and develop an acceptable budget. The Primavera Project Planner software can also be used to:

- Track work in progress and actual costs
- Compare schedule and cost data to baseline
- Use the baseline to guide your decision
- Update and modify the current project with realistic data
- Analyze and evaluate performance
- Recommend action and re-forecast
- Communicate project goals.

Table 3.1-1. Material types and issues.

		Shipping Barriers					
Item	Material	Information	Packaging	Product	Receiver	Composition/ Form	Current Status
1a	PWR Plates					ceramic uranium-zirconium fuel plates	The cut pieces of fuel that are contaminated will be bagged and sealed and then placed within an aluminum container prior to being placed within the 2R inner container. This procedure will eliminate the packaging barrier.
1b	PWR Assembly					ceramic uranium-zirconium subassembly	Upon issuance of a "certificate to ship" from Bettis, the PWR assembly can be shipped, as an intact fuel element, in its existing box as long as it is the only item on the truck. This procedure will eliminate the packaging barrier.
2	Fluorinel					zirconium clad fuels	The Fluorinel fuel pieces that are extra long will be placed in a 72 inch long 2R container which will then fit inside a 110 gallon 6M drum. The use of a longer but narrower 2R container and DOT-6M 110 drum eliminates the packaging barrier.
3	Univ. of Wash.					Aluminum fuel	The calculations showed that the slightly irradiated material does not meet the Y-12 acceptance criteria. Both the unirradiated and irradiated Univ. of Wash. material will be sent to SRS. Information collection is complete.
4	Univ. of Wisc.					Aluminum fuel plates	No barriers. Paperwork in progress to send to Y-12.
5	Custom					Uranium Oxide	The four oversized cans will be repackaged and shipped in DC-1 shipping containers. These larger inside diameter drums will eliminate the packaging barrier.
6	GEFAST					Zirconium & Uranium Oxide	The oversized can contains less than 350 grams of uranium and therefore can be shipped in a larger diameter 35 gallon DOT UN1A2 shipping drum. This eliminates the packaging barrier.
7	Janus					Stainless steel clad uranium foils	Based on which assumptions are used, the calculations showed that the slightly irradiated material may or may not meet the Y-12 acceptance criteria. Since there is no metallurgical bonding the material will be sent to ANL-W.
8	VYCOR Glass					Metal & oxide in broken glass molds	The VYCOR glass will be sent to ANL-W to separate the HEU from the broken glass. They can process this material in its current form which eliminates our barriers.
9	ANL-W					Scrap metal and oxide	No barriers. Paperwork in progress to send to Y-12.
10	ANL-E					Scrap metal and oxide	The ANL-E material along with the characterization data will be sent to ANL-W. Information collection is complete.
11	Rocky Flats					Uranium Oxide with .2% Plutonium	Since there will only be 15 drums with a total of 30 cans of material, SRS will accept this material as soon as they are able to provide some vault space. This eliminates our barriers.
12	Denitrator					Uranium Oxide	This material will be dry blended so that it can be shipped or stored somewhere else as LEU until SRS has available vault space. At that time the material will be shipped "as is" in DC-1 shipping containers. This eliminates our barriers.
			Shaded area denotes a shipping barrier				

3.2.2 Resources, Costs, and Schedule

The tasks or operations associated with removing each material from CPP-651 were grouped into three main functional areas—Receiver Process, Conditioning Process, and Packaging/Transportation Process. Team members were assigned to these three functional areas based on their areas of expertise. Each team resolved the issues, defined resources, developed schedules and costs for the functions within their assigned areas, and provided resource data to the master schedule. Durations and man-hours were allocated for each task based on past experience by knowledgeable personnel.

Resource data sheets were developed as a means to define the functions associated with removal of each material and to record the associated resources, duration, and costs. The main functions identified on the data sheet were preparations, conditioning, and shipment. Subcategories under these functions included project definition, procurement, documentation, procedures, plans, training, certification of readiness, operations, material repackaging and product shipment. The personnel resources identified included plant system engineers, facility fuels engineers, design engineers, technical support engineers, criticality safety engineers, safety analysis engineers, environmental engineers, radiological engineers, radiological technicians, quality engineers, quality inspectors, fuel handling foreman, fuel handling operators, analytical laboratory engineers, analytical laboratory technicians, security operations, procedure writers, trainers, transportation coordinators, administrative assistants, crafts foremen, crafts operators, and project managers. Additional costs were included for subcontract labor, equipment, facilities, and materials necessary for completion of the removal project.

3.2.2.1 Receiver Process Team. The receiver process team initiated negotiations with offsite receivers, determined acceptance criteria, discussed inventory issues, and resolved programmatic issues to determine overall programmatic direction. The receiver process team included spent fuel personnel who are familiar with complex-wide capabilities and issues, security personnel who are responsible for controlling and monitoring accountable nuclear material (NM) transfer to, from, and within the INEEL; and operations personnel who are familiar with the procedures and capabilities of CPP-651.

The receiver process team provided offsite receivers with characterization data on the materials in CPP-651 so that shipper/receiver agreements could start to be negotiated. The team determined that as a minimum the shipper/receiver agreements should include the following information: (1) types and forms of material to be shipped, (2) the period of time for which the shipper/receiver agreement will be in effect, (3) how the materials will be prepared and packaged for shipment, (4) documentation to be provided by the shipper prior to, with, and after the shipment, (5) measurement methods to be used by the shipper, (6) measurement methods to be used by the receiver, (7) how limits of error for accountability measurements will be calculated for accountability measurements required by the shipper/receiver agreement, (8) what acceptance/rejection criteria will be used for confirmatory measurements, (9) what documentation will be provided to the shipper by the receiver both after receipt and after measurement of the materials, (10) documentation of any deviations from DOE policy granted in accordance with DOE Order 5630.11A that apply to shipment covered by the agreement, (11) provisions for periodic review of the agreement, and (12) requirements for change control of revisions to the agreement. The receiver may want to make additional transfer checks or measurements beyond those included in the shipper/receiver agreement as a means to provide other checks. Additionally, the shipper/receiver agreements should include an outline of the process to be used for resolution of significant shipper/receiver differences.

Meetings were held with SRS and OR Y-12 to generate an understanding of our HEU storage issues, to discuss overall programmatic goals, and to help develop a spirit of ownership relative to the management of special nuclear material (SNM) throughout the Department of Energy (DOE) complex. Site-specific

receiving and processing issues such as shipper/receiver agreements, onsite observation of characterizations and packaging, measurement requirements, and shipping schedules were discussed. SRS cannot formally respond to a request to receive HEU from ICPP until a conceptual study is completed. The conceptual study would be initiated by a formal request from DOE-ID to DOE-SR. The conceptual study would assess the technical feasibility and allow SRS to develop their procedures, schedules, and costs before formally committing to receive the HEU from ICPP.

3.2.2.2 Conditioning Process Team. The conditioning process team concentrated their effort on developing the processes required to put materials in a form that is acceptable to offsite receivers. The team discussed processing options for the PWR subassembly, the denitrator product, and the Rocky Flats material.

The conditioning team looked at various cutting processes for the C2S2 PWR subassembly. Prior to finalizing the cutting process the team determined that the PWR subassembly could be shipped, as an intact fuel element, in its existing box.

The conditioning team looked at several options for processing the Rocky Flats material such as dissolution, dilution, and dry blending. The Rocky Flats material requires conditioning because it does not meet the criteria for Y-12 acceptance due to the plutonium content. The conditioning team developed flowsheets and costs for the following Rocky Flats material processing options:

- Send as-is, in DOT-6M drums
- Dissolve, dilute, extract, and send as liquid using RAL
- Dissolve, dilute, extract, and send as liquid using a new process facility
- Dry blend in the North Vault of CPP-651 using a new glovebox within a new containment structure that includes a ventilation and filter system.

The flowsheets and the associated cost and schedule data are in Appendix A.

The conditioning team also looked at several options for processing the denitrator product such as dissolution, dilution, and dry blending. The denitrator product requires conditioning because it does not meet the criteria for Y-12 acceptance due to the high ^{232}U content. Radiation levels have grown in since extraction and have created a handling issue of worker exposure.

The conditioning team developed flowsheets and costs for the following denitrator product processing options:

- Send as-is, in larger diameter drums
- Dry blend in the North Vault of CPP-651 using a new glovebox within a new containment structure that includes a ventilation and filter system
- Dissolve, dilute, and send as liquid using CPP-601 and CPP-627
- Dissolve, dilute, and send as liquid using a new process facility

- Repackage into smaller containers and then ship in DOT-6M drums.

The flowsheets and associated costs and durations for each of these options are included in Appendix A of this report.

Milling and blending is one of the proposed options for diluting the denitrator product to less than 20% enrichment. This dilution will convert the HEU to LEU and eliminate the need to store the material in a vault while waiting at SRS for aqueous processing. Safety and security issues exist that must be addressed prior to accepting dry blending as an interim storage form. The main concern is from a proliferation standpoint. An expert analysis was performed of the relative difficulty of separating the HEU from the blended product. The details of the test and the results of the analysis are discussed in Appendix B. In general, these results look very promising and no show stopper issues were identified.

3.2.2.3 Packaging and Transportation Team. The packaging and transportation team obtained characterization data and identified resources that were required for packaging and transportation of the material in CPP-651. They provided interpretation of regulatory information and requirements pertinent to the packaging and transportation of materials to and from the INEEL. Members of the P&T team have experience with transporting radioactive materials. They have consulted with programs to identify requirements for shipment; assisted in locating the appropriate containers required to ship, identify and contract a transport company to meet requirements of the shipment; ensured packages are transported without damage and delivered to the appropriate locations; managed records to track the shipment; and developed transportation plans. They typically determine the mode of transportation based upon size, weight, cost, destination, and specific regulatory requirements.

During Phase II the P&T team researched available packaging containers and requirements and details of packaging containers of currently stored material. P&T has access to shipping containers located at other DOE laboratories and in radioactive materials packagings (RAMPAC), which is a storage and retrieval database of shipping packaging certified for the transport of radioactive materials. Shipping containers listed in the database are certified by the U.S. Nuclear Regulatory Commission (NRC) and DOE. RAMPAC is the only tool available to radioactive material shippers that contains and reports packaging information from all three U.S. agencies (DOE, NRC, DOT) and the international Atomic Energy Agency (IAEA). RAMPAC contains information on over 2,000 radioactive material shipping containers.

3.2.3 Integration Process

The goal of integrating the various options was to take a systems approach and attempt to optimize the overall plan. By examining the most difficult, highest risk issues first, a plan evolved to leverage options selected for more difficult problems. This process was iterative and was based on judgments about relative difficulties and risks with each material.

Clearly the most difficult problem is the denitrator product because of volume, radiation level, and the size of the product cans (won't fit into a 6-M drum). This material is also complicated in that it is off-spec HEU (high in ^{232}U and ^{236}U) and must be sent to an off-spec HEU dilution site such as SRS. The team felt that there would be significant schedule risk if it were planned to send this material as HEU to SRS. Radiation levels may cause an acceptance issue, but more importantly, the HEU shipment would be dependent on SRS starting their HEU blending process and creating storage space in their vault. At best, they could receive material starting in 2002, but it could be as late as 2006 or 2007 as it is currently an unfunded part of their HEU dilution program. By establishing a repackaging capability that includes

milling and dry blending with DU, it is possible to down blend material to LEU, reduce radiation levels, and ensure internal packages are acceptable to SRS. Material could then be shipped to SRS as soon as ICPP is ready to ship. Thus, the schedule risk is under direct control of ICPP management. Furthermore, if for some reason an off-spec HEU dilution site cannot receive this inventory in the next 10 years, it would still be removed from the CPP-651 vault and stored in a warehouse because it would no longer be HEU. Other materials needing repackaging due to container size can also be included in this campaign such as the custom product samples.

Rocky Flats material is the next biggest problem due to the volume and difficulty associated with plutonium. Initially, the team felt that the best plan would be to down blend Rocky Flats material by dissolution and dilution so that it could also be shipped to SRS for off-spec blending. However, the plutonium contamination (1 to 2 grams of Pu per 1,000 grams of U) eliminated it from being a good candidate for the dry blending process. Thus, it was concluded that the best option was to send this as HEU to SRS where it would become part of the HEU off-spec dilution program. Shipment to SRS is a possibility because of sufficient storage space and the Pu would be removed prior to blending with the DU. The backup option is to dissolve the material in RAL and remove the Pu and ship liquid uranium nitrate to Oak Ridge for conversion to uranium oxide. The RAL facility is capable of processing and handling this volume of material in their hot cell which minimizes cost. A batch-wise process would be established to avoid exceeding any critical mass processing issues.

Y-12 and SRS will not accept the Vycor glass containing HEU. Thus, it is necessary to separate the metal from the glass before it would be accepted. The only viable option other than wet lab-scale processing at the ICPP is to send this material to ANL-W and fund implementation of their magnetic separation process. Working with ANL-W opens the door for them to potentially receive some other low volume, but difficult to place, materials such as the ANL-E explosion scrap and the Janus material.

Utilization of other ICPP dry storage facilities such as CPP-603 IFSF and CPP-749 simply to expedite the removal of SNM from the vault was considered, but programmatic and security issues eliminated this idea from further consideration.

3.3 Base Case Materials Management Options

Sections 3.3.1 through 3.3.12 list the DP-owned, CPP-651 HEU materials that have no complete disposition plan. A description of material is included with proposed options, estimated cost and schedule, disposition barriers, and a brief description of selected priorities. See Appendix A for detailed calculations of costs and schedules.

3.3.1 PWR

3.3.1.1 PWR Plates.

Material Description—Pressurized water reactor (PWR) fuel is a ternary oxide fuel consisting of a calcia-stabilized (ceramic) uranium-zirconium material (UO_2-ZrO_2-CaO), clad in Zircalloy. There are a total of 905 PWR plates. 854 plates are PWR Core 2, Seed 1 type fuel, and 51 plates are PWR Core 2, Seed 2 type fuel. All plates are cut and have smearable contamination ranging from < 10 dpm/cm^2 μ on the PWR Core 2 Seed 1 fuel to 250 dpm/100cm^2 μ on the PWR Core 2 Seed 2 fuel. The PWR Core 2 Seed 2 plates are currently stored in three 6M drums. The PWR Core 2 Seed 1 plates are currently stored in six SPERT boxes.

Issues—A shipping schedule cannot be finalized for this material until the contractor for the reprocessing facility has been selected and receipt criteria established. The accuracy and validations of the accountability measurements required by the receiver will be a key factor in the negotiated schedule. Negotiations with the designated contractor will commence as soon as directed by CSMO.

Packaging—The proposed plan is to repackage the 905 PWR fuel plates into 44 certified 85-gallon DOT 6M drums. The PWR Core 2 Seed 1 plates and the PWR Core 2 Seed 2 plates will be separated into 44 bundles of between 13 to 21 pieces, assayed, and bagged in polyethylene sleeve sealed with duct tape. Each of the 44 bundles will be placed in an aluminum can that is sealed with duct tape. Silicone rubber impact absorbers will be positioned in the bottom and top of each shipping drum 2R inner container to center the aluminum can and provide cushioning for the fuel. The aluminum can is placed in the 2R container so that it rests on top of the silicone rubber impact absorbers. Silicone rubber impact absorbers are added on top of the can up to the top of the 2R container. The 2R container is closed and then placed in the 85-gallon drum which is then sealed for shipping.

Disposition—The 44 certified 85-gallon DOT 6M drums loaded with PWR fuel will be shipped to a designated contractor when a contract has been awarded by the CSMO.

Base Case Cost and Duration—A firm schedule will be developed with the contractor once the selection of the contractor has been made. Preliminary estimates indicate that it will take approximately 1½ years for planning and preparations, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $182.3K Duration: 1½ years

Priority/Justification—This material was submitted and approved by CSMO under Scrap Declaration ID-93-04. Since the original submittal, additional material that was held for potential programmatic use (PPU) has been added to this declaration. In the near future, that declaration number will be canceled and the PWR materials will be put on a FY 1998 scrap declaration number and remaining fluorinel items will also be declared separately. This is being done at the request of the CSMO.

Assumptions

- The packaging plan is acceptable—the material will not need to be separated and/or resorted by type prior to repackaging
- The certified 85-gallon DOT-6M drums are acceptable.

3.3.1.2 PWR Subassembly

Material Description—Pressurized water reactor (PWR) fuel is a ternary oxide fuel consisting of a calcia-stabilized (ceramic) uranium-zirconium material (UO_2-ZrO_2-CaO), clad in Zircalloy. The fuel is a PWR Core 2 Seed 2 subassembly. The subassembly is approximately 105 inches long and is currently stored in a metal box.

Issues—The PWR C2S2 fuel subassembly is too long for available drums. A shipping schedule cannot be finalized for this material until the contractor for the reprocessing facility has been selected and receipt criteria established. Negotiations with the designated contractor will commence as soon as practical for criteria identification.

Packaging—The safety analysis states that the design of the PWR subassembly is inherently safe. Upon issuance of a certificate to ship from Bettis, the PWR subassembly can be shipped, as an intact fuel element, in its existing box. The only criteria is that it is the only item loaded on the truck.

Disposition—The PWR Subassembly will be shipped in its current box to a designated contractor when a contract has been awarded by the CSMO.

Base Case Cost and Duration—A firm schedule will be developed with the contractor once the selection of the contractor has been made. Preliminary estimates indicate that it will take approximately eight months for planning and preparations, inventory, and shipment of the assembly. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $66.3K Duration: 8 months

Priority/Justification—This material was submitted and approved by CSMO under Scrap Declaration ID-93-04. Since the original submittal, additional material that was held for potential programmatic use (PPU) has been added to this declaration. In the near future, that declaration number will be canceled and the PWR materials will be put on a FY 1998 scrap declaration number and remaining fluorinel items will also be declared separately. This is being done at the request of CSMO.

Assumption

- The packaging plan is acceptable—the material can be shipped as is in its existing container.

3.3.2 Fluorinel

Material Description—Fluorinel material is zirconium-clad fuel of various compositions. These materials were intended to be used for research and development (R&D) as part of the prototype work on the new Fluorinel Dissolution Process for zirconium fuels. Fluorinel is an acronym for fluoride dissolution at the INEEL. Fluorinel scrap is currently stored in drums and cabinets in CPP-651.

Issues—Several pieces of fluorinel material are too long for the typical 6M drums used at ICPP. A shipping schedule cannot be finalized for this material until the contractor for the reprocessing facility has been selected and receipt criteria established. The accuracy and validations of the accountability measurements required by the receiver will be a key factor in the negotiated schedule. Negotiations with the designated contractor will commence as soon as practical for criteria identification

Packaging—The proposed plan is to repackage the fluorinel fuel into 21 110-gallon, DOT-6M shipping packages with a 72-inch long 2R inner container; five 110-gallon, DOT-6M shipping packages with a 58-inch long 2R inner container; four 55-gallon, DOT-6M shipping packages with a 23-inch long 2R inner container; and 60 85-gallon, DOT-6M shipping packages with a 43-inch long 2R inner container.

Disposition—The certified 110-, 85-, and 55-gallon DOT 6M drums loaded with fluorinel fuel will be shipped to a designated contractor when a contract has been awarded by the CSMO.

Base Case Cost and Duration—A firm schedule will be developed with the contractor once the selection of the contractor has been made. Preliminary estimates indicate that it will take approximately 1½ years for planning and preparation, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $546K Duration: 1½ years

Justification/Other—This material was submitted and approved by CSMO under Scrap Declaration ID-93-04. Since the original submittal, additional material that was held for potential programmatic use (PPU) has been added to this declaration. In the near future, that declaration number will be canceled and the fluorinel material will be put on a FY 1998 scrap declaration number. The remaining PWR items will also be declared separately. This is being done at the request of the CSMO.

Assumptions

- The packaging plan is acceptable—the material will not need to be separated and/or resorted by type prior to repackaging
- The certified 110-, 85-, and 55-gallon DOT-6M drums are acceptable.

3.3.3 University of Washington

Material Description—The University of Washington fuel is in an aluminum alloy form with an argonaut core and aluminum cladding. The fuel consists of 30 plates and one can containing cut fuel pieces and scraps. The plates are uncut and free of surface contamination. Eleven of the fuel plates are unirradiated and the remaining 19 are slightly irradiated. The slightly irradiated fuel plates contain quantities of plutonium.

Issues—The 19 slightly irradiated fuel elements contain concentrations of Pu-239 and Pu-240 in the milligram range. The irradiated fuel elements do not meet the alpha activity hazard ratio criteria or the gamma activity criteria and therefore would not meet the acceptance criteria for highly enriched fuels into the Y-12 plant.

Packaging—The proposed plan is to repackage the University of Washington fuel (both irradiated and unirradiated) into one certified 85-gallon DOT-6M drum.

Disposition—The one certified 85-gallon DOT-6M drum will be sent to Savannah River for off-spec blending.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately four months for planning and preparation, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $40.3K Duration: 4 months

Priority/Justification—Scrap Declaration ID-94-03 has been submitted for this material. The irradiated material has been rejected by CSMO and therefore will not be sent to Oak Ridge, Y-12 Plant.

Assumptions

- The Y-12 plant will not accept the irradiated material
- Savannah River will accept both the unirradiated and irradiated material

- The packaging plan is acceptable—the material will not need to be separated and/or resorted by type prior to repackaging

- The certified 85-gallon DOT-6M drum is acceptable.

3.3.4 University of Wisconsin

Material Description—The University of Wisconsin is MTR-type fuel manufactured by General Electric. The fuel consists of 10 plates made in an aluminum alloy form with aluminum cladding. The plates are uncut and free of surface contamination.

Issues—None. The only reason this material has not been shipped is because it is on the same scrap declaration as the University of Washington fuel.

Packaging—The proposed plan is to repackage the University of Wisconsin fuel into one certified 85-gallon DOT-6M drum.

Disposition—The one certified 85-gallon DOT-6M drum will be sent to the Oak Ridge Y-12 plant.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately four months for planning and preparations, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $43.2K Duration: 4 months

Priority/Justification—Scrap Declaration ID-94-03 has been submitted for this material. Once this material has been accepted under a scrap declaration, it can be shipped in one certified 85-gallon DOT-6M drum to Y-12 for potential processing and/or storage. Shipment will be coordinated with the custom product and GEFAST.

Assumptions

- The Y-12 plant will accept this material

- The packaging plan is acceptable

- The certified 85-gallon DOT-6M drum is acceptable.

3.3.5 Custom Product

Material Description—The custom product is uranium trioxide (UO_3) powder, a high grade uranium oxide product obtained from reprocessing SNF at ICPP. The powder is contained in 18 cans and four bottles.

Issues—Four bottles of this material do not fit in the typical 2R inner containers for DOT-6M drums. The accuracy and validation of the accountability measurements required by the receiver will be a key factor in the negotiated schedule.

Packaging—The proposed plan is to repackage the 18 cans of custom product into nine certified 55-gallon DOT-6M drums and to repackage the four bottles of custom product into four certified DC-1 shipping packages.

Disposition—The nine certified 55-gallon DOT-6M drums and the four certified DC-1 shipping packages containing the custom product will be sent to the Oak Ridge Y-12 plant.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately four months for planning and preparations, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $76.4K Duration: 4 months

Priority/Justification—This material has been accepted by CSMO under scrap declaration ID-97-07. Shipment will be coordinated with the GEFAST and University of Wisconsin materials.

Assumptions

- The Y-12 plant will accept the nine DOT-6M drums and the four DC-1 shipping packages of material
- The packaging plan is acceptable
- The certified 55-gallon DOT-6M drums and the certified DC-1 drums are acceptable.

3.3.6 GEFAST

Material Description—GEFAST consists of five containers of zirconium oxide and uranium oxide powder. Four of the containers are made of stainless steel pipe 4.5" outside diameter with a 5" bolted flange opening at the top. The fifth container is a large metal can 8" in diameter and 10" tall.

Issues—Scrap Declaration ID-94-03 has been submitted. A firm shipping schedule can be determined for this material once it is accepted under Scrap Declaration ID-94-03.

Packaging—The proposed plan is to ship the four smaller, stainless steel containers in four 55-gallon DOT-6M drums and to ship the single, large metal can in one 35-gallon DOT UN1A2 drum.

Disposition—The five drums containing GEFAST will be sent to the Oak Ridge Y-12 plant. This transfer is expected to be coordinated with the custom product and University of Wisconsin materials.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately five months for planning and preparations, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $63.4K Duration: 5 months

Priority/Justification—Before a shipping schedule can be finalized, this material must be negotiated under a scrap declaration. Shipment will be coordinated with the custom product and University of Wisconsin materials.

Assumptions

- The Y-12 plant will accept this material
- The packaging plan is acceptable
- The certified 55-gallon DOT-6M drums and the 35-gallon DOT UN1A2 drum are acceptable.

3.3.7 Janus

Material Description—Janus is stainless steel-clad enriched uranium foils, known as Janus Reactor High Flux Converter Foils. The stainless steel is not metallurgically bonded to the uranium and should separate rather easily. This material has been slightly irradiated in the Janus Reactor. There are 34 foils with standardized dimensions of 39 inches long, 4 inches wide, and 0.037 inch thick (0.021 inch of uranium and 0.08 inch of cladding). The 34 foils are contained in three 6M drums.

Issues—Janus was previously rejected by the CSMO because the radiation level was too high (5 R per hour). Additional inspections were completed in September 1996. The drum inspected indicated 180 mR beta and 60 mR gamma. Additional analysis appears to indicate that the slightly irradiated JANUS fuel plates meet all the Y-12, acceptance criteria depending on which burnup basis is used in the calculations. The analysis has been sent to Y-12 for review and comment. If the material is acceptable to Y-12, then the scrap declaration will be resubmitted to Y-12. If the scrap declaration is rejected, the material could be sent to Argonne West pending DP's concurrence. If material is sent to ANL-W, DP would still own the material and may need to pay ANL-W for storage and/or processing/stabilization.

Packaging—Janus can be shipped in three, 110-gallon DOT-6M drums.

Disposition—The three drums containing Janus will be sent to the Oak Ridge Y-12 plant assuming that the plates meet Y-12's acceptance criteria. If the material does not meet their acceptance criteria, then the material will be sent to ANL-W.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately four months to complete preparations, transfer documentation, inventory of material, and shipment to ANL-W. The material will not have to be repackaged if it is sent to ANL-W because it can be shipped in the drums that it is currently stored in. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $46.3K Duration: 4 months

Priority/Justification—A scrap declaration has been submitted for this material. Once this material has been accepted under a scrap declaration, it can be shipped to Y-12 for potential processing and/or storage. If the material is not accepted under the scrap declaration, it will be sent to ANL-W for potential processing and/or storage. If the material is sent to ANL-W it will still be owned by DP. Funds may need to be provided to ANL-W for storage and/or processing/stabilization.

Assumptions

- Argonne West will accept the three drums of material if it is rejected by Y-12
- The Y-12 plant will accept the three drums of material

- The packaging plan is acceptable
- The certified 110-gallon DOT-6M drums are acceptable for shipment to Y-12
- The noncertified 110-gallon DOT-6M drums are acceptable to send as is on the back roads to ANL-W.

3.3.8 Vycor Glass

Material Description—This material is broken pieces of glass molds used to manufacture fuel at ANL-W. The glass pieces retain small amounts of the fuel that was being molded. The glass must be processed to remove the small amount of uranium.

Issues—This material has been rejected by CSMO because it is glass. This material does not meet the security termination criteria and therefore cannot be written off the books as waste.

Packaging—The Vycor Glass will not be repackaged; it will be shipped in the drums where it is currently stored.

Disposition—Send to ANL-W for dry processing through their magnetic separator. After separation of the uranium from the glass, ANL-W will be responsible for sending the uranium to Y-12 and for disposing the glass.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately six months to complete preparations, transfer documentation, inventory of material, and shipment to ANL-W. The material will not have to be repackaged if it is sent to ANL-W because it can be shipped in the drums that it is currently stored in. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $578.8K Duration: 6 months

Priority/Justification—ANL-W has approximately 40 cans of Vycor glass, as compared to our 400 cans. ANL-W has not found a way to acceptably dispose their material. They stated that their only option was to dry process to separate uranium from glass. ANL-W has purchased a magnetic separator, but would need funding to help design, set up, test, and operate equipment. If material is sent to ANL-W, DP would still own the material and may need to pay ANL-W for storage and/or processing/stabilization.

Assumptions

- The Argonne West plant will accept the ten drums of material
- The packaging plan is acceptable
- The noncertified 17H drums are acceptable to send as is on the back roads to ANL-W.

3.3.9 ANL-W

Material Description—ANL-W material consists of 48 cans of EBR-II scrap metal and oxide.

Issues—Reevaluation of the characterization of the material has been performed with ANL-W and it has been determined that this material is from the same source as the other ANL-W Miscellaneous (EBR-II) material currently stored in CPP-651. This other ANL-W material has been accepted by the CSMO under scrap declaration ID-93-17. The scrap declaration will be revised to add the additional cans.

Packaging—This material will be divided into two shipments. Twenty eight of the cans will be packaged in 13 55-gallon, certified DOT-6M drums and shipped to the Y-12 plant in FY 1998. The remaining 20 cans will be packaged in approximately 10 55-gallon, certified DOT-6M drums and shipped to the Y-12 plant at a later date.

Disposition— Once this material has been accepted under a scrap declaration it will be sent to the Y-12 plant.

Base Case Cost and Duration — Preliminary estimates indicate that it will take approximately five months for planning and preparations, repackaging, and shipment of all items. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $76.4K Duration: 5 months

Priority/Justification—Before a shipping schedule can be finalized, this material must be negotiated under a scrap declaration. Shipment will be coordinated with the Custom product, GEFAST, and University of Wisconsin materials.

Assumptions

- The Y-12 plant will accept this material
- The packaging plan is acceptable
- The certified 55-gallon DOT-6M drums are acceptable.

3.3.10 ANL-E Miscellaneous

Material Description—ANL-E Miscellaneous is comprised of hot cell experimental scrap collected following the custom processing explosion.

Issues—Argonne stated that they could potentially process this material in their electrorefiner. They currently lack NEPA approval to do this. They are committed to process certain material through their electrorefiner for the next two years. The earliest that they could process this material (assuming they could get NEPA approval) would be in 2000. They have vault space to store this material; therefore it could be sent to them prior to 2000. If material is sent to ANL-W, DP would still own it and may need to pay ANL-W for storage and/or processing/stabilization.

Packaging—The ANL-E material will be repackaged into two, 55-gallon DOT-6M drums and shipped to ANL-W.

Disposition—Once the data package is complete, the material will be shipped in two 55-gallon, DOT-6M drums to ANL-W for processing through their electorefiner. The recovered uranium will then be sent to the Y-12 plant.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately four months to complete preparations, transfer documentation, inventory material, and ship to ANL-W. The material will not have to be repackaged if it is sent to ANL-W because it can be shipped in the drums that it is currently stored in. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $48.8K Duration: 4 months

Priority/Justification—The material sent to ANL-W will still be owned by DP. Funds may need to be provided to ANL-W for storage and/or processing/stabilization.

Assumptions

- The Argonne West plant will accept the two drums of material.
- The packaging plan is acceptable
- The certified 55-gallon, DOT 6M drums are acceptable.

3.3.11 Rocky Flats

Material Description—Rocky Flats has U_3O_8 powder contaminated with plutonium. This material contains a total of 27 kilograms of uranium and a total of 56 grams of plutonium. There are 30 cans (4 inches in diameter and 9.5 inches tall) of this material and they each contain 1 to 2 grams of plutonium.

Issues—This material has been rejected under Scrap Declaration ID-93-16 due to the plutonium content. In order to send this material to Y-12, the material must be processed to separate the plutonium from the uranium oxide. Returning this material to Rocky Flats is not a viable option because they have no processing capabilities. Savannah River (SRS) is capable of taking it, but since it is HEU, it would need to be stored in a vault until their canyon operation is ready to process this material. SRS has very little vault space available until 2001 when they are planning to operate both of their canyons, or until 2005 if only one canyon is allowed to operate.

Note—The ship-as-is option was selected for the base case scenario. See Appendix A for costs and duration of the various conditioning options for the Rocky Flats material.

Packaging—The proposed plan is to repackage the Rocky Flats material in the existing containers into 15 (2 cans per drum) certified 55-gallon DOT-6M drums.

Disposition—The 15 certified 55-gallon DOT-6M drums will be sent to the Savannah River plant.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately four months for planning and preparations, repackaging, and shipment of all items to Savannah River. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $63.5K Duration: 4 months

Priority/Justification—The ship-as-is option is the simplest for ICPP as far as repackaging and shipping but it is also dependent on operation of the SRS canyons. Material cannot be sent to SRS as HEU until

space is made available in their vault by either processing or relocating the material currently stored in their vault.

Assumptions

- This material cannot be sent to SRS as HEU until they make space available in their vault either by operation of their canyons or relocation of material.
- SRS costs are not factored into this option.

3.3.12 Denitrator Product

Material—This denitrator product is UO_3 obtained from Navy fuel dissolved in the fluorinel dissolution process (FDP) at ICPP. This item contains a significant quantity of enriched uranium, 1,700 kg. This material contains approximately 50 parts per billion ^{232}U.

Issues—This material does not meet the criteria for Y-12 acceptance because the ^{232}U content of this material is too high. Radiation levels have grown in since extraction and have created a handling issue of worker exposure. Savannah River (SRS) is capable of processing this material in their off-spec HEU dilution program however, since it is HEU, it would need to be stored in a vault until their canyon operation is ready to process this material. SRS has very little vault space available until 2002 when they are planning to operate both of their canyons, or until 2005 if only one canyon is allowed to operate. Furthermore, it is not clear if the funding will be made available to process this inventory. The current storage containers for the denitrator product do not fit in the 2R inner containers for the DOT-6M shipping containers. In order to send the denitrator product to SRS it will need to be either repackaged into a larger DOT shipping container or repackaged into a smaller storage container that will fit in a DOT-6M shipping container.

Note—The proposed best plan is a combination of two options: to dry blend the denitrator product with DU or LEU (option 2) and ship to SRS. These operations will continue until SRS has vault space to receive HEU. At that time dry blending will be stopped and HEU shipment in DC-1 shipping packages (option1) will proceed. See Appendix A for costs and duration of the various other conditioning options for the denitrator product.

Packaging—The proposed plan is to package the denitrator product with depleted uranium, in a new container, dry blend in a mill, and then place in a 2R inner container for a 110-gallon DOT-6M drum. A total of 552 new containers will be used. It is assumed that 24 110-gallon, DOT-6M drums can be loaded onto one commercial carrier per shipment; therefore it will take 23 shipments to transfer all of the dry blended denitrator product to Savannah River. When SRS has vault space available the dry blending operations will discontinue and then the Denitrator Product will be repackaged into certified 109-gallon Oak Ridge, Y-12 Model DC-1 shipping packages and sent to SRS via a SST. Ninety six DC-1 drums will be purchased and they will be reused in order to send the remaining denitrator product containers to Savannah River.

Disposition—The certified 110-gallon DOT-6M shipping packages (552 maximum) will be used for the dry blending operations to send the material to the Savannah River plant. The certified 109-gallon Oak Ridge, Y-12 Model DC-1 shipping packages will be used for the ship-as-is scenario to send the material to the Savannah River plant. Approximately 7 DC-1 shipping packages can be loaded onto one SST, therefore it will require a maximum of 40 SST shipments to transfer the material to Savannah River.

Base Case Cost and Duration—Preliminary estimates indicate that it will take approximately six years to design, procure, construct, test and operate the dry blend process including the time for planning and preparations, repackaging, and shipment of all items using the dry blending option to Savannah River. The resource-loaded, base case schedule shows the following cost and duration:

Cost: $ 4,621K Duration: 6 years

Preliminary estimates indicate that it will take approximately three years to obtain DC-1 shipping packages, and complete planning and preparations, repackaging, and shipment of all items using the ship-as-is option to Savannah River. The resource-loaded, ship-as-is schedule using the transfer negotiations team shows the following cost and duration:

Cost: $ 1,668K Duration: 3 years

Priority/Justification—The proposed process creates a dilute, dry product that could be shipped to SRS as a nonweapons grade material. This would eliminate the necessity to store the product in the HEU vault at SRS, thereby reducing costs and allowing the INEEL to move the material sooner.

Assumptions

- The dry blending process is an alternative to aqueous processing of the denitrator product.
- Each can of denitrator product will be diluted with depleted uranium to less than 20% enrichment or approximately a 5 to 1 dilution. The volume will therefore grow by a factor of about 6.
- Contact radiation level readings range from 3 mr/hr to 900 mr/hr. The majority are in the 100 to 200 mr/hr range and only 14 of the 276 bottles are at 500 mr/hr or greater.
- The process will be designed for the 100 to 200 mr/hr material. The higher levels will be handled/processed on a case by case basis.
- The dry blended denitrator product will be contained within dissolvable cans that are compatible with the SRS dissolution process.
- This material cannot be sent to SRS as HEU (ship-as-is) until space is made available in their vault by either processing or relocating the material currently stored in their vault.
- The 5.25 inch outside diameter of the 2.85 liter metal can is too large to fit inside a 2R inner container of a DOT-6M drum. The inside dimensions of a 2R inner container for a 55-gallon DOT-6M drum is 5.05 inch inside diameter and 23 inches long.
- The Oak Ridge Y-12, model DC-1 shipping package has a larger inside diameter than the DOT-6M drums.
- The SARP for the DC-1 shipping packaged will need to be revised and approved prior to using it to ship our denitrator product or our custom product.

- Seven DC-1 shipping packages will be allowed per SST. It will take 40 shipments to transfer this material to Savannah River.

- Savannah River will not store the material in the DC-1 shipping packages. They will remove the denitrator product containers and then return the empty DC-1 shipping packages to ICPP for repackaging.

- Ninety six DC-1 shipping packages will be adequate to allow for efficient cycling of shipping packages for repackaging, shipment, unloading, and return.

- Security sampling/measurement issues have not all been addressed.

4. ACCLERATED SCHEDULE OPTIONS

Four different accelerated schedules (Options A, B, C, and D) were developed and analyzed to provide a suite of choices that incrementally evaluated the interaction of cost, shipping risk, and reduced schedule time. These accelerated schedules were developed via a system engineering methodology and an in-depth analysis of the base case. This analysis identified the critical path issues and how they could be improved. From a national programmatic perspective it includes understanding the shipper and receiver limitations and interactions. At the local level, the shipper (ICPP) picture simplifies to preparations for making the transfer (paper work and conditioning) and the hands-on tasks related to the actual material packaging and transfer to an SST. The receiver has very similar preparation paper work and the tasks related to unloading and storing the inventory (receiver related tasks were not resource-loaded on this schedule). All the tasks in the base case fall into the general categories of **preparation, packaging/shipping, tasks outside CPP-651,** and **tasks inside CPP-651**.

Examination of the base case information indicated there are two fundamental ways to reduce the schedule: (a) increase staff and (b) decrease scope (i.e., decrease or eliminate any material conditioning operations) and ship-as-is. Current staffing levels are adequate to support the base case which will empty the CPP-651 vault in less than 10 years. However, it is clear that this level of staffing reflects the effects of down sizing and does not produce the optimum or accelerated results. Additional personnel can reduce the time related to: (a) preparation of paper work and negotiations with the receiver (b) conditioning of material for packaging and (c) the repackaging and transfer operations. It should be noted if additional experienced staff can be allocated to the shipper program it may also require some additional staff at the receiver site to fully realize the benefits. Obviously there is a limit on how many personnel can work effectively inside CPP-651 and similarly there is a limit of effectiveness of personnel working on the preparation related tasks. Thus, the selection of extra personnel was done in a strategic manner.

The first increment of new staff (4 FTEs) was provided to just focus on preparation paper work and receiver negotiations. This group is referred to as the Transfer Negotiations Team (TNT) and included the following areas of expertise: security, accountability/measurements, transportation, facility manager. The team is utilized for a period of about four to five years depending on the option. The next increment of staff (9 FTEs) provided additional crew for only those preparation tasks inside CPP-651 that were significant in duration (e.g., denitrator product). These personnel would be completely dedicated to accelerating tasks inside CPP-651 and are referred to as new dedicated crew (DC). The DC is utilized for a period of about two to four years. The DC included five operators, one foreman, a radiological technician, one materials accountability person and a security guard. The impact of the additional crew equated to increasing from two to four days of conditioning or packaging activities per week. The option of eliminating all material conditioning will obviously reduce the schedule and cost. However, it also presents the highest risk for never removing the material from CPP-651, i.e., the material would have been transferred by now if a receiver would have taken it.

The impacts of implementing the previously discussed ideas for reducing the schedule, such as (a) increase staff and (b) ship-as-is were evaluated by developing the following options and comparing them to the base case:

- Base Case: Existing crew and dry blending

  The denitrator product is milled and dry blended with DU to produce LEU and thereby assure its removal from CPP-651. No new staff is required. The 10-year schedule is shortened by a few months

- Option A—Base case plus transfer negotiation team (TNT)

  A dedicated team of about four experienced personnel are formed to resolve shipper/receiver issues and assist with related preparation paperwork for all inventory items. The schedule is shortened; cost is increased; and shipper/receiver issues are improved (this assumes that the receiver sites retain staffing levels to make these negotiations productive).

- Option B—Ship as-is plus TNT

  None of the SNM is processed or conditioned at ICPP. The schedule is shortened; overall cost is reduced; but uncertainty of shipment is very high for material that requires offsite processing such as the denitrator product (off-spec HEU).

- Option C—Base case plus TNT and a dedicated crew

  Nine ICPP personnel (operators, foreman, radiological technician, and security) are added to the CPP-651 operations to produce the equivalent of four days of packaging operations per week. The critical path issues inside CPP-651 are shortened; cost is increased; and shipper/receiver issues are improved.

- Option D—Ship as-is plus TNT and a dedicated crew

  Nine ICPP personnel are added to the CPP-651 operations to produce the equivalent of four days of packaging operations per week. The schedule is shortened to primarily CPP-651 repackaging operations because no conditioning is proposed. The direct transfer cost is greater than Option B because of the extra personnel, but it is less than Option C because there is no cost for milling and dry blending. However, like Case B, the shipper/receiver issues are high enough that the inventory may never be removed in the allotted 10-year period.

Figure 4.0-1 presents a summary overview of the system engineering approach used in developing and analyzing the above options. The various measures of effectiveness for each option are discussed in the following subsections.

4.1 Schedule Analysis

An important schedule consideration is whether operations at ICPP can support any of the proposed accelerated schedules. Discussions with operations management at ICPP indicate that the level of effort is well within current capacity. For example, current capacity for repackaging drums at CPP-651 is about four packages per day or the equivalent of approximately 400 drums per year. The total number of packages (drums and boxes), excluding the large volume of denitrator product, is a combination of 111 drums and 56 boxes. Level-loaded over a three to five year period, this is well within current capacity. The denitrator product could be processed in a three to four month campaign using trained operators coming off the Rover project. Figure 4.1-1 summarizes the schedule impacts for each of the above options and the base case. More detailed summary level schedules for each option are shown in

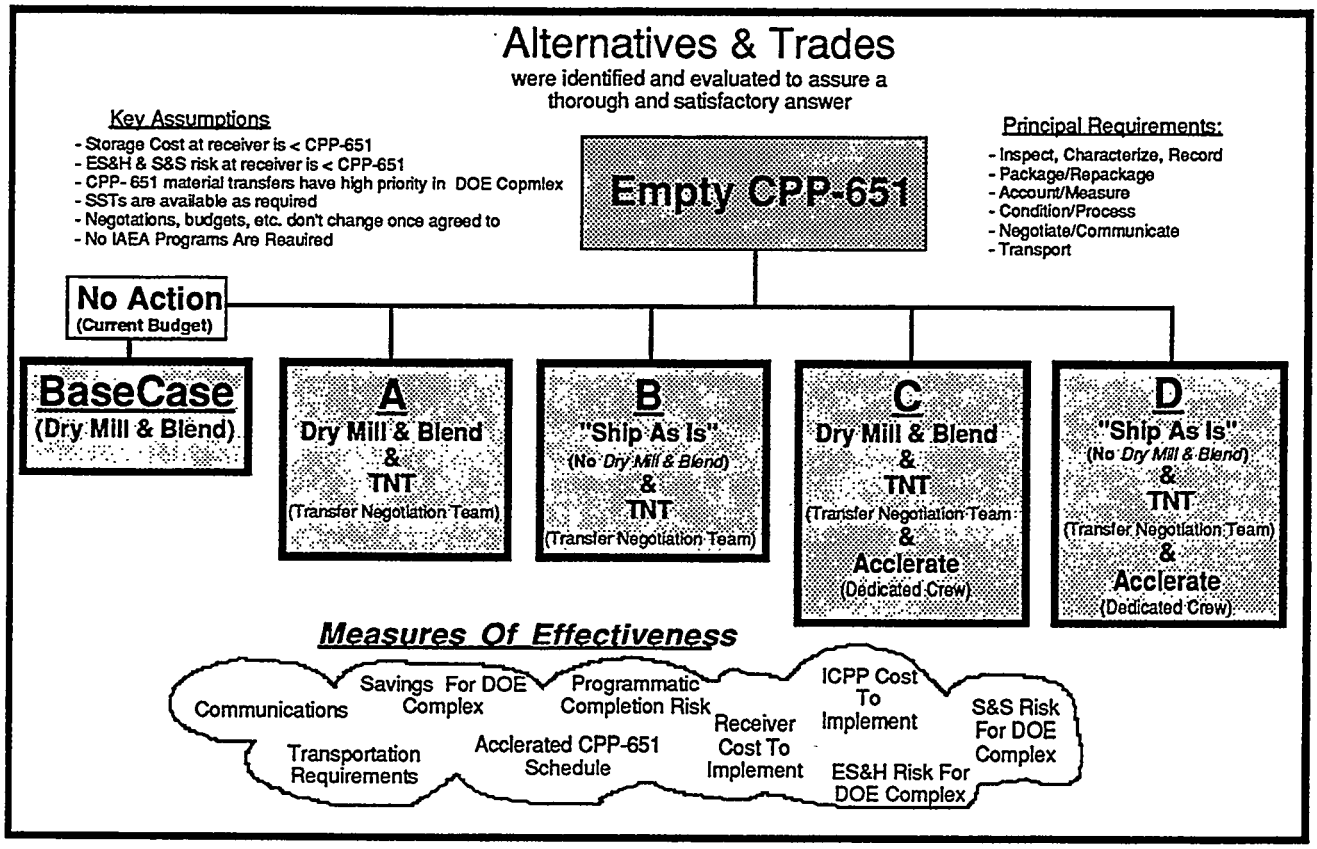


Figure 4.0-1. Measures of effectiveness of the options to remove HEU from CPP-651 early.

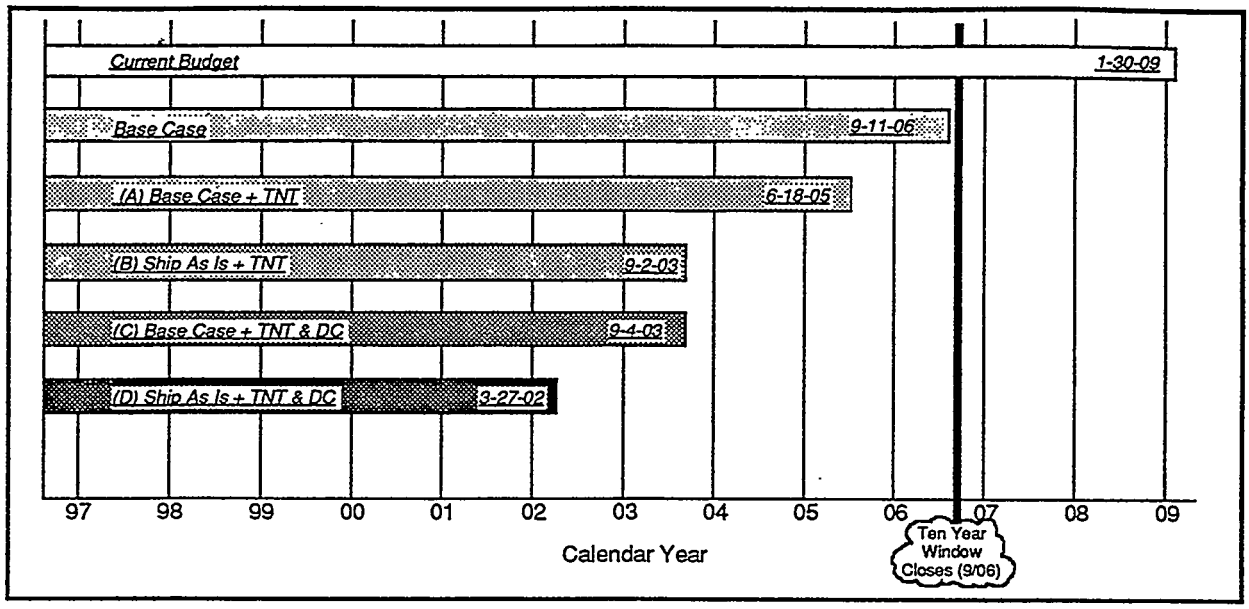


Figure 4.1-1. Schedule comparisons.

Tables 4.1-1 through 4.1-5 (additional detail can be found in Appendix C). As expected option D reduces the schedule the most because it retains the benefits of less work scope and the positive impact of additional staff. However, it also assumes that an offsite HEU dilution site can begin to receive the HEU as early as June 2001. If SRS is the selected site, this shipment date could slip to October 2001 which would add three to four months to this schedule. The maximum schedule impact of adding staff to the base case is a reduction of about 36 months and the maximum impact of reduced conditioning (i.e., ship-as-is) is about 21 months. Since the base case intends to ship HEU as soon as a receiver can be identified, the 21 month savings represents a maximum value because HEU that is shipped without milling and dry blending will reduce this projected savings.

4.2 Cost Analysis

Cost analysis requires the following assumptions: (1) each material will be moved within 10 years, (2) the cost to move material sooner is only marginally higher than waiting to move later, (3) the total (direct and indirect) estimated cost of maintaining CPP-651 is $2.4 M per year. In simple terms, at an estimated savings of $2.4 million per year, a plan that moves material out of CPP-651 sooner would generate $2.4 million in savings for every year reduced from the schedule. Table 4.2-1 summarizes the total cost for each of the options, the base case, and the current budget. Since the life cycle cost of the current budget is $19M more than the base case and does not empty CPP-651 until January 30, 2009, all of the options were compared to the base case cost and schedule. Tables 4.2-2 through 4.2-6 (additional detail can be found in Appendix D) provide the annual cost profiles for only those costs related to the transfer operations (fourth column of Table 4.2-1). The savings realized by each option result from reduced time to complete the work and reduced scope of work. Shorter completion times save an estimated $2.4 M per year for each year the facility is emptied ahead of the 10-year schedule (9-06). The savings realized by reducing the scope of work (ship-as-is) is revealed by comparing the transfer cost values in Table 4.2-1 for those options that include dry blending and those that don't, i.e., A with B ($2.4 M) and C with D ($3.0 M). The difference in total program savings increase to $7.7 M between Options A and B and $7.2 M between Options C and D.

The cost of adding the TNT to the base case (option A) is about $2.0 M. These additional personnel will reduce the base case by 15 months, which pays for their cost and produces an estimated savings of $1.7 M. The cost of adding the DC to Option A is 3.8M ($850,000 per year plus $300,000 for the initial training and worker qualifications). This reduces the base case schedule by another 22 months which pays for the DC and produces an additional savings of about $3.6 M. Thus, the cost of increased staff is recovered in all of the options.

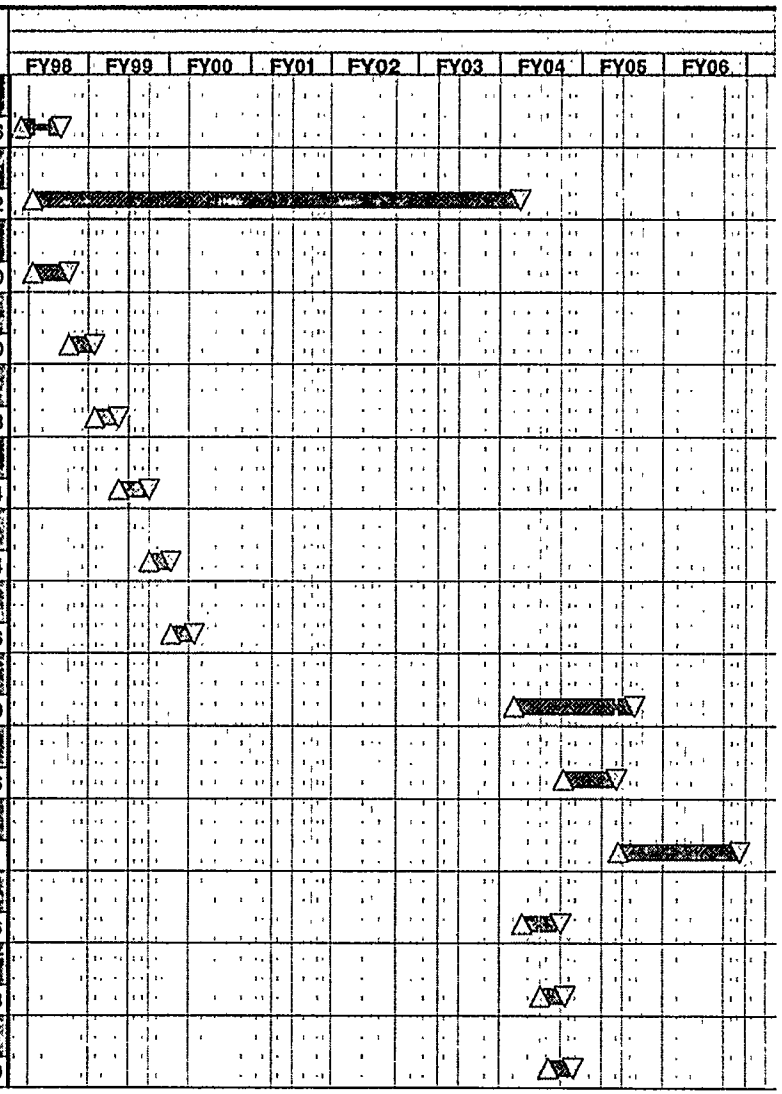
No attempts have been made to level the cost profiles because the main interest was to identify the fastest possible schedule. The level funding profile is more of an issue for the options that include milling and dry blending because of the procurement and installation of equipment needed to support these operations in CPP-651. While the funding isn't very level, it should be noted that the total cost is not a very significant part of the total ICPP budget and therefore should not present any real funding issue. Furthermore, the capital expenditures for milling and dry blending are accomplished via GPP tasks and do not require line item funding.

4.3 Shipment Risk Analysis

There is a risk of not being able to complete the transfers associated with each of the proposed options. Since most of the related issues that determine this risk are directly associated with post cold war

Table 4.1-1. Base case schedule.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
+ LANL Material					
	178	25NOV97	21MAY98	2,964.00	159,385.76
+ Denitrator Material -Dry Blending					
	2,173	22JAN98	03JAN04	38,744.00	4,621,152.72
+ ANL-W Material					
	161	22JAN98	01JUL98	1,308.00	76,376.70
+ Custom Material					
	113	02JUL98	22OCT98	1,313.00	76,446.90
+ U. of Wisconsin					
	108	26OCT98	10FEB99	747.00	43,168.88
+ GEFAST Material					
	134	11FEB99	24JUN99	1,095.00	63,416.14
+ U. of Washington					
	102	28JUN99	07OCT99	772.00	40,308.34
+ Rocky Flats Material - Ship As Is					
	108	11OCT99	26JAN00	1,214.00	63,532.76
+ PWR Material					
	539	01DEC03	22MAY05	3,446.00	182,329.30
+ PWR (1 full assembly)					
	240	07JUL04	03MAR05	1,174.00	66,302.46
+ Fluorinel Material					
	553	08MAR05	11SEP06	8,354.00	545,747.81
+ VYCOR Glass Material					
	177	05JAN04	29JUN04	634.00	578,801.56
+ Janus Material					
	114	29MAR04	20JUL04	883.00	46,334.88
+ ANL-E Material					
	102	10MAY04	19AUG04	936.00	48,762.60



Project Start 01JUL97
Project Finish 11SEP06
Data Date 01OCT97
Run Date 21AUG97

Early Bar
Progress Bar
Critical Activity

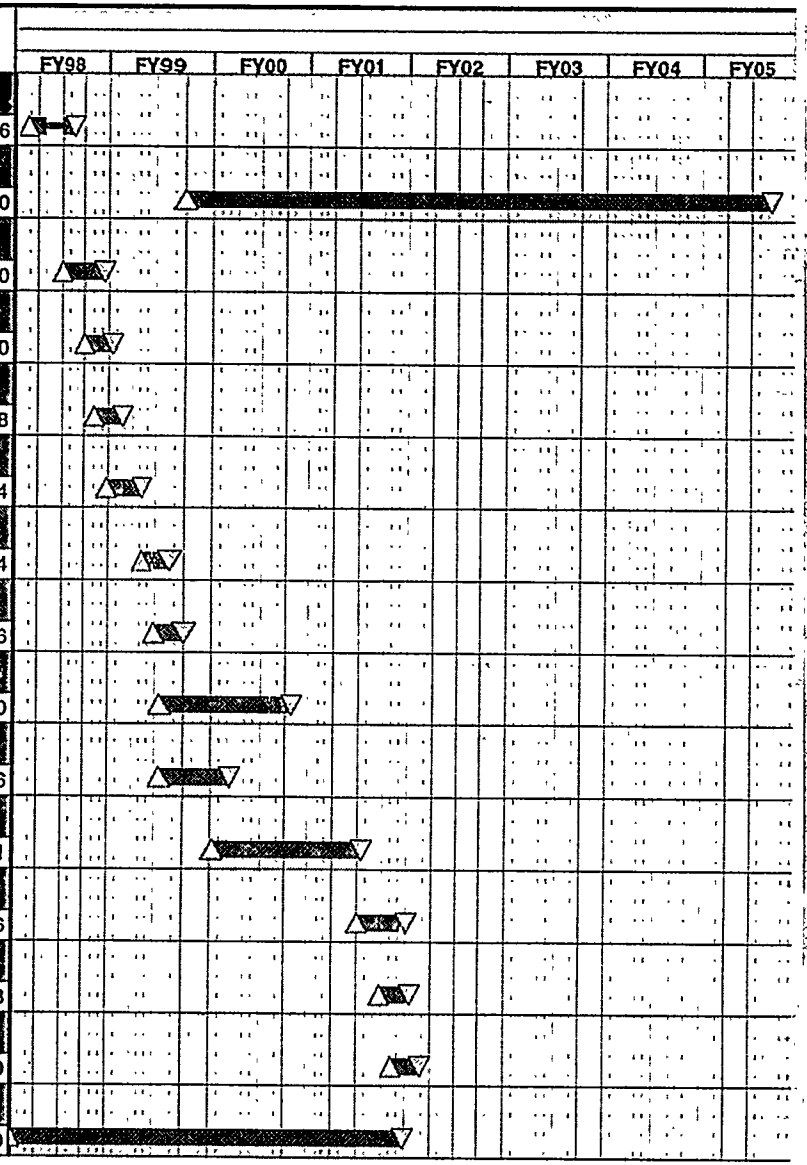
COMP.BASE

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
BASE CASE SCHEDULE - DRY BLENDING
SUMMARIZED BY MATERIAL TYPE

Table 4.1-2. Option A schedule.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
LANL Material					
	178	25NOV97	21MAY98	2,964.00	159,385.76
Denitrator Material -Dry Blending					
	2,180	01JUL99	18JUN05	38,458.00	4,601,917.00
ANL-W Material					
	163	31MAR98	09SEP98	1,308.00	76,376.70
Custom Material					
	114	24JUN98	15OCT98	1,313.00	76,446.90
U. of Wisconsin					
	106	05AUG98	18NOV98	747.00	43,168.88
GEFAST Material					
	141	17SEP98	04FEB99	1,095.00	63,416.14
U. of Washington					
	101	08FEB99	19MAY99	772.00	40,308.34
Rocky Flats Material - Ship As Is					
	101	22MAR99	30JUN99	1,214.00	63,532.76
PWR Material					
	462	19APR99	23JUL00	3,446.00	182,329.30
PWR (1 full assembly)					
	235	19APR99	09DEC99	1,174.00	66,302.46
Fluorinel Material					
	560	06OCT99	17APR01	8,354.00	545,747.81
VYCOR Glass Material					
	183	29MAR01	27SEP01	634.00	578,801.56
Janus Material					
	115	25JUN01	17OCT01	883.00	46,334.88
ANL-E Material					
	107	07AUG01	21NOV01	936.00	48,762.60
Transfer Negotiations Team					
	802	01OCT97	26SEP01	30,720.00	2,023,158.40



Project Start 01JUL97
Project Finish 05MAR10
Data Date 01OCT97
Run Date 21AUG97

Early Bar
Progress Bar
Critical Activity

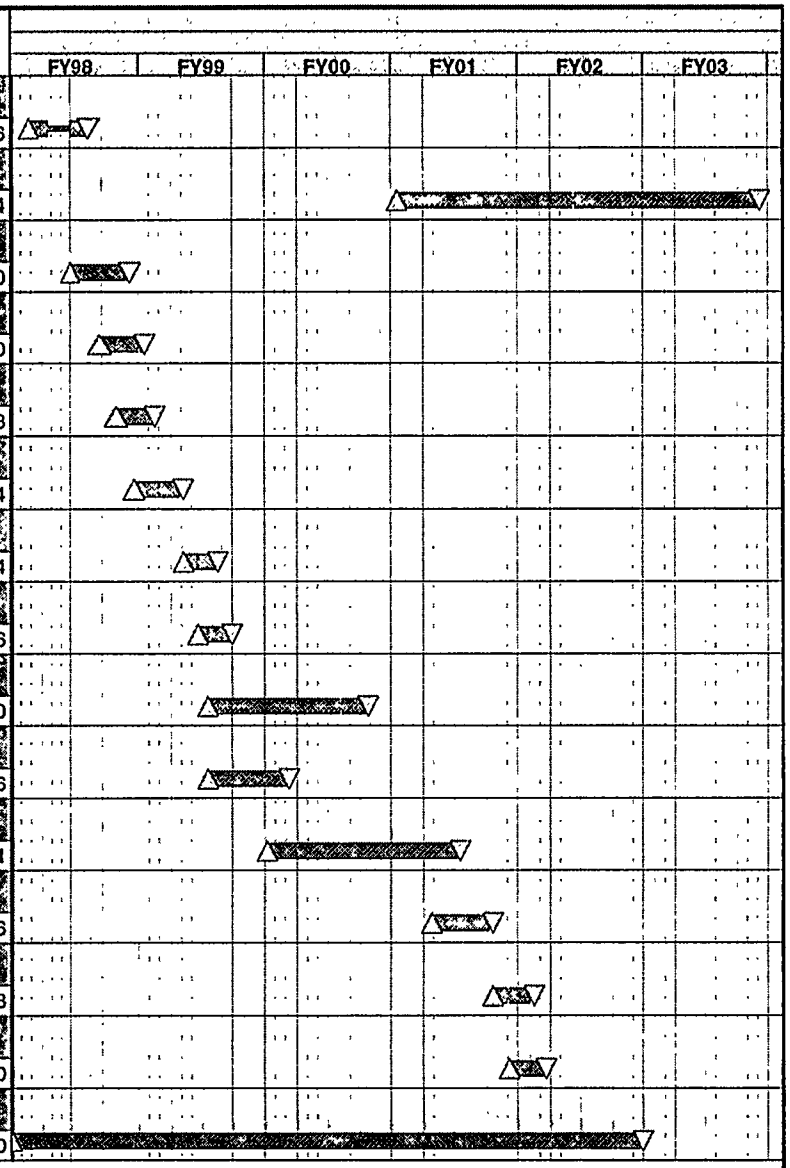
COMP.DRY1

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
OPTION A - BASE CASE & TRANSFER TEAM
SUMMARIZED BY MATERIAL TYPE

Table 4.1-3. Option B schedule.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
+ LANL Material					
	178	25NOV97	21MAY98	2,964.00	159,385.76
+ Denitrator Material - Ship As Is					
	1,050	18OCT00	02SEP03	13,416.00	1,668,084.44
+ ANL-W Material					
	163	31MAR98	09SEP98	1,308.00	76,376.70
+ Custom Material					
	114	24JUN98	15OCT98	1,313.00	76,446.90
+ U. of Wisconsin					
	106	05AUG98	18NOV98	747.00	43,168.88
+ GEFAST Material					
	141	17SEP98	04FEB99	1,095.00	63,416.14
+ U. of Washington					
	101	08FEB99	19MAY99	772.00	40,308.34
+ Rocky Flats Material - Ship As Is					
	101	22MAR99	30JUN99	1,214.00	63,532.76
+ PWR Material					
	462	19APR99	23JUL00	3,446.00	182,329.30
+ PWR (1 full assembly)					
	235	19APR99	09DEC99	1,174.00	66,302.46
+ Fluorinel Material					
	560	06OCT99	17APR01	8,354.00	545,747.81
+ VYCOR Glass Material					
	179	24JAN01	21JUL01	634.00	578,801.56
+ Janus Material					
	114	23JUL01	13NOV01	883.00	46,334.88
+ ANL-E Material					
	107	04SEP01	19DEC01	936.00	48,762.60
+ Transfer Negotiations Team					
	1,003	01OCT97	30SEP02	38,400.00	2,528,448.00



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	21AUG97

Early Bar
Progress Bar
Critical Activity

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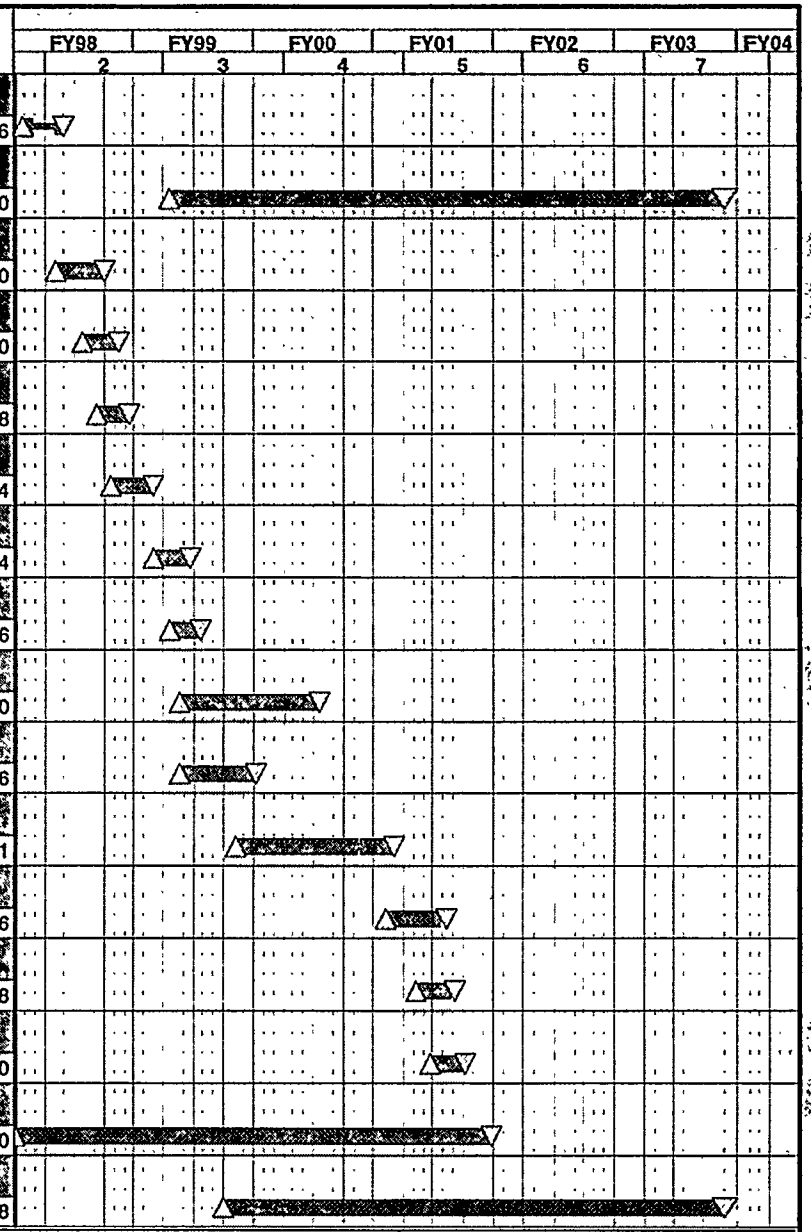
COMP:DRY2

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
OPTION B - SHIP AS IS & TNT
SUMMARIZED BY MATERIAL TYPE

Table 4.1-4. Option C schedule.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
+ LANL Material					
	123	28OCT97	27FEB98	2,964.00	159,385.76
+ Denitrator Material - Dry Blending					
	1,687	21JAN99	03SEP03	38,458.00	4,601,917.00
+ ANL-W Material					
	151	02FEB98	02JUL98	1,308.00	76,376.70
+ Custom Material					
	108	27APR98	12AUG98	1,313.00	76,446.90
+ U. of Wisconsin					
	58	09JUN98	17SEP98	747.00	43,168.88
+ GEFAST Material					
	135	21JUL98	02DEC98	1,095.00	63,416.14
+ U. of Washington					
	111	03DEC98	23MAR99	772.00	40,308.34
+ Rocky Flats Material - Ship As Is					
	93	21JAN99	23APR99	1,214.00	63,532.76
+ PWR Material					
	429	18FEB99	21APR00	3,446.00	182,329.30
+ PWR (1 full assembly)					
	232	18FEB99	07OCT99	1,174.00	66,302.46
+ Fluorinel Material					
	477	09AUG99	27NOV00	8,354.00	545,747.81
+ VYCOR Glass Material					
	185	08NOV00	11MAY01	634.00	578,801.56
+ Janus Material					
	65	08FEB01	04JUN01	883.00	46,334.88
+ ANL-E Material					
	59	22MAR01	05JUL01	936.00	48,762.60
+ Transfer Negotiations Team					
	802	01OCT97	26SEP01	30,720.00	2,023,158.40
+ Added Cost - Dedicated Operations Crew					
	839	01JUL99	04SEP03	31,691.00	1,634,296.88



Project Start 01JUL97
Project Finish 05MAR10
Data Date 01OCT97
Run Date 26AUG97

Early Bar
Progress Bar
Critical Activity

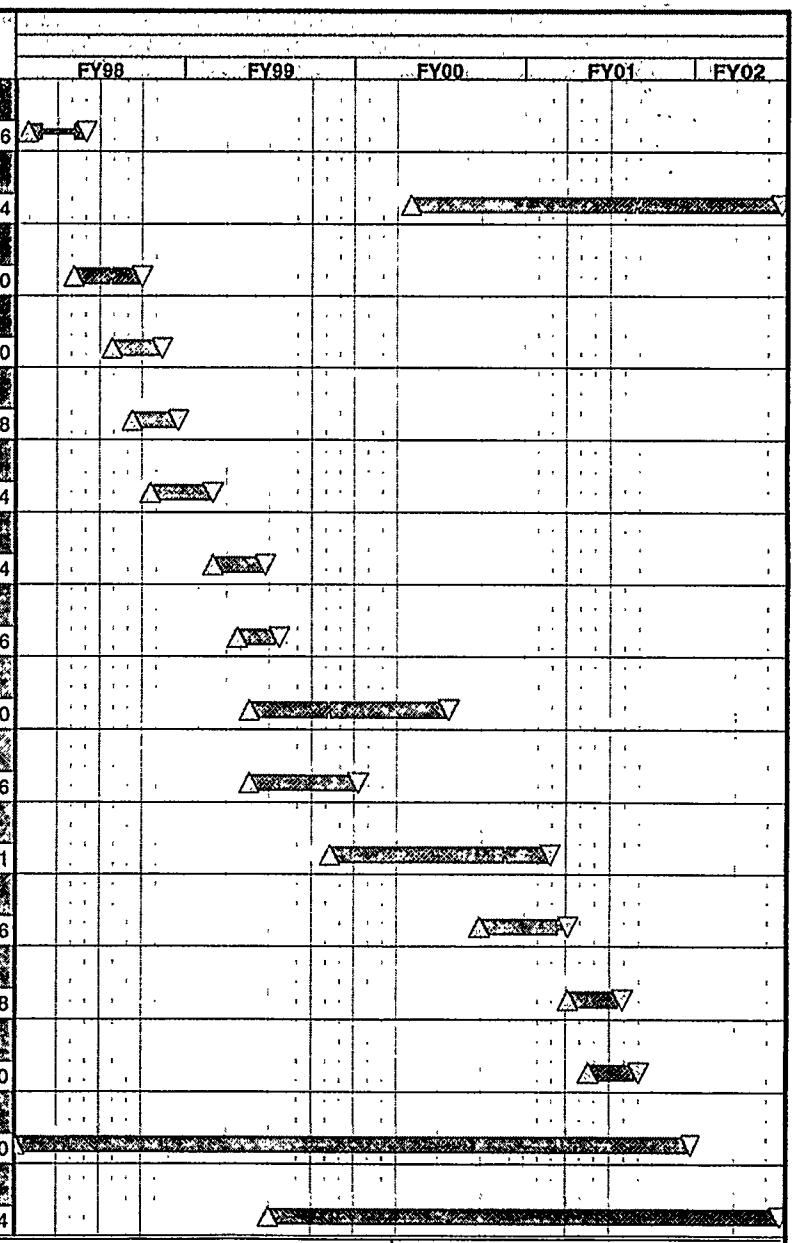
COMP:DRY3

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
OPTION C -BASE CASE & TNT & OPS CREW
SUMMARIZED BY MATERIAL TYPE

Table 4.1-5. Option D schedule.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
+ LANL Material					
	123	28OCT97	27FEB98	2,964.00	159,385.76
+ Denitrator Material - Ship As Is					
	785	02FEB00	27MAR02	13,416.00	1,668,084.44
+ ANL-W Material					
	151	02FEB98	02JUL98	1,308.00	76,376.70
+ Custom Material					
	108	27APR98	12AUG98	1,313.00	76,446.90
+ U. of Wisconsin					
	58	09JUN98	17SEP98	747.00	43,168.88
+ GEFAST Material					
	135	21JUL98	02DEC98	1,095.00	63,416.14
+ U. of Washington					
	111	03DEC98	23MAR99	772.00	40,308.34
+ Rocky Flats Material - Ship As Is					
	93	21JAN99	23APR99	1,214.00	63,532.76
+ PWR Material					
	429	18FEB99	21APR00	3,446.00	182,329.30
+ PWR (1 full assembly)					
	232	18FEB99	07OCT99	1,174.00	66,302.46
+ Fluorinel Material					
	477	09AUG99	27NOV00	8,354.00	545,747.81
+ VYCOR Glass Material					
	190	29JUN00	04JAN01	634.00	578,396.56
+ Janus Material					
	65	04JAN01	26APR01	883.00	46,334.88
+ ANL-E Material					
	59	15FEB01	30MAY01	936.00	48,762.60
+ Transfer Negotiations Team					
	802	01OCT97	26SEP01	30,720.00	2,023,158.40
+ Added Cost - Dedicated Operations Crew					
	598	01APR99	25MAR02	31,440.00	1,619,968.04



Project Start 01JUL97
Project Finish 05MAR10
Data Date 01OCT97
Run Date 21AUG97

Early Bar
Progress Bar
Critical Activity

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COMP:DRY4

Sheet 1A of 1B

LMITCO - CPP 651 MATERIALS SCHEDULE
OPTION D-SHIP AS IS & TNT & OPS CREW
SUMMARIZED BY MATERIAL TYPE

	New Staff (FTEs)	ICPP Safeguards & Security Costs ($ M) Until 9/11/06 (b)	Surveillance & Maintenance Costs ($M) For CPP-651 Until Empty (c)	Transfer Cost To Remove Material From CPP-651 ($ M)	Total Cost - Options Are Benchmarked Against Base Case ($ M)	Savings (Base Case Cost Minus Option Cost)	Receiver Acceptance (10 Is HIGH Risk)	Completion Date	Reduced Base Case Schedule By ( ) Months
Current Budget (a)	0	$100.1	$6.3	$3.4	$109.7	($19.0)	10 +	30-Jan-09	-29
(Ship As Is - Existing Staff)									
Base Case	0	$79.0	$5.1	$6.6	$90.7	$0.0	3	11-Sep-06	0
(Dry Blend - Existing Staff)									
Option A	4	$76.0	$4.4	$8.6	$89.0	$1.7	3	18-Jun-05	15
(Dry Blend + TNT)									
Option B	4	$71.6	$3.5	$6.2	$81.3	$9.4	10	2-Sep-03	37
(Ship As Is + TNT)									
Option C	13	$71.6	$3.5	$10.3	$85.4	$5.3	2	4-Sep-03	37
(Dry Blend + TNT + Crew)									
Option D	13	$68.1	$2.8	$7.3	$78.2	$12.5	9	27-Mar-02	54
(Ship As Is + TNT + Crew)									
(a) Costs for "current budget" do not terminate until the facility is empty (1-30-09)									
(b) S&S costs for ICPP are estimated to be $8.7 M/year. This decreases to $6.3 M/year after the SNM is removed from CPP-651.									
(c) S&M costs for CPP-651 are estimated to be $0.5 M/year. This decreases to $0 M/year after the SNM is removed from CPP-651.									

Table 4.2-1. Summary comparison of options.

Table 4.2-2. Base case schedule.

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 05AUG97 RUN NO. 482
13:01

Cost Loading - Summary by Cost Account

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

BASE CASE SCHEDULE - DRY BLENDING

START DATE 01JUL97 FIN DATE 11SEP06

DATA DATE 01OCT97 PAGE NO. 1

ACCOUNT	ACCOUNT TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	TOTAL
12100	LANL Material	159386									159386
12101	Fluorinel Material								62088	483660	545748
121010	VYCOR Glass Material							578802			578802
121011	ANL-W Material	76377									76377
121012	ANL-E Material							48763			48763
121013	Rocky Flats Option 1 (As Is)			63533							63533
121018	Denitrator Option 2 (Dry Blend)	320259	1182927	1345679	600851	532630	544723	94084			4621153
12103	PWR (6 SPERT Boxes)							41717	140612		182329
12104	PWR (1 full assembly)							20113	46189		66302
12105	U of Washington		24859	15449							40308
12106	U of Wisconsin		43169								43169
12107	Custom Product Material	34830	41616								76447
12108	GFAST - AWF-1		63416								63416
12109	JANUS Material							46335			46335
	REPORT TOTAL	590852	1355988	1424661	600851	532630	544723	829813	248890	483660	6612067

Table 4.2-3. Option A schedule.

LMITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | OPT A - BASE CASE & TRANSFER TEAM

REPORT DATE 05AUG97 12:36 RUN NO. 511 | COST LOADING REPORT | START DATE 01JUL97 FIN DATE 18JUN05

DATA DATE 01OCT97 PAGE NO. 1

Cost Loading - Summary by Cost Account | TOTAL USAGE FOR YEAR

ACCOUNT	ACCOUNT TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TOTAL
12100	LANL Material	159386								159386
12101	Fluorinel Material			235221	310527					545748
121010	VYCOR Glass Material				578802					578802
121011	ANL-W Material	76377								76377
121012	ANL-E Material				10233	38530				48763
121013	Rocky Flats Option 1 (As Is)		63533							63533
121018	Denitrator Option 2 (Dry Blend)		111527	415967	1987991	668520	546878	540551	330483	4601917
12103	PWR (6 SPERT Boxes)		12317	170013						182329
12104	PWR (1 full assembly)		34395	31907						66302
12105	U of Washington		40308							40308
12106	U of Wisconsin	10388	32781							43169
12107	Custom Product Material	36341	40106							76447
12108	GFAST - AWF-1	1199	62218							63416
12109	JANUS Material				29803	16532				46335
12110	Transfer Negotiations Team	507051	509574	504528	502006					2023158
	REPORT TOTAL	790740	906759	1357635	3419361	723582	546878	540551	330483	8615990

Table 4.2-4. Option B schedule.

LMITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | OPT B - SHIP AS IS & TRANSFER TEAM

REPORT DATE 05AUG97 12:30 RUN NO. 462 | COST LOADING REPORT | START DATE 01JUL97 FIN DATE 02SEP03

DATA DATE 01OCT97 PAGE NO. 1

Cost Loading - Summary by Cost Account | TOTAL USAGE FOR YEAR

ACCOUNT	ACCOUNT TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
12100	LANL Material	159386						159386
12101	Fluorinel Material			235221	310527			545748
121010	VYCOR Glass Material				578802			578802
121011	ANL-W Material	76377						76377
121012	ANL-E Material				2712	46051		48763
121013	Rocky Flats Option 1 (As Is)		63533					63533
121017	Denitrator Option 1 (As Is)				692190	625066	350828	1668084
12103	PWR (6 SPERT Boxes)		12317	170013				182329
12104	PWR (1 full assembly)		34395	31907				66302
12105	U of Washington		40308					40308
12106	U of Wisconsin	10388	32781					43169
12107	Custom Product Material	36341	40106					76447
12108	GFAST - AWF-1	1199	62218					63416
12109	JANUS Material				19402	26933		46335
12110	Transfer Negotiations Team	506698	509219	504177	504177	504177		2528448
	REPORT TOTAL	790388	794877	941317	2107810	1202227	350828	6187446

Table 4.2-5. Option C schedule.

LMITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | OPT C - BASE CASE & TNT & DED. CREW

REPORT DATE 05AUG97 13:11 RUN NO. 505 | COST LOADING REPORT | START DATE 01JUL97 FIN DATE 04SEP03

DATA DATE 01OCT97 PAGE NO. 1

Cost Loading - Summary by Cost Account | TOTAL USAGE FOR YEAR

ACCOUNT	ACCOUNT TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
12100	LANL Material	159386						159386
12101	Fluorinel Material		4386	361659	179703			545748
121010	VYCOR Glass Material				578802			578802
121011	ANL-W Material	76377						76377
121012	ANL-E Material				48763			48763
121013	Rocky Flats Option 1 (As Is)		63533					63533
121018	Denitrator Option 2 (Dry Blend)		321522	1171058	1350829	858160	900348	4601917
12103	PWR (6 SPERT Boxes)		21007	161323				182329
12104	PWR (1 full assembly)		46462	19841				66302
12105	U of Washington		40308					40308
12106	U of Wisconsin	43169						43169
12107	Custom Product Material	76447						76447
12108	GFAST - AWF-1	12248	51168					63416
12109	JANUS Material				46335			46335
12110	Transfer Negotiations Team	507051	629105	683826	502006			2321987
12111	Dedicated Operations Crew			467303	508386	280405	79373	1335468
	REPORT TOTAL	874678	1177490	2865010	3214823	1138565	979721	10250286

Table 4.2-6. Option D schedule.

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 05AUG97 RUN NO. 465
13:15

Cost Loading - Summary by Cost Account

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

OPT D - SHIP AS IS & TNT & DED. CREW

START DATE 01JUL97 FIN DATE 27MAR02

DATA DATE 01OCT97 PAGE NO. 1

ACCOUNT	ACCOUNT TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	TOTAL
12100	LANL Material	159386					159386
12101	Fluorinel Material		4386	361659	179703		545748
121010	VYCOR Glass Material .			7457	570940		578397
121011	ANL-W Material	76377					76377
121012	ANL-E Material				48763		48763
121013	Rocky Flats Option 1 (As Is)		63533				63533
121017	Denitrator Option 1 (As Is)			440019	897354	330711	1668084
12103	PWR (6 SPERT Boxes)		21007	161323			182329
12104	PWR (1 full assembly)		46462	19841			66302
12105	U of Washington		40308				40308
12106	U of Wisconsin	43169					43169
12107	Custom Product Material	76447					76447
12108	GFAST - AWF-1	12248	51168				63416
12109	JANUS Material				46335		46335
12110	Transfer Negotiations Team	507051	808402	504528	502006		2321987
12111	Dedicated Operations Crew		15870	452260	340538	512471	1321139
	REPORT TOTAL	874678	1051135	1947087	2585639	843182	7301720

transition conditions it is nearly impossible to assess this risk in a totally objective manner. Site-specific budgets, processing capabilities, accountability requirements, characterization requirements, storage capacities, staffing levels, IAEA programs, unfunded mandates and the like continue to change the planning horizon. Nevertheless the task team has made a subjective determination of this risk factor for each option which is based on the collective experience of the team. Several general observations were agreed upon:

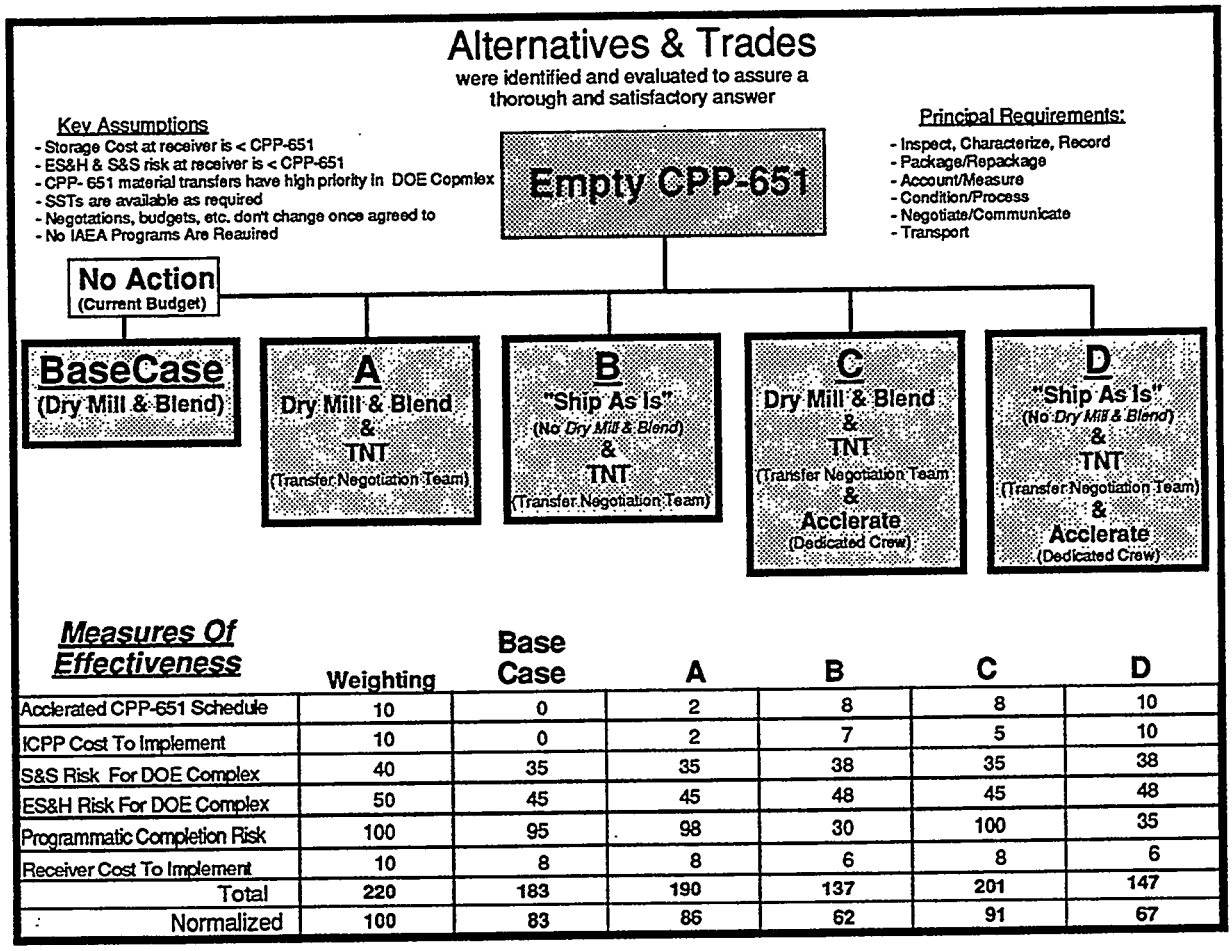
- The more user friendly the package the better the chance that it will be shipped
- Changes will continue and are likely to become more restrictive as the DOE complex ages
- Site budgets are not likely to increase in the near term and will probably decrease with time
- Processing capability (personnel, equipment and facilities) are not being maintained per the DNFSB's Recommendation 94-1
- Future EIS RODs and licensing issues for repositories could significantly change SNM management strategies and related facilities/infrastructure.

The strategic planning response to this uncertain future forced the selection of options that (a) retained as much local control as possible, and (b) produced user friendly packaged products. Thus, the collective effect of this general situation lead the team to conclude that the risk of ever shipping material like the denitrator product without conditioning (reduce its radiation level and/or its attractiveness level) was be too great to accept. Accordingly, high risk values were assigned to Options B and D. B is slightly worse than D because the program runs longer and is therefore subject to more change.

4.4 Proposed Accelerated Schedule

Figure 4.4-1 presents a summary overview of the options and a subjective measure of their effectiveness. Per DP's request to provide the schedule ASAP, it is concluded that Option C should be selected because it provides the best balance of accelerated schedule, reduced cost, and probability of success. The strategy developed is designed to expedite (a) removal of material currently in CPP-651, (b) disposition of its excess off-spec HEU, and (c) consolidation of SNM to fewer locations at the INEEL and across the DOE complex. The result is a cost savings to the complex due to lower INEEL security costs. This assumes that the storage cost at the receiver site does not equal or exceed the cost of storage at ICPP. This assumption appears to be true for most inventory items. However, preliminary discussions indicate that there are scenarios for the denitrator product where the storage costs could be as high as $6.0M per year if the total cost was allocated to this material. Thus, the cost savings for the DOE complex cannot be validated at this time without additional study. The possibility of even greater savings may be realized by making CPP-651 available for new missions which may avoid or delay capital outlays for upgrading old facilities or constructing new capacity.

The proposed accelerated schedule implements the base case strategy with 13 additional personnel to expedite all phases of operations. The principal tasks include the actions: (1) collect data and resolve transportation packaging issue. These actions are currently underway and should take care of about half of the problem materials; (2) mill and dry blend the denitrator product with LEU to less than 20% enrichment and ship to an off-spec HEU dilution site such as SRS. Terminate dry milling and blending as soon as any off-spec HEU dilution site has vault storage space to receive HEU shipments. Products that have simple packaging problems (such as custom product and GEFAST) can also take advantage of the glovebox



Measures Of Effectiveness	Weighting	Base Case	A	B	C	D
Acclerated CPP-651 Schedule	10	0	2	8	8	10
ICPP Cost To Implement	10	0	2	7	5	10
S&S Risk For DOE Complex	40	35	35	38	35	38
ES&H Risk For DOE Complex	50	45	45	48	45	48
Programmatic Completion Risk	100	95	98	30	100	35
Receiver Cost To Implement	10	8	8	6	8	6
Total	220	183	190	137	201	147
Normalized	100	83	86	62	91	67

Figure 4.4-1. Overview of options and measure of effectiveness.

repackaging system; (3) transfer Rocky Flats material to SRS as soon as possible; and (4) utilize ANL-W resources for timely storage and/or dispositioning Vycor glass, ANL-E material, and Janus material.

The key to accelerating the schedule is recognizing that the major volumes of material and the most difficult repackaging issues lie squarely with the denitrator product. Extra personnel can significantly expedite this process and also shorten the PWR and Fluorinel packaging efforts. Because the Rocky Flats inventory is small and requires significantly less storage space, it can be sent to SRS long before the denitrator product. This leaves Vycor glass as the next most troublesome material to deal with. By working with ANL-W, this material can also be moved. At this point subtraction of materials that already are being moved along with those that will likely be resolved by providing data or packaging leaves about six drums (one of University of Washington, two of ANL-E, and three of Janus). ANL-W has already indicated that they would accept a few drums for future processing to allow early completion of material removal from CPP-651.

4.4.1 Strengths and Weaknesses

The key elements of success for the proposed strategy are: extra dedicated personnel (13 FTEs, TNT, and DC), centralization of efforts at CPP-651, a mill and dry blending process that is accomplished in a sealed can, and continuous offsite negotiations with all receivers to resolve any issues as soon as they are identified.

Using a new glovebox facility in CPP-651 to repackage, mill, and dry blend the denitrator product into a more user friendly form provides the following advantages:

- Eliminates need to provide additional security.
- The process can be designed to fit easily into the 475 square feet available in the North Vault.
- The process can be designed to operate safely and efficiently within a low cost, temporary, self-contained Perma Con structure with a shielded glovebox and a portable ventilation system.
- Eliminates the need to create a new material balance area (MBA) for staging material and drum.
- The CPP-651 annulus provides shielding for the material until it is removed for blending and milling.
- Eliminates intra-site shipments.
- Makes repackaging of the custom product more viable.
- Makes use of an existing facility with minimal changes to safety analysis documentation, technical standards, and operating procedures.
- Minimizes reliance on offsite resources by allowing material to be stored somewhere besides CPP-651, LEU will not require vault type security. This means that we are not depending entirely on SRS to complete their canyon operations and empty out their HEU vault.

- Repackaging the milled and blended material provides opportunity to package it in containers that can be put directly into the SRS dissolver (no plastic bags or bottles).

Using ANL-W for storage, processing, and disposition of materials provides the following advantages:

- A capability to remove Vycor glass from CPP-651 as early as the year 2000.
- Allows Vycor glass to be processed with similar material for removal of uranium.
- The glass separation process allows ANL-W to establish a capability that they can use to solve their own Vycor glass problem.
- Use of ANL-W simplifies material transfer issues.
- Reduces need to set up small lab-scale dissolutions at CPP.

Option C represents the best overall strategy for quickly removing SNM from CPP-651 because it will:

- Reduces the 10-year schedule by 37 months
- Balance reliance of onsite and offsite resources and their transitioning process capabilities and budgets
- Help assure success because the denitrator product is converted to a form that is more user friendly relative to storage and/or site specific processing capabilities
- Eliminate the utilization/restart of ICPP aqueous production purification systems
- Require minimal ICPP conditioning and funding (same as the base case). These expenditures ($2.7M for new construction) are recovered and exceeded by reduced schedule (no operations in the out years saves about $5 M)
- Produce incremental ES&H and security risks that do not appear to be significant
- Require minimal new dedicated staffing (13 FTEs) and their cost is recovered and exceeded by the savings that result from the reduced schedule
- Provide a blend of synergistic ICPP operations that utilize a common operational area and concept (dry glovebox operations) rather than different processes for each inventory item.

The main weakness of the proposed strategy is the additional funding (personnel and the dry blending equipment) relative to the current funding level. As noted earlier the procurement and installation of dry blending equipment do increase funding levels above what has been required in the past.

Another weakness of the proposed strategy is uncertainty of utilizing ANL-W and SRS to store, process, and disposition materials. Firm commitments from the DOE field offices for these sites will be

needed to ensure they can support this strategy. We are unsure if DP will need to fund ANL-W to process and/or store the DP material. ANL-W receives the majority of its funding from NE.

4.4.2 Contingency Strategies

The critical path issue for the proposed strategy is the probability/risk of the offsite receivers ever accepting or having room in their vaults to accept any of these materials, e.g., SRS needs room for the denitrator product and Rocky Flats HEU. This issue is resolved for the denitrator product by blending this material to less than 20% enrichment. This allows material to be accepted at another HEU dilution site as soon as the LEU is ready to ship and allows it to be stored in a warehouse rather than a SNM vault if the offsite receiver has no HEU storage space. In general if the proposed offsite receiver cannot receive the material this will require ICPP to condition that inventory via some lab scale process (see backup options identified in Table 2.4-1). This will be more time consuming and costly.

4.4.3 Future SNM Management Issues

Removal of SNM from CPP-651 will reduce the number of SNM vaults at the INEEL and reduce related costs. However, this does not necessarily imply that CPP-651 does not have a continued cost-effective role to play in the DOE complex. An overall complex-wide SNM storage strategy needs to be developed to assess the best use of post cold war SNM storage facilities. This type of study was initiated in *The Integrated Facility Plan* for the 94-1 Implementation Plan but the results have not yet been utilized to develop complex-wide facility planning strategies. The recent HEU vulnerability assessment has underscored safety-related risks of continuing to operate first generation SNM facilities throughout the complex. If HEU can be diluted fast enough, the need for new storage facilities and some related safety issues will be reduced. Under these circumstances, utilization of CPP-651 as an interim storage facility may help promote retirement of a higher risk facility at another site that may be scheduled for significant upgrade activity and thereby save money. The disposition of excess Pu and the storage of ^{233}U present other circumstances where CPP-651may provide a cost-effective role. The 3019 Building at Oak Ridge has been identified in the HEU vulnerability assessment and significant funding is anticipated to correct facility deficiencies. Relocating and storing this material in CPP-651 or any other newer facility in the DOE complex may prove to be much more cost-effective and would consolidate all ^{233}U for dispositioning and/or medical isotope production.

5. OBSERVATIONS AND RECOMMENDATIONS

5.1 Proposed Action

The recommended plan to empty CPP-651 can be divided into three general functions:

- Obtain commitments from receivers
- Process/condition HEU to remove unwanted waste materials, i.e., utilize ANL-W resources for timely storage and/or dispositioning of Vycor glass, ANL-E, and JANUS; SRS for off-spec denitrator product, Rock Flats, and University of Washington material
- Repackage and condition off-spec denitrator product to provide a more user friendly condition, i.e., mill and dry blend denitrator (with UO_3) to less than 20% enrichment and ship to SRS to serve as feed stock in their off-spec blending program for fabrication of TVA fuel.

These actions represent the best plan for removing SNM from CPP-651 because they will:

- Reduce the 10-year schedule by 37 months
- Balance reliance of onsite and offsite resources and their transitioning process capabilities and budgets
- Assure shipping dates for dry blended uranium oxide because the product is in a form that is more user friendly relative to storage and/or site-specific processing capabilities
- Not require utilization of ICPP aqueous production purification systems
- Require minimal ICPP conditioning and funding (same as the base case). These expenditures ($2.7M for new construction) are recovered and exceeded by reduced schedule (no operations in the out years saves about $5 M)
- Require minimal new dedicated staffing (13 FTEs) and their cost is recovered and exceeded by the savings that result from the reduced schedule
- Produce incremental ES&H and security risks that do not appear to be significant
- Provide a blend of synergistic ICPP operations that utilize a common operational area and concept (dry glovebox operations) rather than different processes for each inventory item.

5.2 Critical Path Issues

Figure 5.2-1 summarizes in a programmatic overview the efforts of this task team and the key conclusions that have been developed. Action is absolutely necessary relative to programmatic direction and funding if the identified benefits and savings are to be realized. The critical path issues for accelerated removal of SNM from CPP-651 include:

- Immediate funding to support the proposed program changes

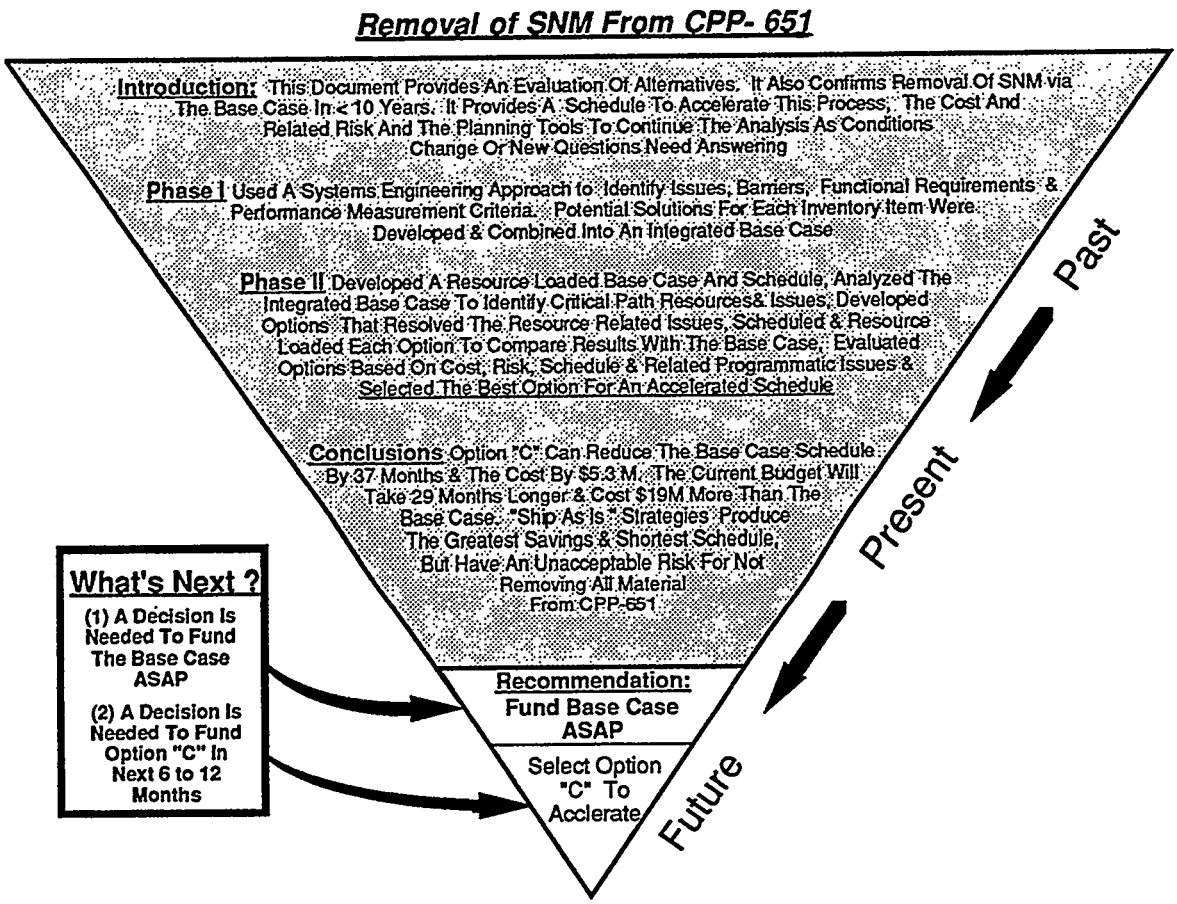


Figure 5.2.1 Programmatic overview of key conclusions.

- Continued regular and aggressive communications with offsite receivers
- Implementation of extra staff
- Implementation of the proposed milling and dry blending process.

The largest single inventory item and the most difficult to ship is the denitrator product. If denitrator material does not get into the off-spec dilution program, then the only remaining option in DOE's HEU management strategy is dilution to 0.9% for disposal. This will require an aqueous blending process that would be expensive and time consuming if initiated at ICPP as a one-time stand-alone program. DOE's current focus is on dispositioning HEU that has a value added capability (sales to LEU fuel fabricators). Thus, dispositioning of denitrator product via dilution to 0.9% on or before 2006 is unlikely. The proposed plan of dry blending to < 20% enrichment would provide a fall back position of at least not requiring vault storage for this material, because it would not be classified as SNM. Dry blending to less than 20% also simplifies receipt issues at SRS or any other site and promotes delivery prior to initiation of the off-spec dilution program. Shipping HEU to SRS in the near term requires vault space that is unavailable until their processing has emptied enough room in the vault (2001 for a two canyon operation and 2005 for a one canyon operation). Storage with unirradiated HWR fuel is under consideration and will continue to be evaluated. This may provide an earlier shipping date that could reduce or eliminate milling and dry blending.

Plutonium in the Rocky Flats material makes it difficult to get it into the HEU dispositioning cycle via Y-12. The SRS program will remove the Pu prior to TVA fuel fabrication. If for some reason SRS cannot take the material, we know of no other site at this time willing to receive it. However, dissolution and removal of the Pu via RAL operations would allow material to be removed from CPP-651 and shipped to Oak Ridge, but as previously mentioned this will take longer and cost more than the proposed action.

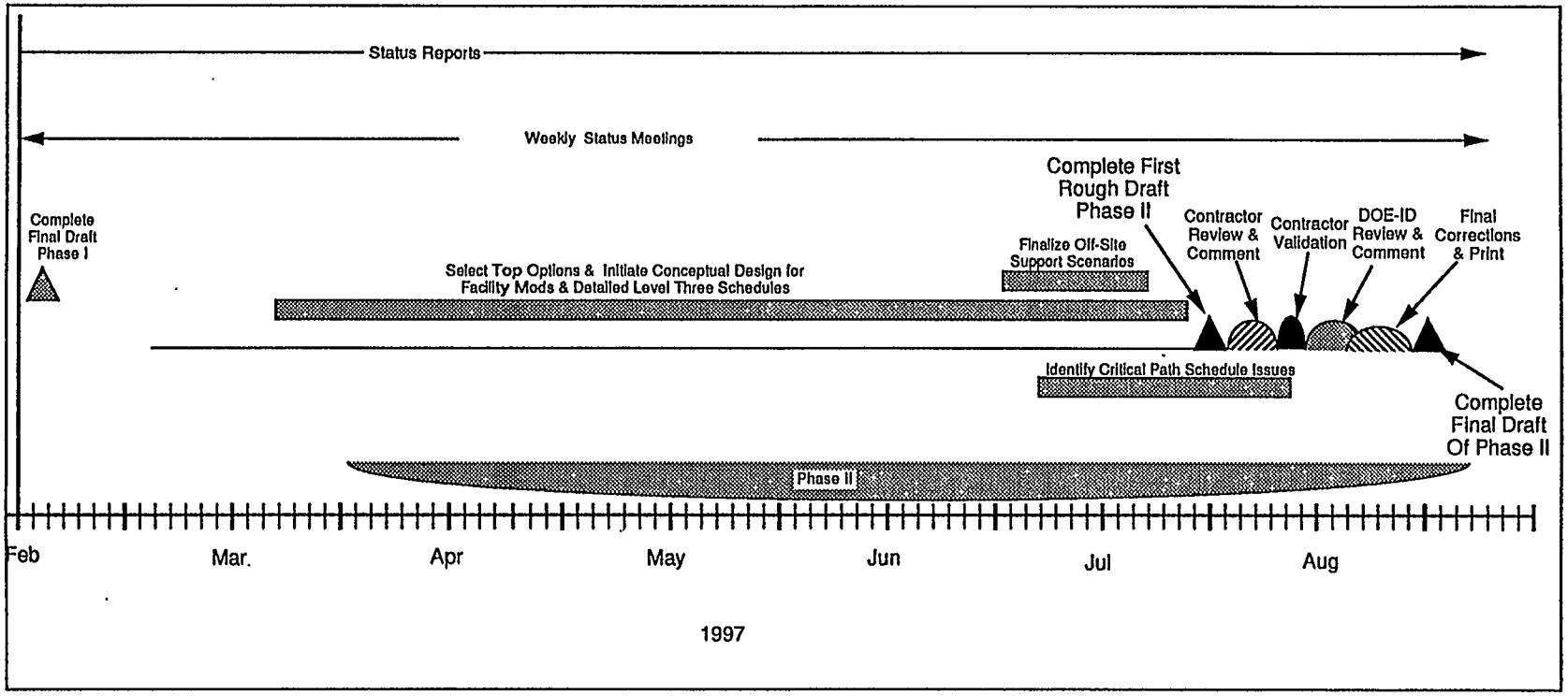
5.3 Path Forward

Publishing this report completes the Phase I and Phase II tasks and deliverables that are shown on the schedule in Figure 5.3-1. A conceptual strategy and contingency options have been developed to resolve local and national issues that are related to HEU management in CPP-651.

Thus, DOE-HQ approval and funding for these Phase II tasks should be initiated as soon as possible to at least implement the base case and if possible the accelerated schedule and its related tasks. This is very important for timely completion of ICPP actions that will integrate with various offsite processing capabilities and schedules. When approved by DOE, these ICPP HEU management plans well become an integrated part of a much larger post cold war transition program to disposition excess (HEU) (proliferation reduction) and promote consolidation of SNM to fewer locations at the INEL and across the DOE complex. The changes that have occurred across the DOE complex since the start of this study are significant and are likely to continue. Thus, the value of having this planning capability (resource data , offsite contacts and the planning software) is strategic to success. Maintaining this capability will require periodic updating and publication of the results. Ownership, funding, and control of this responsibility will be key to the continued planning success. Regular scheduled communications/contacts with the offsite receivers is another important success factor that is built into Option C. This information will also improve the remaining decisionmaking prior to finalizing commitments, schedules, and expending funds.

Successful early removal of SNM from CPP-651 will make this facility available for other support roles (e.g., dispositioning of ^{239}Pu or ^{233}U) that should be evaluated as part of a national stewardship and materials management planning process.

Figure 5.3-1. Schedule for CPP-651 feasibility study - Phase II.



Appendix A

Cost Estimates, Schedules and Flowsheets

for

CPP-651 Material Conditioning Options

Attachment A

Cost Estimates, Schedules and Flowsheets for CPP-651 Material Conditioning Options

PWR PLATES

Option 1 (Order drums, repackage, ship to B&W/NFS)

Cost

Cost to Procure Drum(s) = $ **6,000**

Cost to Design & fabricate 2R inner containers = $ **29,600**

Cost for Planning and preparations = $ **26,500**

Cost for Procedure Preparation = assume **$15,500**

Cost to Repackage in CPP-651 and Ship
$34,500 + ($1500/drum x 47 drum) = **$104,700**

Total Cost for Option 1 (Base Case) =
$ 6,000 + $ 29,600 + $26,500 + $15,500 + 104,700 = **$182,300**

Schedule: 4 months to procure containers and drums
9 months for planning & preparations
2 months to develop procedures and QA drums
3 months to repackage and ship

Total Duration for Option 1 (Base Case) = 18 months

Comments: The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

PWR PLATES
Option 2 (Obtain certification of SPERT boxes, ship, as-is to B&W/NFS)

Cost

Cost to Certify SPERT boxes:
Assume certification costs $3000 per box
$3,000 x 6 = **$18,000**

Cost for Planning and preparations = $ **23,300**

Cost for Procedure Preparation = assume **$15,500**

Cost to inventory material in CPP-651
$3500 per Spert box x 6 boxes = **$21,000**

Cost to perform radiation surveys, QA boxes, and remove from CPP-651
Assume $2000 per box
$2,000 x 6 boxes = **$12,000**

Total Cost for Option 2 =
$ 18,000 + $ 23,300 + $15,500 + $21,000 + $12,000 = **$89,800**

Schedule: 6 months to certify SPERT boxes
9 months for planning & preparations
2 1/2 months to develop procedures and QA drums
2 weeks to inventory and ship
Total Duration for Option 2 = 18 months

Comments: The Packaging and Transportation team determined that the Spert boxes were not an acceptable shipping package. No detailed cost estimates were performed for this option.

PWR PLATES
Option 3 (Manage as Spent Fuel) No cost estimate was performed for this option.

##

PWR Assembly

Option 1 (Certify the box the assembly is currently in, ship to B&W or NFS)

Cost:

Cost to Certify existing box = **$8,500**

Cost for Planning and preparations = $ **23,300**

Cost for Procedure Preparation = **$15,500**

Cost to inventory assembly in CPP-651 = **$10,100**

Cost to perform radiation surveys, QA box, and ship = **$8,900**

Total Cost for Option 1 (Base Case) =

$8,500 + $23,300 + $15,500 +$10,100 + $8,900 = **$66,300**

Schedule: 5 months to obtain certification
1 month for planning and preparations
2 months to develop procedures and QA drums
1 week to inventory and ship

Total Duration for Option 1 (Base Case) = 8 months

Comments: The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

PWR Assembly

Option 2 (Obtain certified B&W box, package into B&W box, ship to B&W or NFS)

* Assume fuel assembly will fit in B&W box without being cut.
* Assume that the repackaging and shipping of 1 B&W box is equivalent to the repackaging and shipping of 4 drums.

Cost

Cost for Planning and preparations = $ **23,300**

Cost for Procedure Preparation = **$15,500**

Cost to inventory assembly in CPP-651 = **$10,100**

Cost to perform radiation surveys and QA box = **$8,900**

Cost to Repackage in CPP-651 and Ship = **$7,500**

Total Cost for Option 2 =

$23,300 + $15,500 +$10,100 + $8,900 + $ 7,500 = **$65,300**

Schedule: 4 months to negotiate use of B&W box
1 month for planning and preparations
2 months to develop procedures and QA drums
1 week to inventory
1 month to repackage and ship

Total Duration for Option 2 = 8 months

Comments: The Packaging and Transportation team determined that the PWR Assembly would not fit in a B&W box without being cut. No detailed cost estimates were performed for this option.

PWR Assembly
Option 3 (Cut assembly to fit a certified shipping package)

Comments: The Packaging and Transportation team determined that the PWR Assembly could be shipped in its current storage package therefore no cutting would be required. No detailed cost estimates were performed for this option.

##

Fluorinel
Option 1 (Obtain longer 2R inner containers and certified 6M drums, package into 6M drums, ship to B&W or NFS)

* Assume that the repackaging and shipping of 1 B&W box is equivalent to the repackaging and shipping of 4 drums, therefore a total of 220,110-gallon, 6M drums are needed.

Cost

Cost to Procure 2R inner containers and Drum(s) = **$148,000**

Cost to Design & fabricate 2R inner containers = $ **29,600**

Cost for Planning and preparations = $ **45,600**

Cost for Procedure Preparation = **$30,000**

Cost to Repackage in CPP-651 and Ship
$28,000 + (1200/drum x 220 drums) = **$292,800**

Total Cost for Option 1 (Base Case) =
$148,000 + $29,600 + $ 45,600 +$30,000 +$292,800 = **$546,000**

Schedule: 6 months to procure 110 gallon, 6M drum
4 months for planning and preparations
2 months to develop procedures and QA drums
6 months to repackage and ship

Total Duration for Option 1 (Base Case) = 18 months

Comments: The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

Fluorinel

Option 2 (Obtain certified 6M drums, cut material to fit into 6M drums, package into 6M drums, ship to B&W or NFS)

* Assume it will take 55 B&W boxes to hold all of this Fluorinel material
* Assume that the repackaging and shipping of 1 B&W box is equivalent to the repackaging and shipping of 4 drums, therefore a total of 220, 110-gallon, 6M drums are needed.
* Assume that cutting can be done using glovebags, in CPP-651

Cost

Cost to Procure Drum(s)
$1,200 per 110 gallon drum x 220 drums = **$264,000**

Cost for Planning and preparations = $ **46,000**

Cost to cut material to fit into 6M drums
assume time to cut fuel is equivalent to repackaging and shipping every fourth drum or 1/4 the cost to repackage & ship
[$11,900 + (940/drum x 220 drums)] x 1/4 = **$54,675**

Cost for Procedure Preparation = **$30,000**

Cost to Repackage in CPP-651 and Ship
$11,900 + (940/drum x 220 drums) = **$218,700**

Total Cost for Option 2 =
$264,000 + $ 46,000 + $54,675 + $ 30,000 + $218,700 = **$613,375**

Schedule: 6 months to procure 110 gallon, 6M drum
4 months for planning and preparations
1 month to develop procedures and QA drums
5 months to cut
5 months to repackage and ship

Total Duration for Option 2 = 21 months

Comments: The Packaging and Transportation team determined that extra long 2R inner containers and 6M drums could be fabricated that could contain the long pieces of Fluorinel material therefore no cutting would be required. No detailed cost estimates were performed for this option.

Fluorinel

Option 3 (Obtain certified B&W boxes, package into B&W boxes, ship to B&W or NFS)

* Assume it will take 55 B&W boxes to hold all of this Fluorinel material

Cost

Cost for Procedure Preparation = assume **$30,000**

Cost for Planning and preparations = $ **45,600**

Cost to perform radiation surveys and inspect boxes in CPP-651
Assume $500 per box
$500 x 55 boxes = **$27,500**

Cost to Repackage in CPP-651 and Ship
$3500 per B&W box x 55 boxes = **$192,500**

Total Cost for Option 3 =
$ 30,000 + $45,600 + $27,500 + $192,500 = **$295,600**

Schedule: 3 months to negotiate use of B&W boxes
2 months to develop procedures and QA drums
4 months for planning and preparations
12 months to repackage and ship

Total Duration for Option 3 = 21 months

Comments: The Packaging and Transportation team determined that extra long 2R inner containers and 6M drums could be fabricated that could contain the long pieces of Fluorinel material therefore no B&W boxes were needed. No detailed cost estimates were performed for this option.

##

University of Washington

Option 1 & 2 (Repackage and ship to either SRS or Y-12)

Cost:

Cost for Planning and preparations = $ **10,600**

Cost for Procedure Preparation = **$15,500**

Cost to perform radiation surveys, inspect and QA drum
Assume $2200 per drum
$2,200 x 1 drum = **$2,200**

Cost to Repackage in CPP-651 and Ship
$11,000 + (1000/drum x 1 drum) = **$12,000**

Total Cost for Option 1 (Base Case) & 2 =
$10,600 + $15,500 +$2,200 +$12,000 = **$40,300**

Schedule: 2 months for planning and preparations
2 months to develop procedures and QA drums
1 day to ship

Total Duration for Option 1 (Base Case) & 2 = 4 months

Comments: The characterization data showed that the material did not meet the Y-12 acceptance criteria therefore the material will be sent to SRS. The Primavera generated Base Case detailed resources, cost data and scheduled activities for option 1 is shown in Appendix C and D of this report.

University of Washington

Option 3 (CPP Stabilization to Uranium Oxide, repackage and ship to Y-12)

Assumed a small lab scale set-up is used that consists of a 10 liter dissolver. The dissolver can process approximately 50 grams of uranium per batch. Assumed the waste is disposed of via the PEW system. The University of Washington Aluminum Clad Plates contain approximately 460 grams of Uranium.

Cost:

Dissolution of this material (460 grams uranium) will require 10 batches through the dissolver.
Estimated time - 2 people full time for three weeks.
Cost to stabilize: 2 people x 40 hrs/wk. x 3 wks x $67/hr = **$16,080**

Total Cost for Option 3 to stabilize, repackage and ship to Y-12 =
$40,300 (see option 1 & 2) + $16,080 = **$56,380**

Schedule: 3 weeks to stabilize material
2 months for planning and preparations
2 months to develop procedures and QA drums
1 day to ship

Total Duration for Option 3 = 5 months

Comments: No detailed cost estimates were performed for this option.

##

University of Wisconsin

Option 1 & 2 (Repackage and ship to either Y-12 or SRS)

Cost:

Cost for Planning and preparations = $ **10,500**

Cost for Procedure Preparation = assume **$15,500**

Cost to perform radiation surveys, inspect and QA drum
Assume $2200 per drum
$2,200 x 1 drum = **$2,200**

Cost to Repackage in CPP-651 and Ship
$14,000 + (1000/drum x 1 drum) = **$15,000**

Total Cost for Option 1 (Base Case) & 2 =
$10,500 + $15,500 +$2,200 +$15,000 = **$43,200**

Schedule: 2 months for planning and preparations
2 months to develop procedures and QA drums
1 day to ship

Total Duration for Option 1 (Base Case) & 2 = 4 months

Comments: The material meets the Y-12 acceptance criteria therefore the material will be sent to Y-12. The Primavera generated Base Case detailed resources, cost data and scheduled activities for option 1 is shown in Appendix C and D of this report.

University of Wisconsin

Option 3 (ICPP Stabilization to Uranium Oxide, order drums, repackage, ship to Y-12)

Assumed a small lab scale set-up is used that consists of a 10 liter dissolver. The dissolver can process approximately 50 grams of uranium per batch. Assumed the waste is disposed of via the PEW system. The University of Wisconsin Aluminum Clad Plates contain approximately 150 grams of Uranium.

Cost:

Dissolution of this material (150 grams uranium) will require 3 batches through the dissolver.
Estimated time - 2 people full time for two weeks.
Cost to stabilize: 2 people x 40 hrs/wk. x 2 wks x $67/hr = **$10,720**

Total Cost Option 3 to stabilize, order drums, repackage, ship to Y-12 =
$43,200 (see option 1 & 2) + $10,720 = **$53,920**

Schedule:
2 weeks to stabilize material
2 months for planning and preparations
2 months to develop procedures and QA drums
1 day to ship
Total Duration for Option 3 = 5 months

Comments: No detailed cost estimates were performed for this option.

##

Custom Product

Option 1 (Order seven 6M drums, repackage small bottles into 6M drums, borrow four DC-1 shipping packages from Y-12, repackage 4 large bottles into DC-1's, ship to Y-12.)

Cost:

Cost to Procure Drum(s)
$600 per 55 gallon drum x 7 drums = **$4200**

Cost for Planning and preparations = $ **20,200**

Cost for Procedure Preparation = **$15,500**

Cost to Repackage 11 drums in CPP-651 and Ship
$20,000 + (1500/drum x 11 drums) = **$36,500**

Total Cost for Option 1 (Base Case) =
$4,200 + $20,200 + $15,500 + $36,500 = **$76,400**

Schedule: 1 1/2 months for planning and preparations
2 months to develop procedures and QA drums
2 weeks to ship

Total Duration for Option 1 (Base Case) = 4 months

Comments: The material meets the Y-12 acceptance criteria therefore the material will be sent to Y-12. The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

Custom Product

Option 2 (Order drums, repackage 7 drums in CPP-651, repackage 4 bottles in CPP-651, ship to Y-12)

Cost:

Cost to Procure Drum(s)
$600 per 55 gallon drum x 11 drums = **$6600**

Cost for Planning and preparations = $ **20,200**

Cost for Procedure Preparation = **$15,500**

Cost to Repackage 7 drums of the 11 in CPP-651 and Ship
$11,900 + (940/drum x 7 drums) = **$18,480**

Cost to Repackage the 4 large bottles into smaller bottles in CPP-651 and ship
assumes process initiation costs are incurred within the denitrator product estimate
1 Technical Shift Engineer at $65/hour
1 Radcon Technician at $49/hour
1 Supervisor at $52/hour
3 Operators at $52/hour
8 hours worth of work in a 10 hour shift. Work 4 10 hour shifts per week. Estimate repackaging 15 big bottles of HEU per day. Will repackage one big bottle every ½ hour. Repackaging a total of 4 big bottles of Custom Product.

1 day (to repackage 4 bottles at 15 bottles per day) x 10 hrs/day = 10 hours
($65/hr x 10 hrs) + ($49/hr x 10 hrs) + ($52 x 4 x 10 hours) =
$650 + $490 + $2080 = **$3,220**

Guards on average have cost $80,000 per month (assume $5,000 per day)
Assume we need 2 days = **$10,000**

Cost to repackage & ship each drum in CPP-651:

10 hour days at 15 drums per day = .67 hours per drum

3 Operators = .67 laborhrs/drum x 3 x $52/hr	=	$110/drum
2 Foreman/Supervisor = .67 laborhrs/drum x 2 x $52/hr	=	$70/drum
1 Engineer/Scientist = .67 laborhrs/drum x $67/hr	=	$50/drum
1 Radcon Tech. = .67 laborhrs/drum x $49/hr	=	$40/drum
Total		$270/drum x 4 drums = **$1,080**

Total Cost for Option 2 =

$6,600 + $20,200 + $15,500 + $18,480 + $3,220 + $10,000 + $1,080 = **$75,080**

Schedule: 4 months to procure a 55 gallon, 6M drums
1 1/2 months for planning and preparations
2 months to develop procedures and QA drums
1 week to repackage in CPP-651
1 week to ship
Total Duration for Option 2 = 8 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for repackaging the Denitrator Product and installing the glovebox is shown as option 5 for the Denitrator Product in this appendix.

Custom Product

Option 3 (Order drums, repackage 7 drums in CPP-651 and ship to Y-12;dry-blend remaining 4 bottles to less than 20% enrichment, repackage into 40 smaller cans which will be shipped in 20 6M drums to SRS.)

- Assumed a 5 to 1 dilution is used to reduce the enrichment to less than 20%.

Cost:

Cost to Procure Drum(s)
$600 per 55 gallon drum x 27 drums = **$16,200**

Cost for Planning and preparations = $ **20,200**

Cost for Procedure Preparation = **$15,500**

Cost to Repackage 7 drums of the 20 in CPP-651 and Ship to Y-12
$11,900 + (940/drum x 7 drums) = **$18,480**

Dry blend 4 large bottles into 40 small cans (2 per drum) in CPP-651 and ship to SRS
assumes process initiation costs are incurred within the denitrator product estimate

1 Technical Shift Engineer at $65/hour
1 Radcon Technician at $49/hour
1 Supervisor at $52/hour
3 Operators at $52/hour

8 hours worth of work in a 10 hour shift. Work 4 10 hour shifts per week. Estimate repackaging 15 big bottles of HEU per day. Will repackage one big bottle every ½ hour. Blending and repackaging a total of 4 big bottles of Custom Product to fit into 20 6M drums.

3 days (to repackage 4 bottles at 15 new bottles per day) x 10 hrs/day = 30 hours

($65/hr x 30 hrs) + ($49/hr x 30 hrs) + ($52 x 4 x 30 hours) =
$1,950 + $1,470 + $6,240 = **$9,660**

Guards on average have cost $80,000 per month (assume $5,000 per day)
Assume we need 6 days = **$30,000**

Cost to repackage & ship each drum in CPP-651:

10 hour days at 15 drums per day = .67 hours per drum

3 Operators = .67 laborhrs/drum x 3 x $52/hr =	$110/drum
2 Foreman/Supervisor = .67 laborhrs/drum x 2 x $52/hr =	$70/drum
1 Engineer/Scientist = .67 laborhrs/drum x $67/hr =	$50/drum
1 Radcon Tech. = .67 laborhrs/drum x $49/hr =	$40/drum
Total	$270/drum x 20 drums = **$5,400**

Cost for Decontamination and Accountability = **$30,000**

Total Cost for Option 3 = $16,200 + $20,200 + $ 15,500 + $18,480 + $9,660 + $30,000 + $5,400 + $30,000 = **$145,440**

Schedule:
4 months to procure a 55 gallon, 6M drums
1 1/2 months for planning and preparations
2 months to develop procedures and QA drums
2 weeks to dry blend and repackage in CPP-651
1 week to ship

Total Duration for Option 3 = 8 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for dry blending the Denitrator Product is shown as option 1 for the Denitrator Product in this appendix.

##

GEFAST

Option 1 (Repackage 4 cans into 6M drums in CPP-651 and ship to Y-12)

Cost:

Cost for Planning and preparations = $ **8,500**

Cost for Procedure Preparation = assume **$14,000**

Cost to perform radiation surveys, inspect and QA drum

Assume $1200 per drum

$1,200 x 4 drum = **$4,800**

Cost to Repackage 4 drums in CPP-651 and Ship

$9,500 + (1000/drum x 4 drums) = **$13,500**

Total Cost for Option 1 (Base Case) for GEFAST

$8,500 + $14,000 + $4,800 +$13,500 = **$40,800**

Schedule: 2 months for planning and preparations

2 months to develop procedures and QA drums

1 week to load and ship drums

Total Duration for Option 1 (Base Case), GEFAST = 5 months

GEFAST - AWF-1

Option 1 (Purchase one UN1A2 drum; repackage 1 large can into UN1A2 drum in CPP-651 and ship to Y-12)

Cost:

Cost to Procure one UN1A2 drum

$900 per UN1A2 drum x 1 drum = **$900**

Cost for Planning and preparations = $ **4,300**

Cost for Procedure Preparation = assume **$14,000**

Cost to Repackage 1 UN1A2 drum in CPP-651 and Ship

$11,900 + (940/drum x 1 drums) = **$3,400**

Total Cost Option 1 (Base Case) for GEFAST-AWF-1

$900 +4,300 + $14,000 + $3,400 = **$22,600**

Schedule: 2 month for planning and preparations
2 months to develop procedures and QA drums
1 months to procure & load UN1A2 drum

Total Duration for Option 1 (Base Case), GEFAST AWF-1 = 5 months

++

Total Cost Option 1 (Base Case) for GEFAST & GEFAST-AWF-1

$40,800 + $22,600= $ 63,400

Total Duration for Option 1 (Base Case) for GEFAST & GEFAST AWF-1

= 5 months

Comments: The material meets the Y-12 acceptance criteria therefore the material will be sent to Y-12. The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

GEFAST - AWF-1

Option 2 (Re-can 1 can into 3 smaller cans in CPP-651, repackage 3 cans into 3 6M drums in CPP-651, ship to Y-12)

Cost:

Cost for Planning and preparations = $ **4,300**

Cost for Procedure Preparation = assume **$14,000**

Re-can 1 large can into smaller cans in CPP-651
Cost to Repackage the 1 large can in CPP-651 and ship
assumes process initiation costs are incurred within the denitrator product estimate
1 Technical Shift Engineer at $65/hour
1 Radcon Technician at $49/hour
1 Supervisor at $52/hour
3 Operators at $52/hour
8 hours worth of work in a 10 hour shift. Work 4 10 hour shifts per week. Estimate repackaging 15 big bottles of HEU per day. Will repackage one big bottle every ½ hour. Repackaging 1 big can of GEFAST.

1 day (to repackage 1 can at 15 bottles per day) x 10 hrs/day = 10 hours
($65/hr x 10 hrs) + ($49/hr x 10 hrs) + ($52 x 4 x 10 hours) =
$650 + $490 + $2080 = **$3,220**

Guards on average have cost $80,000 per month (assume $5,000 per day)
Assume we need 2 days = **$10,000**

Cost to repackage & ship each drum in CPP-651:

10 hour days at 15 drums per day = .67 hours per drum

3 Operators = .67 laborhrs/drum x 3 x $52/hr =	$110/drum
2 Foreman/Supervisor = .67 laborhrs/drum x 2 x $52/hr =	$70/drum
1 Engineer/Scientist = .67 laborhrs/drum x $67/hr =	$50/drum
1 Radcon Tech. = .67 laborhrs/drum x $49/hr =	$40/drum
Total	$270/drum x 3 drums = **$810**

Decontamination and Accountability = **$30,000**

Total Cost for Option 2 for GEFAST-AWF-1 =

$4,300 + $14,000 + $3,220 + $10,000 + $810 + $30,000 = **$62,330**

Total Cost for GEFAST (Option 1) + GEFAST-AWF-1 (Option 2) =

$40,800 + 62,330 = $103,130

Schedule:
- 4 months to procure a 55 gallon, 6M drums
- 2 ½ months for planning and preparations
- 2 months to develop procedures and QA drums
- 1 week to load and ship drums
- 1 week to repackage in CPP-651

Total Duration for Option 2 for GEFAST-AWF-1 = 9 months

* Duration for GEFAST option 1 can be done concurrently.

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for repackaging the Denitrator Product is shown as option 5 for the Denitrator Product in this appendix.

GEFAST - AWF-1

Option 3 (Dry-blend 1 can to less than 20% enrichment, repackage into 10 cans which will be shipped in 5 6M drums to SRS.)

Cost:

Cost to Procure Drum(s)

$600 per 55 gallon drum x 5 drums = **$3,000**

Cost for Planning and preparations = $ **4,300**

Cost for Procedure Preparation = assume **$14,000**

Dry blend 1 large can into 10 cans (2 per drum) in CPP-651 and ship to SRS assumes process initiation costs are incurred within the denitrator product estimate

- 1 Technical Shift Engineer at $65/hour
- 1 Radcon Technician at $49/hour
- 1 Supervisor at $52/hour
- 3 Operators at $52/hour

8 hours worth of work in a 10 hour shift. Work 4 10 hour shifts per week. Estimate repackaging 15 big bottles of HEU per day. Will repackage one big bottle every ½ hour. Blending and repackaging 1 big can of GEFAST to fit into 5 6M drums.

1 day (to repackage 1 can at 15 new cans per day) x 10 hrs/day = 10 hours

($65/hr x 10 hrs) + ($49/hr x 10 hrs) + ($52 x 4 x 10 hours) =
$650 + $490 + $2,080 = **$3,220**

Guards on average have cost $80,000 per month (assume $5,000 per day)
Assume we need 2 days = **$10,000**

Cost to repackage & ship each drum in CPP-651:

10 hours day at 15 drums per day = .67 hours per drum

3 Operators = .67 laborhrs/drum x 3 x $52/hr	=	$110/drum
2 Foreman/Supervisor = .67 laborhrs/drum x 2 x $52/hr	=	$70/drum
1 Engineer/Scientist = .67 laborhrs/drum x $67/hr	=	$50/drum
1 Radcon Tech. = .67 laborhrs/drum x $49/hr	=	$40/drum
Total		$270/drum x 5 drums = **$1,350**

Decontamination and Accountability = **$30,000**

Total Cost for Option 3 for GEFAST-AWF-1 =
$3,000 + $ 4,300 + $ 14,000 + $3,220 + $10,000 + $1,350 + $30,000 = **$65,870**

Total Cost for GEFAST (Option 1) + GEFAST-AWF-1 (Option 3) =
$40,800 + 65,870 = $106,670

Schedule:
4 months to procure a 55 gallon, 6M drums
2 ½ months for planning and preparations
2 months to develop procedures and QA drums
1 week to load and ship drums
2 weeks to repackage in CPP-651

Total Duration for Option 3 for GEFAST-AWF-1 = 9 months

* Duration for GEFAST option 1 can be done concurrently.

Comments: No detailed cost estimates were performed for this option. The Primavera generated Base Case detailed resources, cost data and scheduled activities for dry blending the Denitrator Product is shown as option 1 for the Denitrator Product in this appendix.

##

Janus
Option 1 (Ship in current drum to ANL-W)

Cost:

Cost for Planning and preparations = $ **15,200**

Cost for Procedure Preparation = **$15,500**

Cost to perform radiation surveys, inspect and QA drum
Assume $1200 per drum
$1,200 x 3 drums = **$3,600**

Cost to Ship to ANL-W = **$12,000**

Total Cost for Option 1 (Base Case) =
$15,200 +15,500 + $3,600 +$12,000 = **$46,300**

Schedule: 1 1/2 months for planning and preparations
2 months to develop procedures and QA drums
1 week to ship
Total Duration for Option 1 (Base Case) = 4 months

Comments: The material does not meet the Y-12 acceptance criteria therefore the material will be sent to ANL-W. The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

Janus
Option 2 (Repackage, ship to Y-12)

Cost:

Cost for Planning and preparations = $ **15,200**

Cost for Procedure Preparation = **$15,500**

Cost to perform radiation surveys, inspect and QA drum
Assume $1200 per drum
$1,200 x 3 drums = **$3,600**

Cost to Repackage in CPP-651 and Ship
$11,900 + (940/drum x 3 drum) = **$14,720**

Total Cost for Option 2 = $15,200 + $15,500 + $3,600 +$14,720 = **$49,020**

Schedule: 1 1/2 months for planning and preparations
2 months to develop procedures and QA drums
1 week to ship
Total Duration for Option 2 = 4 months

Comments: The characterization data showed that the material did not meet the Y-12 acceptance criteria therefore the material will be sent to ANL-W. No detailed cost estimates were performed for this option.

Janus

Option 3 (ICPP Stabilization to Uranium Oxide, order drums, repackage, ship to Y-12)

Assumed a small lab scale set-up is used that consists of a 10 liter dissolver. The dissolver can process approximately 50 grams of uranium per batch. Assumed the waste is disposed of via the PEW system. The Janus material consists of stainless steel clad plates.

Cost:

Dissolution of this material (34,000 grams uranium) will require 680 batches through an electrolytic dissolver. Estimated time 2 people full time for 1 year.
Cost: 2 people x 1920 hours/yr x $67/hr = **$260,000**

Total Cost for Option 3 to stabilize, order drums, repackage, ship to Y-12 =
$49,020 (see option 2) + $260,000 = **$309,020**

Schedule: 12 months weeks to stabilize material
4 months to procure a 110 gallon, 6M drum
1 1/2 months for planning and preparations
2 months to develop procedures and QA drums
1 week to ship

Total Duration for Option 3 = 20 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for dissolution of the Denitrator Product is shown as option 3 and 4 for the Denitrator Product in this appendix.

Vycor Glass:

Option 1 (Send to ANL-W, provide funds to ANL-W for dry processing using their magnetic separator)

The Vycor glass will be shipped to Argonne in the drums that it is currently stored in. Each drum will contain approximately 24 cans of Vycor glass.

Cost:

Cost for Planning and preparations = **$4,900**

Cost to perform radiation surveys, inspect and QA drum
Assume $1,200 per drum
$1,200 x 10 drums = **$12,000**

Cost to inventory and Ship to ANL-W = **$16,900**

Argonne plans on removing the uranium from the Vycor glass by using a magnetic separation process. Argonne has already purchased and tested the magnetic separator. Assuming budget was provided to them in 1998, the Vycor glass could be shipped from ICPP to Argonne-West in 2000.

Listed below are the estimated costs for Argonne to set up the process for the Vycor glass.

2 operators - 6 months time	$150,000
glovebox purchase and installation	$150,000
engineering design & support - 4 months	$ 75,000
training & start-up	$ 65,000
safety documentation & procedures	$ 30,000
overhead - HP's, Radiation Safety, NDA, MC&A, etc.	$ 75,000
Total	**$545,000**

Total Cost for Option 1 (Base Case) =

$4,900 + $12,000 +$16,900 +$545,000= **$578,800**

Schedule: 4 months for planning and preparations
2 months to develop inventory procedure and QA drums
1 week to inventory and ship

Total Duration for Option 1 (Base Case) = 6 months

Comments: The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

Vycor Glass:

Option 2 (Stabilize to uranium oxide, then repackage and send to Y-12

Cost:

Cost for Planning and preparations = **$4,900**

Cost to perform radiation surveys, inspect and QA drum
Assume $1,200 per drum
$1,200 x 10 drums = **$12,000**

Dissolution of this material (5,500 grams uranium) will require 110 batches through the dissolver. Estimated time 2 people full time for 9 months.
Cost: 2 people x 160hrs/mo. x 9 mo. x $67/hr = **$200,000.**

Cost to dispose of glass, assume $800 per drum
$800 x 10 drums = **$8,000**

Cost to package and ship to Y-12 = **$16,500**

Total Cost for Option 2 to stabilize, repackage, ship to Y-12 =
$4,900 + $12,000 + $200,000 + $8,000 + $16,500 = **$241,400**

Schedule: 9 months weeks to stabilize material
4 months to procure a 55 gallon, 6M drum
4 months for planning and preparations
2 months to develop inventory procedure and QA drums
1 week to package and ship
Total Duration for Option 2 = 19 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for dissolution of the Denitrator Product is shown as option 3 and 4 for the Denitrator Product in this appendix.

##

ANL-W EBR-II Scrap

Option 1 (Repackage material, ship to Y-12)

Cost:

Cost for Planning and preparations = **$4,000**

Cost for Procedure Preparation = **$12,000**

Cost to perform radiation surveys, inspect and QA drum
Assume $1,200 per drum
$1,200 x 20 drums = **$24,000**

Cost to Repackage in CPP-651 and Ship
$12,400 + (1200/drum x 20 drum) = **$36,400**

Total Cost for Option 1 (Base Case) =
$4,000 + $12,000 + $24,000 + $36,400 = **$76,400**

Schedule:
4 months for planning and preparations
2 months to develop procedure and QA drums
1 week to package and ship

Total Duration for Option 1 (Base Case) = 6 months

Comments: The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

ANL-W EBR-II Scrap
Option 2 (Ship to ANL-W)

Cost:
Cost for Planning and preparations = **$4,000**

Cost for Procedure Preparation = **$12,000**

Cost to perform radiation surveys, inspect and QA drum
Assume $1,200 per drum
$1,200 x 20 drums = **$24,000**

Cost to Ship to ANL-W
$11,900 + (940/drum x 20 drum) = **$30,700**

Total Cost for Option 2 = $4,000 + $12,000 + $24,000 +$30,700 = **$70,700**

Schedule: 4 months for planning and preparations
2 months to develop procedure and QA drums
1 week to inventory and ship

Total Duration for Option 2 = 6 months

Comments: The characterization data showed that the material did meet the Y-12 acceptance criteria therefore the material will not be sent to ANL-W. No detailed cost estimates were performed for this option.

ANL-W EBR-II Scrap

Option 3 (ICPP Stabilization to Uranium Oxide, repackage, ship to Y-12)

Assumed a small lab scale set-up is used that consists of a 10 liter dissolver. The dissolver can process approximately 50 grams of uranium per batch. Assumed the waste is disposed of via the PEW system. The ANL-W EBR-II scrap contains approximately 1,000 grams of Uranium.

Cost:

Dissolution of this material (1,000 grams uranium) will require 20 batches through the dissolver.

Estimated time - 2 people full time for two months.

Cost to stabilize: 2 people x 40 hrs/wk. x 8 wks x $67/hr = **$42,880**

Total Cost for Option 3 stabilize, order drums, repackage, ship to Y-12 = $70,700 (see option 2) + $42,880 = **$113,580**

Schedule:
- 8 weeks to stabilize material
- 4 months for planning and preparations
- 2 months to develop procedure and QA drums
- 1 week to inventory and ship

Total Duration for Option 3 = 8 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for dissolution of the Denitrator Product is shown as option 3 and 4 for the Denitrator Product in this appendix.

##

ANL-E Hot Cell Explosion Scrap

Option 1 (Ship to ANL-W)

Cost:

Cost for Planning and preparations = **$ 18,000**

Cost for Procedure Preparation = **$15,500**

Cost to perform radiation surveys, inspect and QA drum = **$ 3,800**

Cost to Ship to ANL-W = **$11,500**

Total Cost for Option 1 (Base Case) =
$18,000 + $15,500 + $3,800 +$11,500 = **$48,800**

Schedule: 2 months for planning and preparations
2 months to develop procedure and QA drums
1 week to inventory and ship

Total Duration for Option 1 (Base Case) = 4 months

Comments: The Primavera generated Base Case detailed resources, cost data and scheduled activities for this option is shown in Appendix C and D of this report.

ANL-E Hot Cell Explosion Scrap

Option 2 (ICPP Stabilization to Uranium Oxide, repackage, ship to Y-12)

Assumed a small lab scale set-up is used that consists of a 10 liter dissolver. The dissolver can process approximately 50 grams of uranium per batch. Assumed the waste is disposed of via the PEW system. The ANL-E Hot Cell Explosion scrap contains approximately 1,000 grams of uranium.

Cost:

Dissolution of this material (1000 grams uranium) will require 20 batches through the dissolver. Estimated time - 2 people full time for two months.
Cost to stabilize: 2 people x 40 hrs/wk. x 8 wks x $67/hr = **$42,880**

Total Cost for Option 2 to stabilize, repackage, ship to Y-12 =
$52,020 (see option 3) + $42,880 = **$94,900**

Schedule: 8 weeks to stabilize material
2 months for planning and preparations
2 months to develop procedure and QA drums
1 week to repackage and ship

Total Duration for Option 2 = 6 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for dissolution of the Denitrator Product is shown as option 3 and 4 for the Denitrator Product in this appendix.

ANL-E Hot Cell Explosion Scrap

Option 3 (Repackage and ship to Y-12)

Cost:

Cost for Planning and preparations = **$ 18,000**

Cost for Procedure Preparation = **$15,500**

Cost to perform radiation surveys, inspect and QA drum = **$ 3,800**

Cost to repackage and ship to Y-12 = **$14,720**

Total Cost for Option 3 =
$18,000 + $15,500 + $3,800 +$14,720 = **$52,020**

Schedule: 2 months for planning and preparations
2 months to develop procedure and QA drums
1 week to repackage and ship

Total Duration for Option 3 = 4 months

Comments: The characterization data showed that the material did not meet the Y-12 acceptance criteria therefore the material will be sent to ANL-W. No detailed cost estimates were performed for this option.

##

Rocky Flats

Option 1 (Repackage and ship as HEU to SRS)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **16,344**

Cost to QA drums = **$3,186**

Cost for Procedure Preparation and Training = **$19,800**

Cost to Repackage in CPP-651 and Ship = **$24,203**

Total Cost for Option 1 = $16,344 + $3,186 + $19,800 +$24,203 = **$63,533**

Schedule: 2 months for planning and preparations
2 months to develop procedures, train and QA drums
1 week to repackage and ship
Total Duration for Option 1 = 4 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost	FY00 4
Rocky Flats Material - Ship As Is							
		100	19JAN00	27APR00	1,214.00	63,532.76	

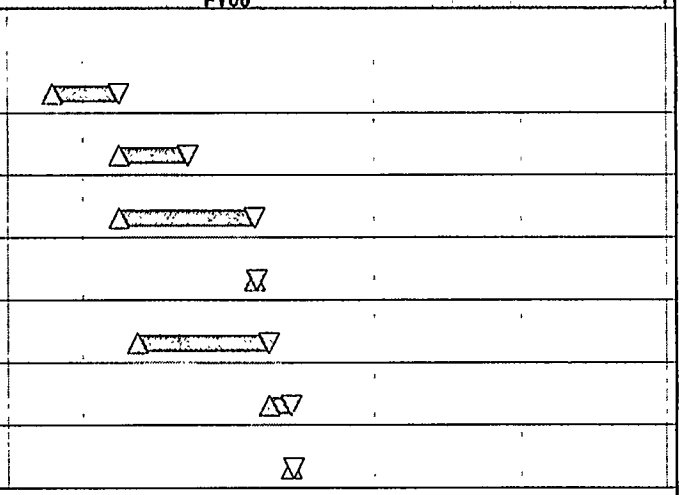
Project Start	01JUL97	Early Bar	COMP:ASIS
Project Finish	05MAR10	Progress Bar	Sheet 1 of 1
Data Date	01OCT97	Critical Activity	
Run Date	20AUG97		

LMITCO - CPP 651 MATERIALS SCHEDULE

ROCKY FLATS OPT 1 - SHIP AS IS

Summary

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Rocky Flats Material - Ship As Is					
+ Project Definition					
	16	19JAN00	15FEB00	80.00	4,200.60
+ Procurement					
	16	16FEB00	14MAR00	60.00	3,185.80
+ Procedures					
	32	16FEB00	11APR00	310.00	15,998.50
+ Training					
	1	12APR00	12APR00	70.00	3,801.40
+ S&S Plans for Repackaging					
	31	23FEB00	17APR00	244.00	12,142.96
+ Material Repackaging					
	4	18APR00	26APR00	360.00	19,487.90
+ Product Shipment					
	1	27APR00	27APR00	90.00	4,715.60



Project Start	01JUL97
Project Finish	30JAN09
Data Date	01OCT97
Run Date	19AUG97

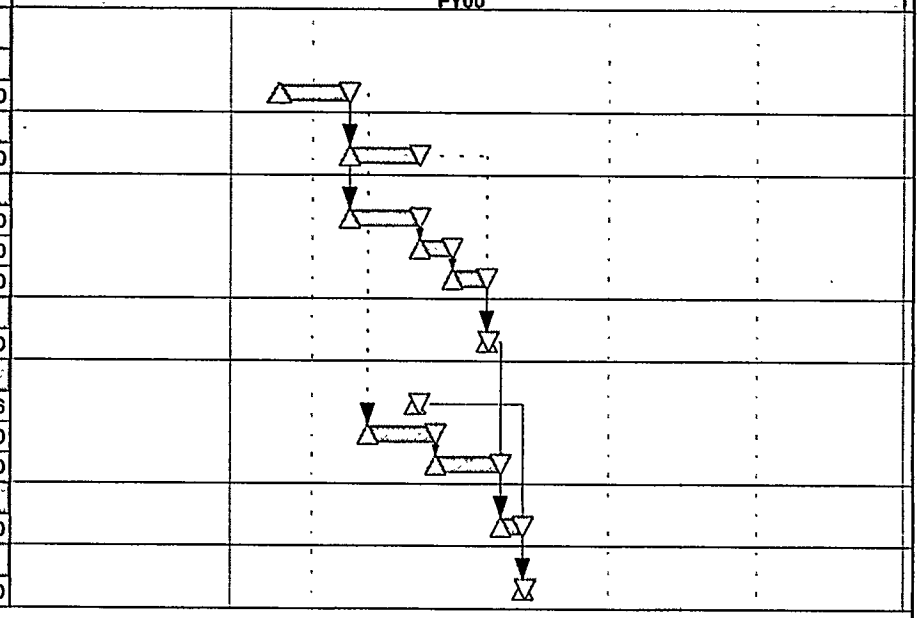
Early Bar
Progress Bar
Critical Activity

COMP:ASIS

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 1 - SHIP AS IS
Summarized by Functional Area

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Rocky Flats Material - Ship As Is					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	16	19JAN00*	15FEB00	80.00	4,200.60
Procurement					
Inspect & PM Shipping Container	16	16FEB00	14MAR00	60.00	3,185.80
Procedures					
Develop Procedure	16	16FEB00	14MAR00	160.00	7,754.80
Review & Resolve Comments	8	15MAR00	28MAR00	120.00	6,623.50
Approve New Procedure	8	29MAR00	11APR00	30.00	1,620.20
Training					
Practice Dry Run	1	12APR00	12APR00	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	14MAR00	14MAR00	4.00	200.56
Material Control & Accountability Work	16	23FEB00	21MAR00	160.00	7,961.60
Complete Materials Management Plan Activities	15	22MAR00	17APR00	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	4	18APR00	26APR00	360.00	19,487.90
Product Shipment					
Load Truck and Ship to Receiver	1	27APR00	27APR00	90.00	4,715.60



Project Start	01JUL97
Project Finish	30JAN09
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

COMP:ASIS

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 1 - SHIP AS IS
Detailed Activities Schedule

MITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | CURRENT FUNDING -SHIP AS IS SCENARIO

EPORT DATE 19AUG97 RUN NO. 487 16:46 | COST LOADING REPORT | START DATE 01JUL97 FIN DATE 30JAN09

DATA DATE 01OCT97 PAGE NO. 1

ost load by resource type | TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 2000	TOTAL
341E140	Radiological Engineer	1216	1216
342T050	Radiological Technician	1975	1975
420E110	Quality Engineer	513	513
420T060	Quality Inspector	1538	1538
280P170	Transporation Coordinator	2708	2708
110E130	Other/Technical Engineer	781	781
112M010	CPP 651 Operations Foreman	1038	1038
112R040	CPP 651 Fuel Operators	14008	14008
113E080	Facility Fuel Engineer	13281	13281
130P130	Trainer	1500	1500
152P160	Procedure Writer	4128	4128
221E010	Technical Safety Engineer (TSE)	709	709
432E130	Plant Systems Engineer	1207	1207
100E130	Security Operations	604	604
120P170	Safeguards & Accountability	16421	16421
520R080	Equipment Operator	1906	1906
	REPORT TOTAL	**63533**	**63533**

LMITCO - CPP 651 MATERIAL SCHEDULE

PRIMAVERA PROJECT PLANNER

CURRENT FUNDING -SHIP AS IS SCENARIO

REPORT DATE 19AUG97 16:48 RUN NO. 488

RESOURCE LOADING REPORT

START DATE 01JUL97 FIN DATE 30JAN09

DATA DATE 01OCT97 PAGE NO. 1

All Resource Estimates

TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 2000	TOTAL
1341E140	Radiological Engineer	36	36
1342T050	Radiological Technician	70	70
1420E110	Quality Engineer	26	26
1420T060	Quality Inspector	40	40
3280P170	Transporation Coordinator	108	108
4110E130	Other/Technical Engineer	30	30
5100M6	Direct Purchases		
5100M8	Subcontracts		
5112M010	CPP 651 Operations Foreman	108	108
5112R040	CPP 651 Fuel Operators	690	690
5113E080	Facility Fuel Engineer	528	528
5122E130	Design Engineer		
5130P130	Trainer	66	66
5152P160	Procedure Writer	216	216
5213R040	CPP 602 Fuel Operators		
5221E010	Technical Safety Engineer (TSE)	26	26
5432E130	Plant Systems Engineer	40	40
6100E130	Security Operations	26	26
6120P170	Safeguards & Accountability	602	602
6520C040	Machinist		
6520C110	Welder		
6520M010	Craft Foreman		
6520R080	Equipment Operator	90	90
	REPORT TOTAL	**2703**	**2703**

Rocky Flats

Option 2 (Stabilize to oxide and extract in RAL, ship as liquid to Y-12)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **53,476**

Cost for Documentation (SAR, etc.) = **$ 80,955**

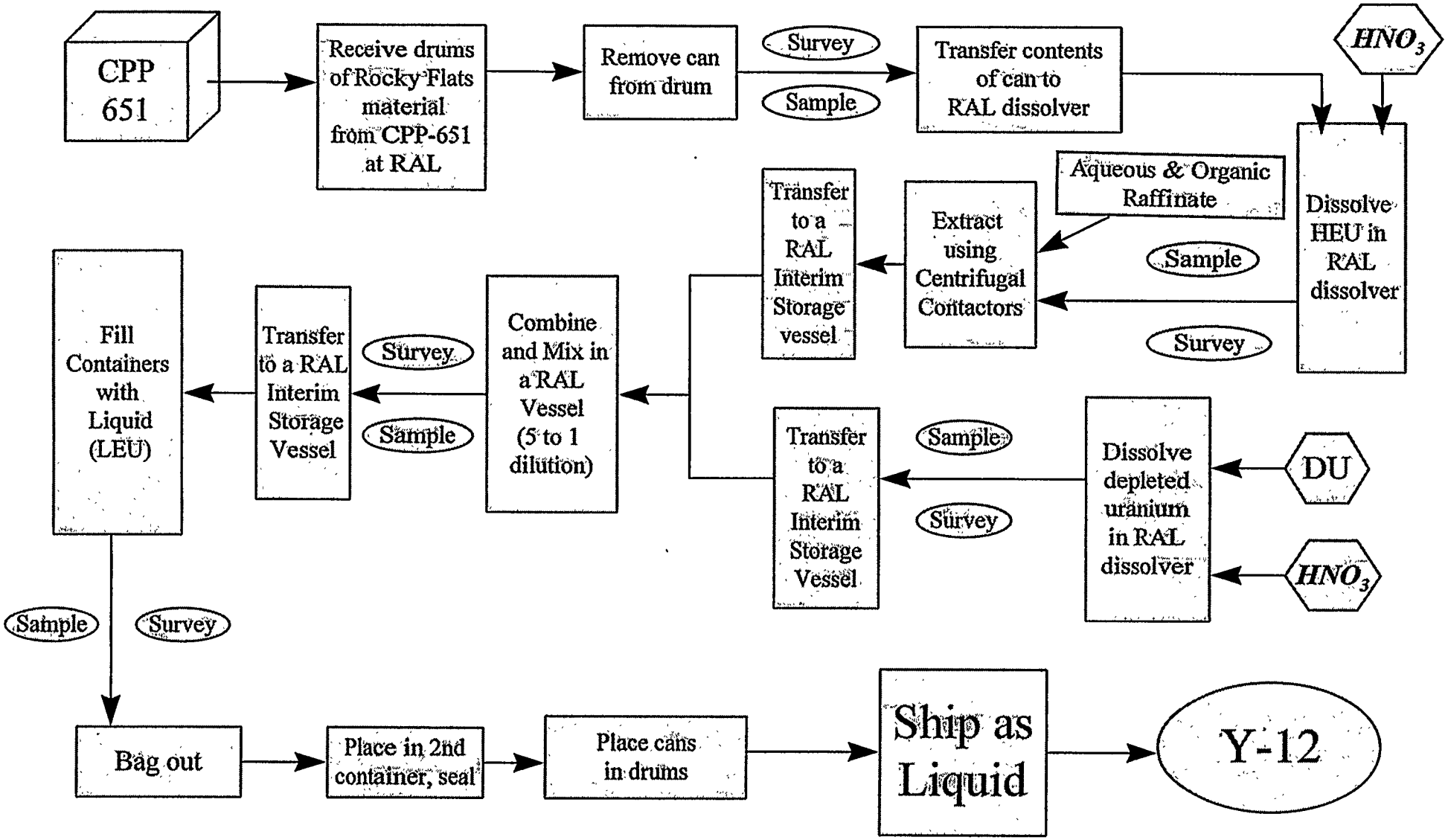
Cost for Procedure Preparation and Training = **$33,500**

Cost to Repackage in CPP-651 and Ship = **$66,498**

Total Cost for Option 2 = $53,476 + $80,955 + $33,500 +$66,498 = **$234,429**

Schedule: 7 months for planning and preparations
6 months for documentation, procedures and training
1 month to repackage and ship
Total Duration for Option 2 = 14 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.



DISSOLVE, DILUTE, AND SEND AS LIQUID USING EXISTING FACILITIES

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Cost
+ Rocky Flats - Opt a: Dissolve Using Existing Fac					
		406	09JUL98	18AUG99	234,429.40

FY98 | FY99

Project Start 01JUL97
Project Finish 24AUG09
Data Date 01OCT97
Run Date 20AUG97

Early Bar
Progress Bar
Critical Activity

DRYB:RKY3

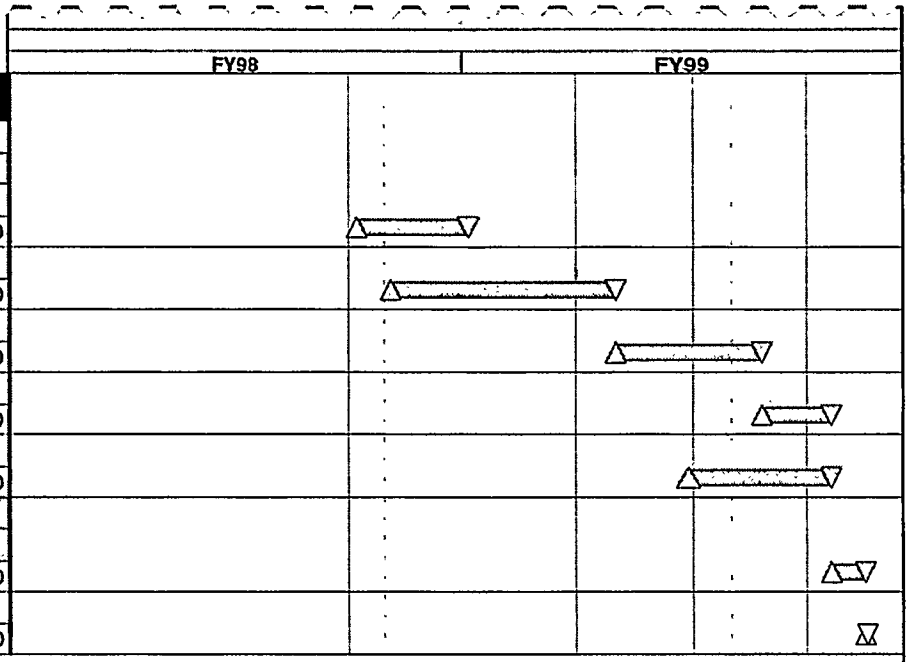
Sheet 1A of 1B

LMITCO CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPTa- DISSOLVE IN RAL
Summary

CPP-651 SNM Shipments

Rocky Flats - Opt 2 (Dissolve Use Existing Bldg)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
+ Project Definition	49	09JUL98	05OCT98	800.00	38,980.80
+ ES&H Documentation (SAR,NEPA,Permits)	96	06AUG98	01FEB99	1,500.00	80,955.00
+ Procedures	64	02FEB99	25MAY99	440.00	21,500.00
+ Training	32	26MAY99	20JUL99	240.00	12,000.00
+ S&S Plans for Repackaging	64	30MAR99	20JUL99	300.00	14,495.60
SNMShipment					
+ Material Repackaging	16	21JUL99	17AUG99	1,160.00	61,748.00
+ Product Shipment	1	18AUG99	18AUG99	100.00	4,750.00



Project Start	01JUL97
Project Finish	18AUG99
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

DRYB:RKY3

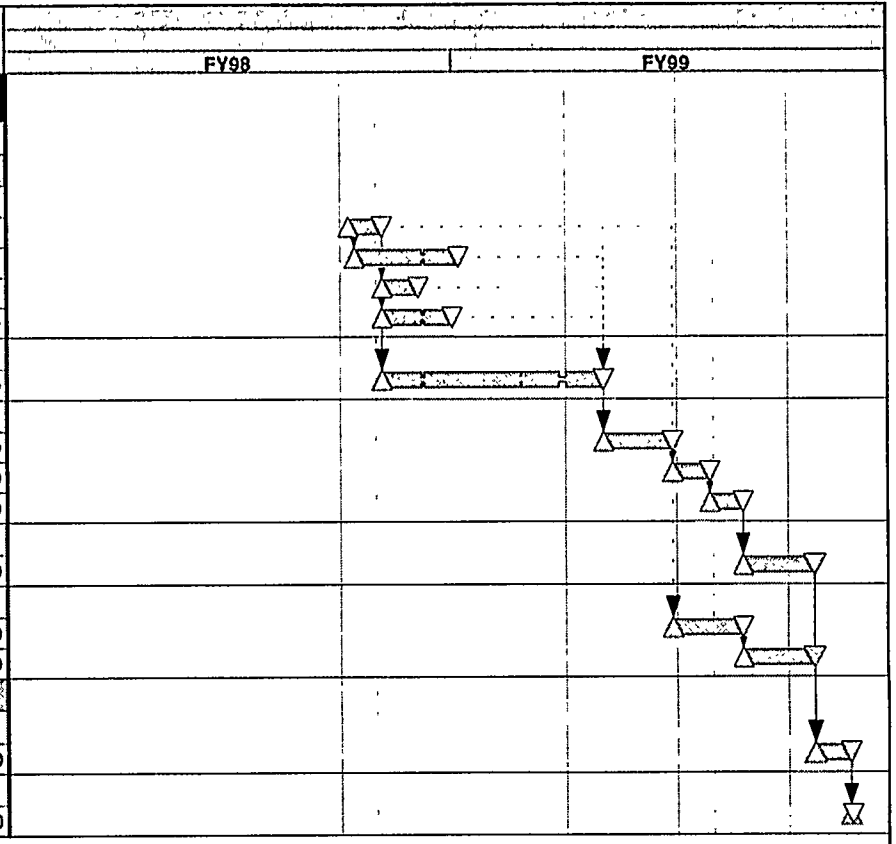
Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 2 - DISSOLVE IN RAL
Summary by Functional Area

CPP-651 SNM Shipments

Rocky Flats - Opt 2 (Dissolve Use Existing Bldg)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	16	09JUL98	05AUG98	120.00	5,600.00
Obtain Written Agreements As Required	48	13JUL98	05OCT98	60.00	2,985.60
Identify On-Site Representative	16	06AUG98	02SEP98	20.00	995.20
Obtain Characterization Data	32	06AUG98	01OCT98	600.00	29,400.00
ES&H Documentation (SAR,NEPA,Permits)					
Evaluate & Develop Safety Document	96	06AUG98*	01FEB99	1,500.00	80,955.00
Procedures					
Develop Procedure	32	02FEB99	29MAR99	160.00	7,800.00
Review & Resolve Comments	16	30MAR99	26APR99	220.00	10,800.00
Approve New Procedure	16	27APR99	25MAY99	60.00	2,900.00
Training					
Practice Dry Run	32	26MAY99	20JUL99	240.00	12,000.00
S&S Plans for Repackaging					
Material Control & Accountability Work	32	30MAR99	25MAY99	140.00	6,300.00
Complete Materials Management Plan Activities	32	26MAY99	20JUL99	160.00	8,195.60
SNM Shipment					
Material Repackaging					
Dissolve, Extract and Dilute Material	16	21JUL99	17AUG99	1,160.00	61,748.00
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	1	18AUG99	18AUG99	100.00	4,750.00



Project Start	01JUL97
Project Finish	18AUG99
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

DRYB:RKY3

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 2 - DISSOLVE IN RAL
Detailed Activity Schedule

LMITCO

PRIMAVERA PROJECT PLANNER

CPP 651 Rocky Flats Matl Opt a

REPORT DATE 19AUG97 RUN NO. 328
16:16

COST LOADING REPORT

START DATE 01JUL97 FIN DATE 18AUG99

DATA DATE 01OCT97 PAGE NO. 1

Costs by Resource by Material Type

TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	TOTAL
1341E140	Radiological Engineer	5813	1188	7000
1342T050	Radiological Technician	5813	10064	15876
1420E110	Quality Engineer		1000	1000
1710P170	Environmental Engineer	4448	9327	13775
3280P170	Transporation Coordinator	1000	500	1500
4110E010	Safety Analyst	8073	16927	25000
4110E120	Criticality Safety Engineer	8073	16927	25000
4110E130	Other/Technical Engineer		6000	6000
41E1R010	RAL Technician	5813	188	6000
5110M020	Fuel Manager	5548	11632	17180
5112R040	CPP 651 Fuel Operators		11000	11000
5113E080	Facility Fuel Engineer	6813	32921	39733
5130P130	Trainer		5000	5000
5152P160	Procedure Writer		3600	3600
5213R040	CPP 602 Fuel Operators		16602	16602
5221E010	Technical Safety Engineer (TSE)		1000	1000
6100E130	Security Operations		2700	2700
6120P170	Safeguards & Accountability	12688	20976	33664
6520M010	Craft Foreman		2000	2000
6520R080	Equipment Operator		800	800
	REPORT TOTAL	**64079**	**170350**	**234429**

MITCO

EPORT DATE 19AUG97 RUN NO. 330
16:19

L-09 All Resource Estimates

PRIMAVERA PROJECT PLANNER

RESOURCE LOADING REPORT

TOTAL USAGE FOR YEAR

CPP 651 Rocky Flats Matl Opt a

START DATE 01JUL97 FIN DATE 18AUG99

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1997	FY 1998	FY 1999	TOTAL
1341E140	Radiological Engineer		116	24	140
1342T050	Radiological Technician		116	204	320
1420E110	Quality Engineer			20	20
1710P170	Environmental Engineer		81	169	250
3280P170	Transporation Coordinator		20	10	30
4110E010	Safety Analyst		161	339	500
4110E120	Criticality Safety Engineer		161	339	500
4110E130	Other/Technical Engineer			120	120
41E1R010	RAL Technician		116	4	120
5110M020	Fuel Manager		81	169	250
5112R040	CPP 651 Fuel Operators			220	220
5113E080	Facility Fuel Engineer		136	584	720
5130P130	Trainer			100	100
5152P160	Procedure Writer			80	80
5213R040	CPP 602 Fuel Operators			320	320
5221E010	Technical Safety Engineer (TSE)			20	20
6100E130	Security Operations			60	60
6120P170	Safeguards & Accountability		274	436	710
6520M010	Craft Foreman			40	40
6520R080	Equipment Operator			20	20
	REPORT TOTAL		**1263**	**3277**	**4540**

Rocky Flats

Option 3 (Stabilize to oxide and extract in a new building, ship as liquid to Y-12)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **47,800**

Cost for procurement = **$ 307,900**

Cost for Documentation (SAR, etc.) = **$ 50,000**

Cost for Procedure Preparation and Training = **$190,300**

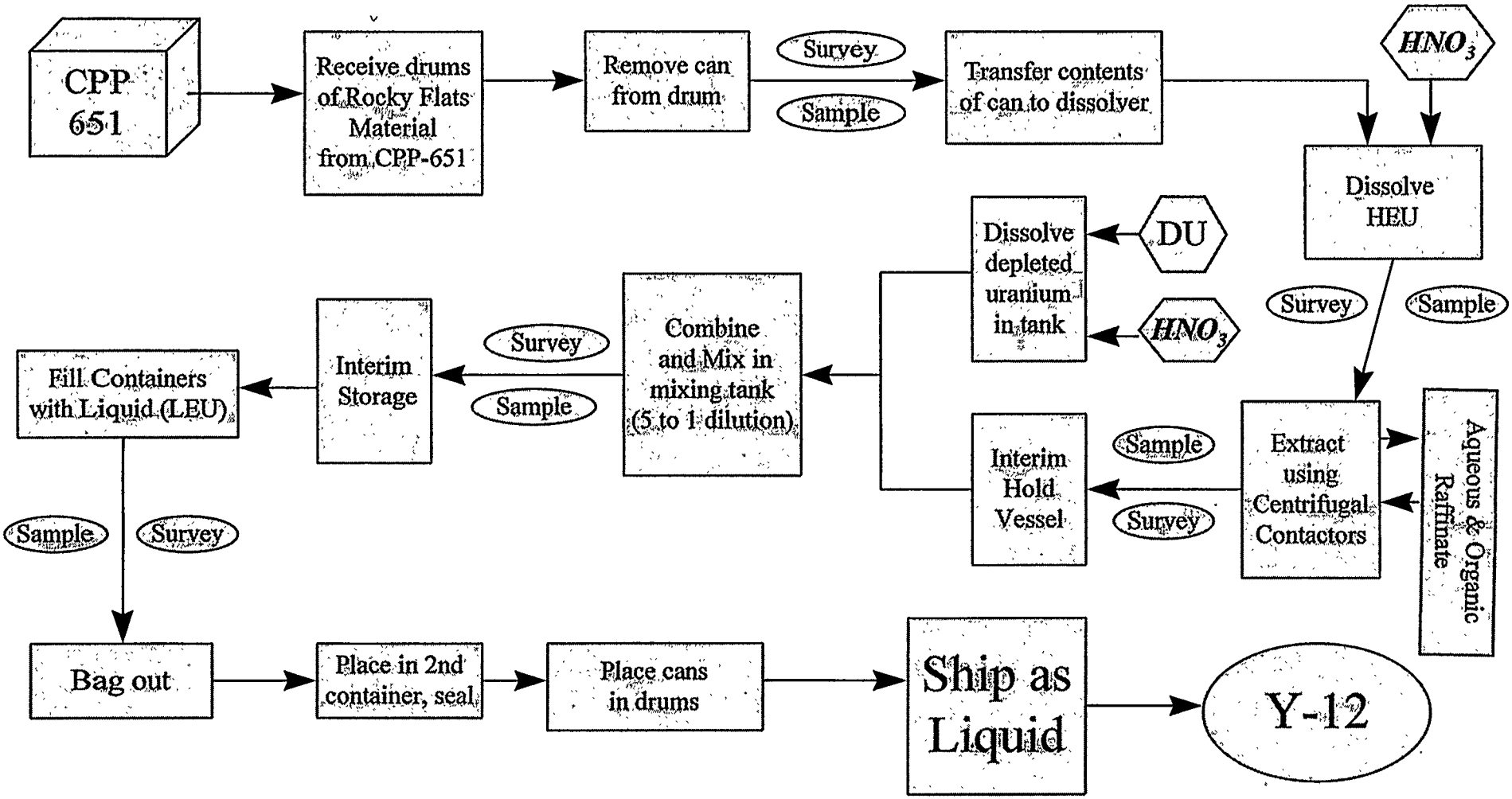
Cost to package in CPP-651 and Ship = **$9,500**

Total Cost for Option 3 =

$47,800 + $307,900 + $50,000 + $190,300 +$9,500 = **$605,500**

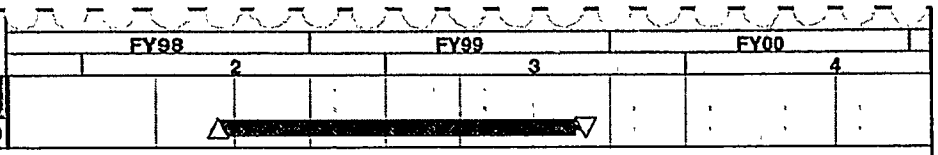
Schedule: 8 months for planning, preparations and procurement
6 months for documentation, procedures and training
1 weeks to repackage and ship
Total Duration for Option 3 = 15 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.



DISSOLVE, EXTRACT, DILUTE, AND SEND AS LIQUID USING NEW FACILITY

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Cost
Rocky Flats - Opt 3 - Dissolve Using New Bldg					
		447	11JUN98	31AUG99	605,500.00



Project Start	01JUL97
Project Finish	24AUG09
Data Date	01OCT97
Run Date	20AUG97

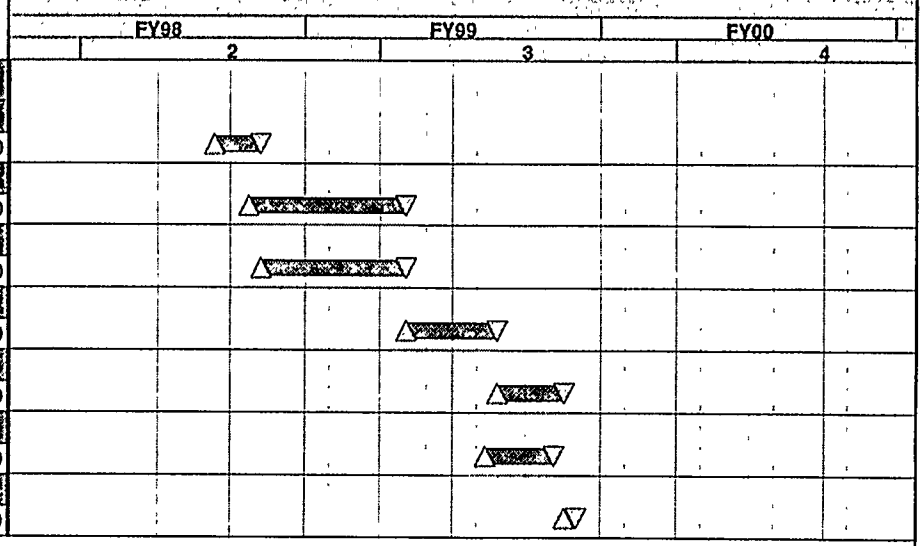
Early Bar
Progress Bar
Critical Activity

DRYB:RKY2

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 3 - DISSOLVE (NEW B)
Summary

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Cost
Rocky Flats - Opt 3 - Dissolve Using New Bldg					
Project Definition					
		32	11JUN98	05AUG98	35,000.00
Procurement					
		104	23JUL98	01FEB99	307,900.00
ES&H Documentation (SAR, NEPA, Permits)					
		96	06AUG98	01FEB99	50,000.00
Procedures					
		64	02FEB99	25MAY99	21,500.00
Training					
		48	26MAY99	17AUG99	168,800.00
S&S Plans for Repackaging					
		48	11MAY99	03AUG99	12,800.00
Product Shipment					
		14	18AUG99	31AUG99	9,500.00



Project Start	01JUL97
Project Finish	24AUG09
Data Date	01OCT97
Run Date	20AUG97

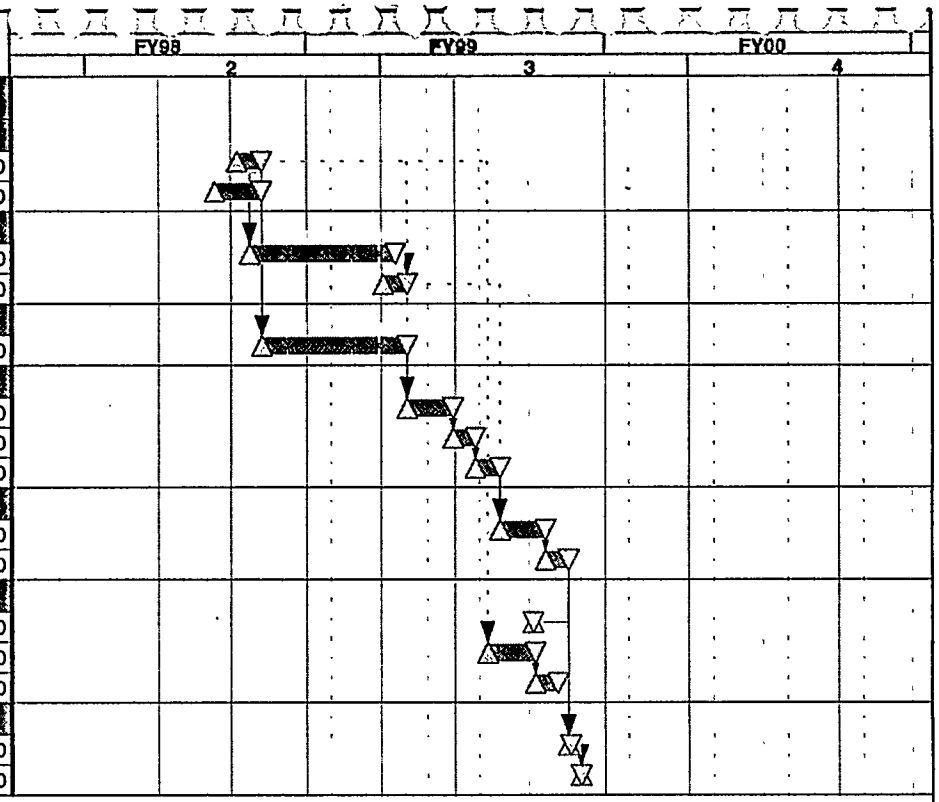
Early Bar
Progress Bar
Critical Activity

DRYB:RKY2

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 3 - DISSOLVE (NEW B)
Summary by Functional Area

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Cost
Rocky Flats - Opt3 - Dissolve Using New Bldg					
Project Definition					
R2A0C102	Evaluate & Develop Customer Receiving Criteria	16	09JUL98*	05AUG98	5,600.00
R2A0C105	Obtain Characterization Data	32	11JUN98	05AUG98	29,400.00
Procurement					
R2A0C104	Purchase Fifteen 55 gal DOT-6M Drums	96	23JUL98*	18JAN99	306,000.00
R2A0C106	Inspect & PM New Shipping Container	16	05JAN99	01FEB99	1,900.00
ES&H Documentation (SAR NEPA Permits)					
R2A0C103	Evaluate & Develop Safety Document Requirements	96	06AUG98*	01FEB99	50,000.00
Procedures					
R2A0C108	Develop Procedure	32	02FEB99	29MAR99	7,800.00
R2A0C10	Review & Resolve Comments	16	30MAR99	26APR99	10,800.00
R2A0C12	Approve New Procedure	16	27APR99	25MAY99	2,900.00
Training					
R2A0C14	Practice Dry Run	32	26MAY99	20JUL99	12,000.00
R2A0C22	Dissolve, Extract and Dilute Material	16	21JUL99	17AUG99	156,800.00
S&S Plans for Repackaging					
R2A0C24	Request for Safe Secure Transport (SST)	1	05JUL99	05JUL99	200.00
R2A0C16	Material Control & Accountability Work	32	11MAY99	06JUL99	6,300.00
R2A0C18	Complete Materials Management Plan Activities	16	07JUL99	03AUG99	6,300.00
Product Shipment					
R2A0C26	Load Truck and Ship to Receiver - 1st Shipment	1	18AUG99	18AUG99	4,750.00
R2A0C27	Load Truck and Ship to Receiver - 2nd Shipment	1	31AUG99	31AUG99	4,750.00



Project Start	01JUL97
Project Finish	24AUG09
Data Date	01OCT97
Run Date	20AUG97

Early Bar
Progress Bar
Critical Activity

DRYB:RKY2

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
ROCKY FLATS OPT 3 - DISSOLVE (NEW B)
Detailed Activity Schedule

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	TOTAL
1341E140	Radiological Engineer	120	20	140
1342T050	Radiological Technician	120	400	520
1420E110	Quality Engineer	16	44	60
1420T060	Quality Inspector		10	10
3280P170	Transporation Coordinator	20	44	64
4110E010	Safety Analyst	161	339	500
4110E120	Criticality Safety Engineer	161	339	500
4110E130	Other/Technical Engineer		120	120
41E1R010	RAL Technician	120		120
5100M6	Direct Purchases			
5112R040	CPP 651 Fuel Operators		2180	2180
5113E080	Facility Fuel Engineer	173	928	1100
5130P130	Trainer		100	100
5152P160	Procedure Writer		80	80
5221E010	Technical Safety Engineer (TSE)		20	20
5432E130	Plant Systems Engineer		20	20
6100E130	Security Operations		60	60
6120P170	Safeguards & Accountability	200	300	500
6520M010	Craft Foreman		40	40
6520R080	Equipment Operator		50	50
	REPORT TOTAL	**1092**	**5092**	**6184**

Costs by Resource by Material Type TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	TOTAL
1341E140	Radiological Engineer	6000	1000	7000
1342T050	Radiological Technician	6000	20000	26000
1420E110	Quality Engineer	813	2188	3000
1420T060	Quality Inspector		500	500
3280P170	Transporation Coordinator	1000	2200	3200
4110E010	Safety Analyst	8073	16927	25000
4110E120	Criticality Safety Engineer	8073	16927	25000
4110E130	Other/Technical Engineer		6000	6000
41E1R010	RAL Technician	6000		6000
5100M6	Direct Purchases	121875	178125	300000
5112R040	CPP 651 Fuel Operators		109000	109000
5113E080	Facility Fuel Engineer	8625	46375	55000
5130P130	Trainer		5000	5000
5152P160	Procedure Writer		3600	3600
5221E010	Technical Safety Engineer (TSE)		1000	1000
5432E130	Plant Systems Engineer		1000	1000
6100E130	Security Operations		2700	2700
6120P170	Safeguards & Accountability	9000	13500	22500
6520M010	Craft Foreman		2000	2000
6520R080	Equipment Operator		2000	2000
	REPORT TOTAL	**175458**	**430042**	**605500**

Rocky Flats

Option 4 (Dry blend to less than 20% enrichment, repackage, ship to SRS)

- Assumed a 5 to 1 dilution is used to reduce the enrichment to less than 20%.
- Assumes process initiation costs are incurred within the denitrator product estimate

Cost:

Revise Procedures - 8 weeks

2 people x $65/hour x 10hr/day x 16 days/mo x 2 mo = $41,600

Revise SAR and Technical Standards - OSA - 36 weeks

1 person x $65/hr x 40 hr/wk x 36 weeks = $ 93,600

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up-front = **$135,200**

Cost to Procure Drum(s)

$600 per 55 gallon drum x 150 drums = **$90,000**

Cost for Planning and preparations = $ **35,700**

Dry blend 30 bottles into 150 cans (1 per drum) in CPP-651 and ship to SRS
assumes process initiation costs are incurred within the denitrator product estimate

1 Technical Shift Engineer at $65/hour
1 Radcon Technician at $49/hour
1 Supervisor at $52/hour
3 Operators at $52/hour

8 hours worth of work in a 10 hour shift. Work 4 10 hour shifts per week. Estimate repackaging 15 bottles of HEU per day. Will repackage one bottle every ½ hour. Blending and repackaging a total of 30 bottles of Rocky Flats material to fit into 150 6M drums of LEU.

10 days (to repackage 4 bottles at 15 new bottles per day) x 10 hrs/day = 100 hours

($65/hr x 100 hrs) + ($49/hr x 100 hrs) + ($52 x 4 x 100 hours) =
$6,500 + $4,900 + $20,800 = **$32,200**

Guards on average have cost $80,000 per month (assume $5,000 per day)
Assume we need 10 days = **$50,000**

Cost to repackage & ship each drum in CPP-651:

10 hour days at 15 drums per day = .67 hours per drum

3 Operators = .67 laborhrs/drum x 3 x $52/hr =	$110/drum
2 Foreman/Supervisor = .67 laborhrs/drum x 2 x $52/hr =	$70/drum
1 Engineer/Scientist = .67 laborhrs/drum x $67/hr =	$50/drum
1 Radcon Tech. = .67 laborhrs/drum x $49/hr =	$40/drum
Total	$270/drum x 150 drums = **$40,500**

Cost for Decontamination and Accountability = **$30,000**

Total Cost for Option 4= $135,200 + $90,000 + $35,700 + $32,200 + $50,000 + $40,500 + $30,000 = **$413,600**

Schedule: 6 months to procure 55 gallon, 6M drums
6 months for planning, SAR changes and preparations
2 months to develop procedures and QA drums
2 weeks to dry blend and repackage in CPP-651
1 week to ship

Total Duration for Option 4 = 15 months

Comments: No detailed cost estimates were performed for this option. The Primavera generated detailed resources, cost data and scheduled activities for dry blending the Denitrator Product is shown as option 1 for the Denitrator Product in this appendix.

##

Denitrator Product

Option 1 (Dry Blend to less than 20%, repackage and ship to SRS)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **1,032,895**

Cost for procurement = **$1,808,000**

Cost for ES&H documentation (SAR) = **$257,154**

Cost for Procedure Preparation and Training = **$84,500**

Cost to Dry Blend, Repackage and Ship = **$1,438,603**

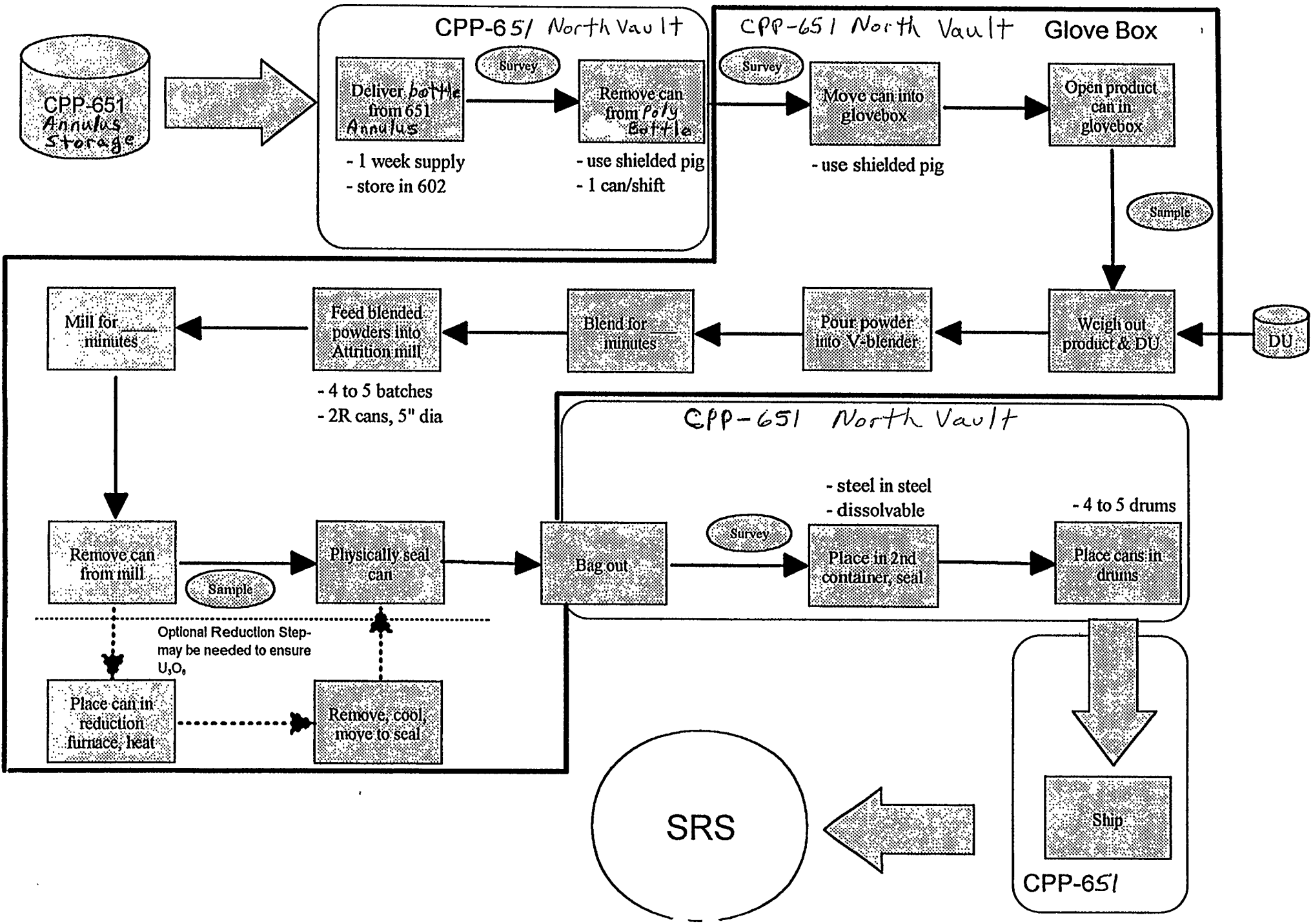
Total Cost for Option 1 =
$1,032,895 + $1,808,000 + $257,154 +$84,500 + $1,438,603 = **$4,621,152**

Schedule: 26 months for planning, SAR changes and preparations
6 months for procurement
8 months to develop procedures and train
32 months to dry blend, repackage and ship

Total Duration for Option 1 = 72 months (6 years)

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.

Dry Blending Process



Denitrator Product - Option 1

Assumption to Mill and Dry Blend

Each can (drum) of product will result in 5 cans (drums) of blended product. Therefore the volume will grow by a factor of 5.

This process will be contained within an enclosure which has a self contained ventilation and filter system. The enclosure will be similar to the personal containment (Permacon) structures that have been used at ICPP.

The enclosure will be placed within the CPP-651, North vault.

Shielding will be incorporated in the design of the process and the enclosure.

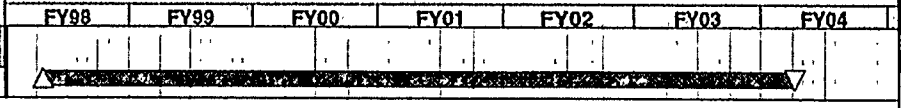
One can of Denitrator product will be processed per 12 hour shift.

Dry Blended Denitrator Product will be contained within dissolvable cans.

It will take approximately 2 ½ years to process all (276 cans) of the material.

The Rocky Flats material will not be dry blended.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Denitrator Material-Dry Blending					
	2,173	22JAN98	03JAN04	38,744.00	4,621,152.72



oject Start	01JUL97
oject Finish	11SEP06
ta Date	01OCT97
n Date	20AUG97

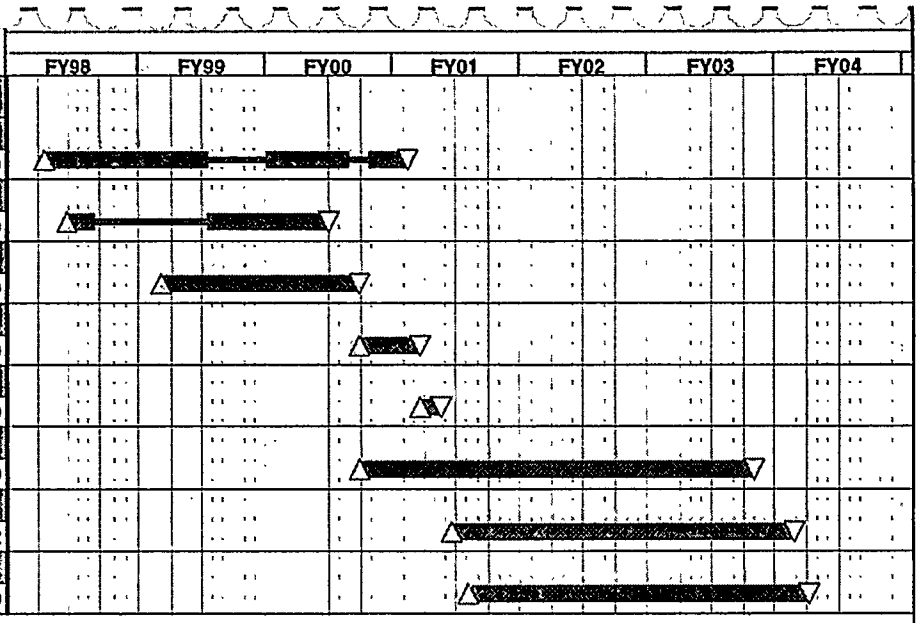
Early Bar
Progress Bar
Critical Activity

COMP:BASE

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 1 - DRY BLENDING
Summary

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Denitrator Material - Dry Blending					
+ Project Definition					
	572	22JAN98	16NOV00	1,520.00	876,800.00
+ Procurement					
	409	24MAR98	30MAR00	160.00	1,808,000.00
+ ES&H Documentation (SAR, NEPA, Permits)					
	316	02DEC98	27JUN00	3,810.00	257,154.10
+ Procedures					
	96	28JUN00	18DEC00	490.00	23,700.00
+ Training					
	32	19DEC00	19FEB01	1,280.00	60,800.00
+ SAS Plans for Repackaging					
	1,127	28JUN00	29JUL03	3,125.00	156,095.30
+ Material Repackaging					
	278	20MAR01	26NOV03	24,564.00	1,256,467.92
+ Product Shipment					
	976	03MAY01	03JAN04	3,795.00	182,135.40



Project Start	01JUL97	Early Bar
Project Finish	11SEP06	Progress Bar
Data Date	01OCT97	Critical Activity
Run Date	20AUG97	

COMP:BASE

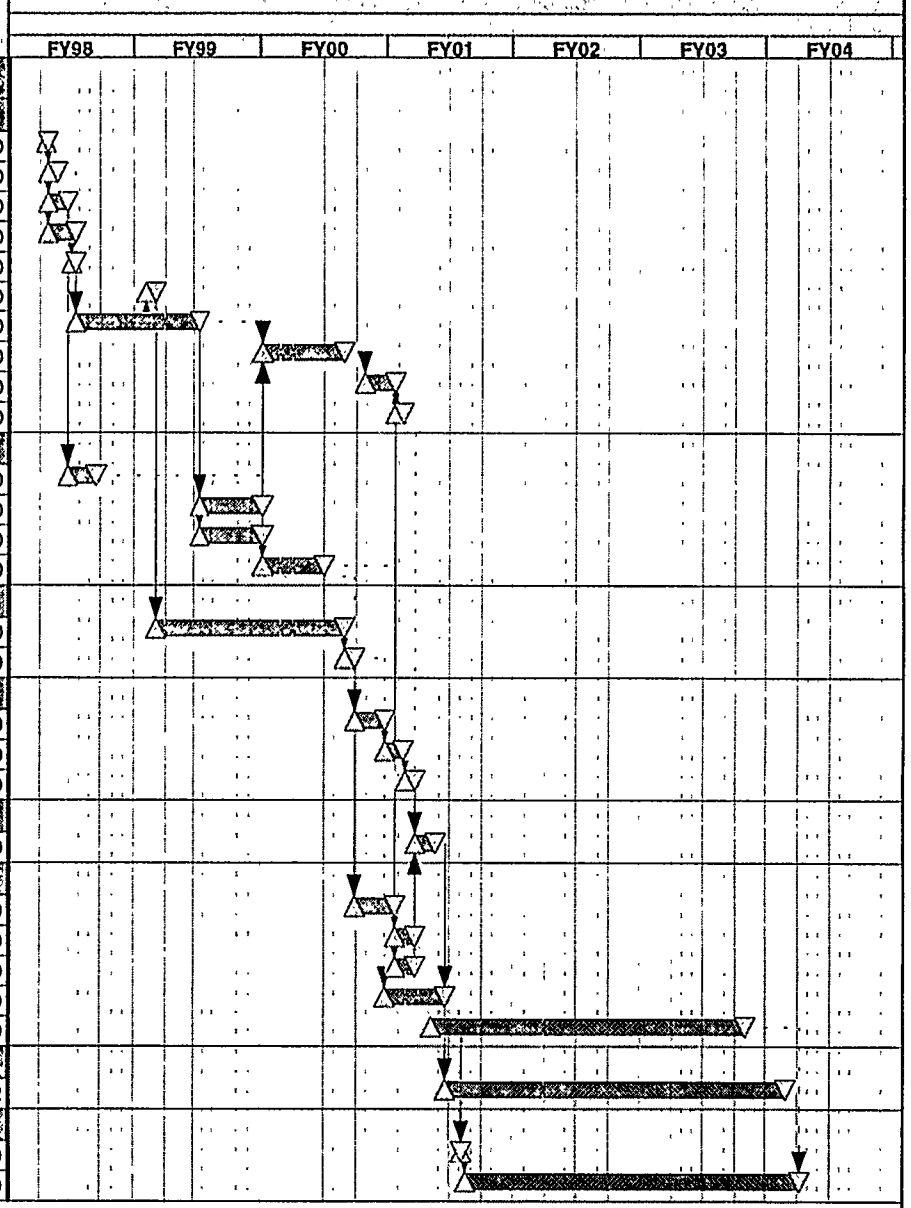
Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE

DENITRATOR OPT 1 - DRY BLENDING

Summary by Functional Area

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Denitrator Material - Dry Blending					
Project Definition					
Conduct Value Engineering Sessions	2	22JAN98*	26JAN98	280.00	14,200.00
Identify On-site Representative	16	27JAN98*	23FEB98	20.00	900.00
Obtain Characterization Data (product & depleted	32	27JAN98	23MAR98	120.00	5,800.00
Obtain Written Agreements as required (DOE, etc)	48	27JAN98*	20APR98	60.00	2,700.00
Obtain Peer Reviews & Approvals of Concepts	8	07APR98	20APR98	560.00	28,400.00
Provide Input to SAR NEPA, Operating Permits	16	03NOV98	01DEC98	160.00	8,800.00
Develop Design Process Drawings (Title I & II)	201	21APR98	19APR99	80.00	254,000.00
Construction, Testing and Startup at U. of Utah	128	07OCT99	25MAY00	80.00	254,000.00
Install New Equipment in CPP-651	48	27JUL00	19OCT00	80.00	254,000.00
Inspection, Testing & Startup of New Equipment	16	23OCT00	16NOV00	80.00	54,000.00
Procurement					
Purchase Perma-Con Structure	48	24MAR98	16JUN98	40.00	152,000.00
Purchase Process Equipment	96	20APR99	06OCT99	40.00	752,000.00
Purchase Support Systems	96	20APR99	06OCT99	40.00	202,000.00
Purchase 600 Drums - 110 gal DOT-6M Containers	96	07OCT99	30MAR00	40.00	702,000.00
ES&H Documentation (SAR,NEPA,Permits)					
Develop SAR/CSE	300	02DEC98	30MAY00	2,690.00	200,354.10
Final Review & Approval of SAR	16	31MAY00	27JUN00	1,120.00	56,800.00
Procedures					
Develop Procedure	48	28JUN00	21SEP00	280.00	13,400.00
Review & Resolve Comments	32	25SEP00	16NOV00	160.00	7,700.00
Approve New Procedure	16	20NOV00	18DEC00	50.00	2,600.00
Training					
Practice Dry Run	32	19DEC00	19FEB01	1,280.00	60,800.00
S&S Plans for Repackaging					
Define Security Requirements & Modify Equipment	64	28JUN00	19OCT00	150.00	7,366.80
Identify MC&A Requirements - Sampling Plan	32	23OCT00	18DEC00	320.00	15,200.00
Develop Security Procedures & Implemt. Plans	32	23OCT00	18DEC00	240.00	11,200.00
Complete RA & Obtain Approval to Operate	96	25SEP00	19MAR01	1,920.00	97,509.20
Request for Safe Secure Transport (SST)	254	07FEB01	29JUL03	495.00	24,819.30
Material Repackaging					
Facility Operations - Dry Blending (1-23)	278	20MAR01	26NOV03	24,564.00	1,256,467.92
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	03MAY01	04MAY01	165.00	7,825.00
Load Truck and Ship to Receiver - (2 thru 23)	960	19MAY01	03JAN04	3,630.00	174,310.40



roject Start	01JUL97
roject Finish	11SEP06
ata Date	01OCT97
un Date	20AUG97

Early Bar
Progress Bar
Critical Activity

COMP:BASE

Sheet 1 of 1

LMITCO - CPP 651 MATERIALS SCHEDULE

DENITRATOR OPT 1 - DRY BLENDING

Detailed Activity Schedule

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 20AUG97 RUN NO. 486
10:27

Cost load by resource type

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

BASE CASE SCHEDULE - DRY BLENDING

START DATE 01JUL97 FIN DATE 11SEP06

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	TOTAL
1341E140	Radiological Engineer	4000		4581	14748	6099	6280	1027	36734
1342T050	Radiological Technician				27799	50137	51626	8439	138000
1420E110	Quality Engineer	4000	1938	5354	4708				16000
1710P170	Environmental Engineer	4000	11257	11440	3833				30530
3280E130	Transportation Engineer			167	3833				4000
3280P170	Transporation Coordinator	3000		6000	12700	22451	20985	3275	68412
4110E010	Safety Analyst	3000	78277	65504					146781
4110E120	Criticality Safety Engineer	3000	13119	14308					30427
4110E130	Other/Technical Engineer	4831	2169	11167	8833				27000
41E1R010	RAL Technician	1000			16679	30082	30976	5063	83800
41E1S010	RAL Engineer				13560	10027	10325	1688	35600
5100M4	Construction Purchases			437500	112500				550000
5100M8	Subcontracts	264428	1055885	729688					2050000
5110M020	Fuel Manager	4200	14345	14904	6067				39516
5112G050	Administration Support			2019	8056				10075
5112M010	CPP 651 Operations Foreman			167	34724	56204	57749	9845	158689
5112R040	CPP 651 Fuel Operators	3000		7150	143750	229785	235966	40672	660323
5113E070	Fuel Supervisor			200	4600				4800
5113E080	Facility Fuel Engineer	5000	3938	9229	77726	58501	59990	10616	225000
5122E130	Design Engineer	3000	2000	5625	375				11000
5130P130	Trainer	3000		4125	16875				24000
5152P160	Procedure Writer			3713	1688				5400
5213R040	CPP 602 Fuel Operators	900		113	15188				16200
5221E010	Technical Safety Engineer (TSE)			292	4708				5000
5432E130	Plant Systems Engineer			167	3833				4000
6100E130	Security Operations	2700		5325	8175				16200
6120P170	Safeguards & Accountability	7200		5732	47016	51778	53260	8888	173874
6520C020	Electrician			422	97				519
6520M010	Craft Foreman			403	2140	4182	4182	1089	11996
6520R080	Equipment Operator				6550	13383	13383	3483	36800
6520T070	Instrument Technician			387	89				476
	REPORT TOTAL	**320259**	**1182927**	**1345679**	**600851**	**532630**	**544723**	**94084**	**4621153**

MITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | BASE CASE SCHEDULE - DRY BLENDING

EPORT DATE 20AUG97 10:30 RUN NO. 488 | RESOURCE LOADING REPORT | START DATE 01JUL97 FIN DATE 11SEP06

DATA DATE 01OCT97 PAGE NO. 1

l Resource Estimates | TOTAL USAGE FOR YEAR

ESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	TOTAL
341E140	Radiological Engineer	125	40	110	246	100	103	38	762
342T050	Radiological Technician	370	70	50	556	1003	1033	209	3290
420E110	Quality Engineer	100	79	117	94			26	416
420T060	Quality Inspector	40	40	30				60	170
710P170	Environmental Engineer	80	208	215	77				580
280E130	Transportation Engineer			3	77				80
280P170	Transporation Coordinator	182	112	194	253	448	419	199	1807
110E010	Safety Analyst	60	1002	868					1930
110E120	Criticality Safety Engineer	60	168	212					440
110E130	Other/Technical Engineer	307	113	233	177			73	903
1E1R010	RAL Technician	20			334	602	620	101	1676
1E1S010	RAL Engineer				271	201	207	34	712
100M4	Construction Purchases								
100M6	Direct Purchases								
100M8	Subcontracts								
110M020	Fuel Manager	60	208	215	87				570
112G050	Administration Support			41	199				240
112M010	CPP 651 Operations Foreman	400	130	53	674	1086	1116	291	3750
112R040	CPP 651 Fuel Operators	1740	720	533	2825	4429	4548	1308	16104
113E070	Fuel Supervisor			3	77				80
113E080	Facility Fuel Engineer	848	743	467	1555	1170	1200	822	6804
122E130	Design Engineer	60	40	113	8			131	351
130P130	Trainer	120	120	113	338			81	771
152P160	Procedure Writer	194	341	184	38			281	1037
213R040	CPP 602 Fuel Operators	20		3	338				360
221E010	Technical Safety Engineer (TSE)	20	40	16	94			21	191
432E130	Plant Systems Engineer	60	60	23	77			40	260
100E130	Security Operations	80	40	128	182			21	451
120P170	Safeguards & Accountability	1013	369	485	970	1045	1074	1265	6220
520C020	Electrician			8	2				10
520C040	Machinist							131	131
520C110	Welder							65	65
520M010	Craft Foreman			8	43	84	84	64	283
520R080	Equipment Operator	100	110	60	164	335	335	187	1290
520T070	Instrument Technician			8	2				10
	REPORT TOTAL	**6058**	**4753**	**4494**	**9752**	**10501**	**10737**	**5448**	**51744**

Denitrator Product

Option 2 (Repackage into DC-1's and ship as HEU to SRS)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **28,930**

Cost to procure drums = **$986,832**

Cost for Procedure Preparation and Training = **$26,904**

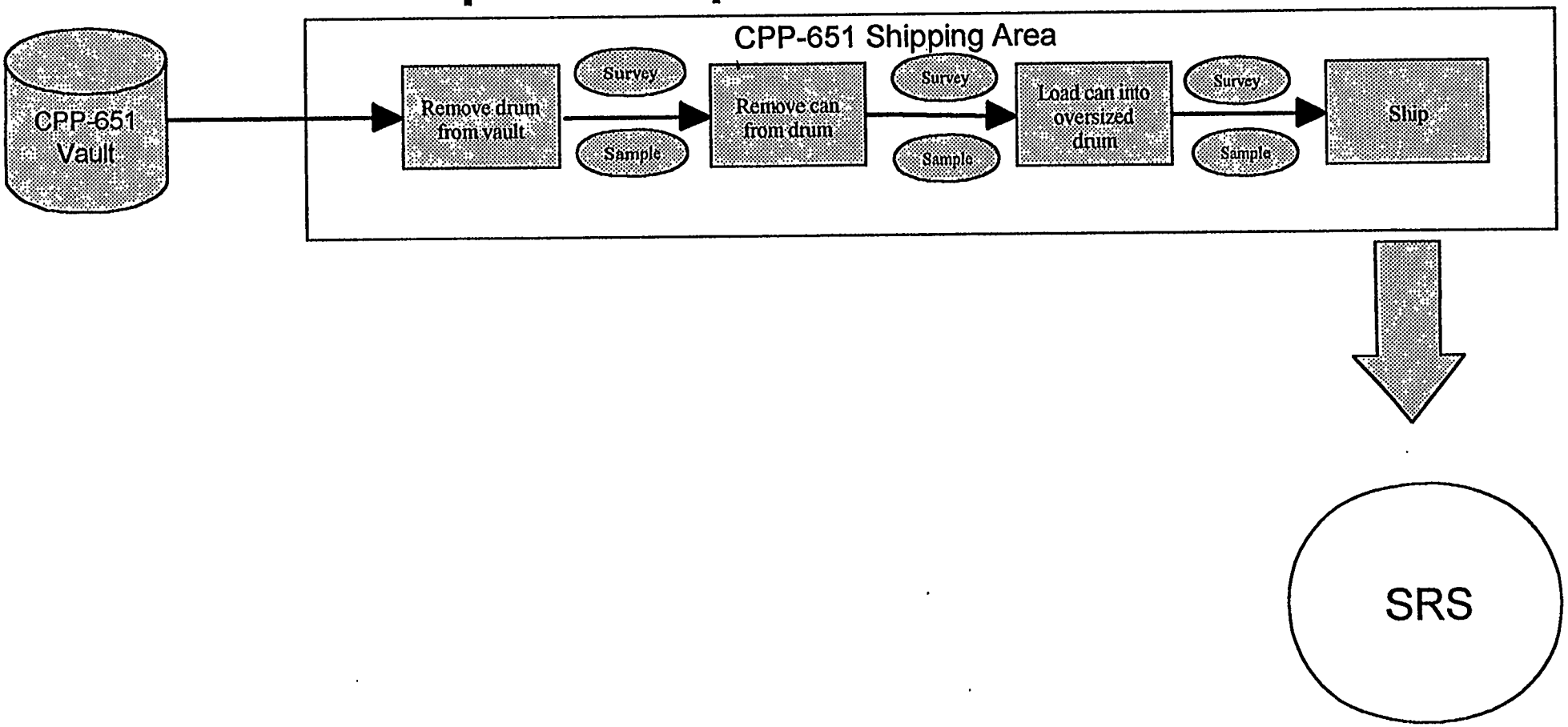
Cost to Repackage in CPP-651 and Ship = **$636,765**

Total Cost for Option 2 = $28,930 + $986,832 + $26,904 +$636,765 = **$1,679,431**

Schedule: 8 months for planning, SAR changes and preparations
13 months for procurement
5 months to develop procedures and training
10 months to repackage and ship
Total Duration for Option 2 = 36 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.

Ship as is - Special Drum



Denitrator Product - Option 2

Assumption to Send As Is in Larger Diameter Drums

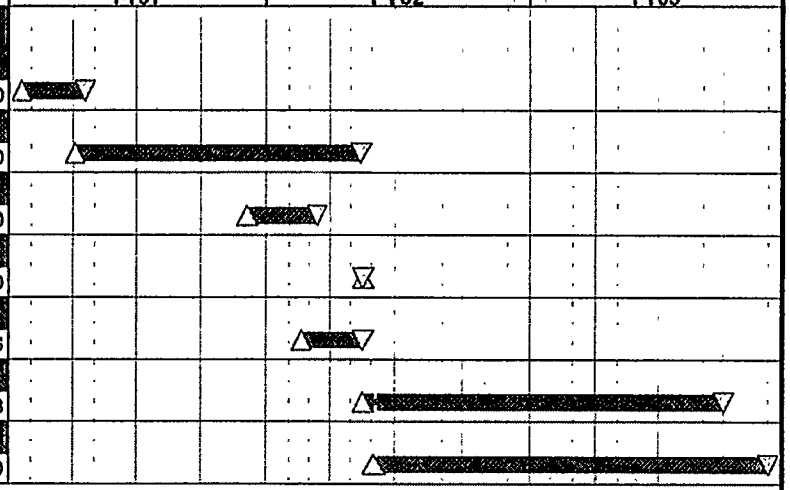
The 276 containers of Denitrator product would be transferred to drums in CPP-651.

DOT DC-1 shipping drums will be used following completion and approval of changes to the DC-1 SARP.

Assuming 2 drums can be packaged per day and operators will work 2, 10 hour days per week; it will require approximately 18 months to package the product into drums and ship. This time can be accelerated if a dedicated crew is added.

Assuming 7 drums per truck. It will require 40 SST shipments to ship this material to Savannah River.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Denitrator Material - Ship As Is					
Product Definition					
	48	18OCT00	17JAN01	240.00	12,806.40
Procurement					
	224	04JAN01	14FEB02	280.00	975,485.40
Procedures					
	56	05SEP01	12DEC01	390.00	19,300.90
Training					
	2	18FEB02	19FEB02	140.00	7,602.80
Sets Plan Mod/Repackaging					
	48	19NOV01	19FEB02	324.00	16,123.76
Material Repackaging					
	141	20FEB02	01JUL03	9,737.00	518,356.38
Product Shipment					
	546	06MAR02	02SEP03	2,305.00	118,408.80



Project Start	01JUL97	Early Bar
Project Finish	05MAR10	Progress Bar
Data Date	01OCT97	Critical Activity
Run Date	03SEP97	

COMP:DRY2

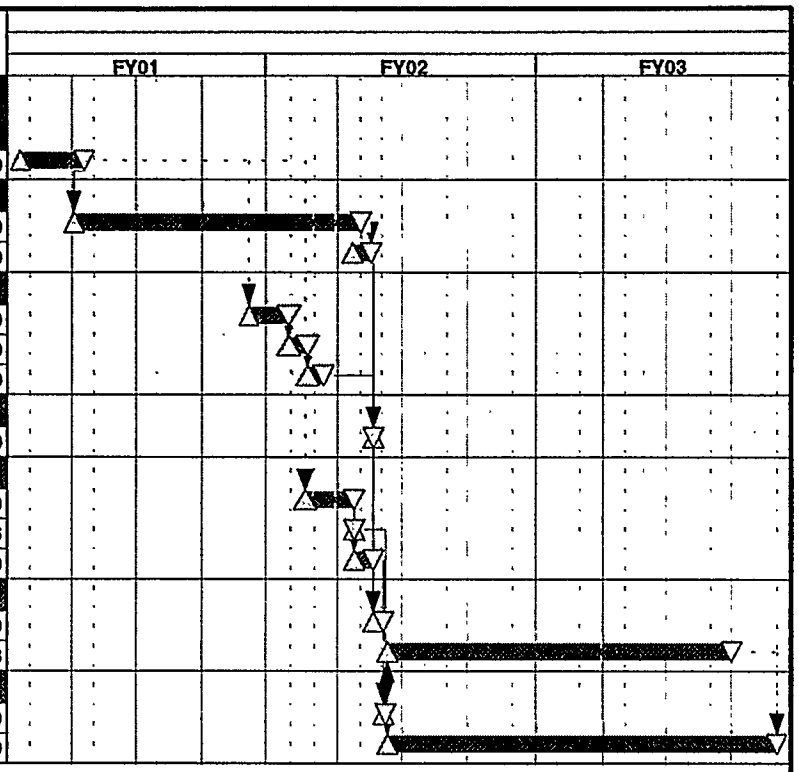
Sheet 1A of 1B

LMITCO - CPP 651 MATERIALS SCHEDULE

DENITRATOR OPT 2 - SHIP AS IS

Summary by Functional Area

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Denitrator Material - Ship as Is					
Preparation					
Evaluate & Develop Customer Receiving Criteria	48	18OCT00*	17JAN01	240.00	12,806.40
Procurement					
Purchase 96 DC-1 Shipping Containers	216	04JAN01*	31JAN02	200.00	971,346.80
Inspect & PM New Shipping Container	16	21JAN02	14FEB02	80.00	4,138.60
Procedures					
Develop Procedure	32	05SEP01	30OCT01	240.00	11,057.20
Review & Resolve Comments	12	31OCT01	20NOV01	120.00	6,623.50
Approve New Procedure	12	21NOV01	12DEC01	30.00	1,620.20
Training					
Practice Dry Run	2	18FEB02	19FEB02	140.00	7,602.80
S&S Plan for Ship Ready					
Material Control & Accountability Work	32	19NOV01	22JAN02	200.00	9,952.00
Request for Safe Secure Transport (SST)	1	23JAN02	23JAN02	4.00	200.56
Complete Materials Management Plan Activities	16	23JAN02	19FEB02	120.00	5,971.20
Material Repackaging					
Place shipping pkg in DC1's - (1- 7)	4	20FEB02	05MAR02	505.00	27,387.50
Place remaining containers in DC-1's (8- 280)	136	12MAR02	01JUL03	9,232.00	490,968.88
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	06MAR02	07MAR02	145.00	7,455.00
Load Truck and Ship to Receiver - (2 thru 40)	540	12MAR02	02SEP03	2,160.00	110,953.80



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	03SEP97

Early Bar
Progress Bar
Critical Activity

COMP:DRY2

Sheet 1A of 1B

LMITCO - CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 2 - SHIP AS IS
Detailed Activity Schedule

RESOURCE	RESOURCE DESCRIPTION	FY 2001	FY 2002	FY 2003	FY 2004	TOTAL
341E140	Radiological Engineer	40	74	46		160
342T050	Radiological Technician	470	514	596		1580
420E110	Quality Engineer	56	54			110
420T060	Quality Inspector	24	71			95
280E130	Transportation Engineer	1914	1914			3829
280P170	Transporation Coordinator	419	365	382		1167
110E130	Other/Technical Engineer	245	173	179		597
100M6	Direct Purchases					
100M8	Subcontracts					
110M020	Fuel Manager	1914	1914			3829
112M010	CPP 651 Operations Foreman	710	685	765		2160
112R040	CPP 651 Fuel Operators	2488	2437	2386		7310
113E080	Facility Fuel Engineer	1118	1056	765		2939
122E130	Design Engineer					
130P130	Trainer	28	63			90
152P160	Procedure Writer	153	235			388
213R040	CPP 602 Fuel Operators		203	337		540
221E010	Technical Safety Engineer (TSE)		30			30
432E130	Plant Systems Engineer	24	41			65
100E130	Security Operations		30			30
120P170	Safeguards & Accountability	4990	5058	765		10814
520C040	Machinist					
520C110	Welder					
520M010	Craft Foreman		71	84		155
520R080	Equipment Operator	449	344	337		1130
	REPORT TOTAL	**15041**	**15333**	**6643**		**37016**

Cost load by resource type

TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 2001	FY 2002	FY 2003	FY 2004	TOTAL
1341E140	Radiological Engineer		3291	2791		6082
1342T050	Radiological Technician		24370	29454		53824
1420E110	Quality Engineer	2849	1766			4615
1420T060	Quality Inspector		1538			1538
3280P170	Transporation Coordinator	2006	16121	19178		37304
4110E130	Other/Technical Engineer		11952	13974		25926
5100M8	Subcontracts	666667	293333			960000
5112M010	CPP 651 Operations Foreman		32427	39687		72113
5112R040	CPP 651 Fuel Operators	454	110783	123780		235016
5113E080	Facility Fuel Engineer	10917	48549	46181		105648
5130P130	Trainer	438	1063			1500
5152P160	Procedure Writer	2890	4541			7430
5213R040	CPP 602 Fuel Operators		10532	17484		28015
5221E010	Technical Safety Engineer (TSE)		709			709
5432E130	Plant Systems Engineer		1207			1207
6100E130	Security Operations		604			604
6120P170	Safeguards & Accountability	5971	45781	38065		89817
6520M010	Craft Foreman		3016	4182		7198
6520R080	Equipment Operator		13482	16055		29537
	REPORT TOTAL	**692190**	**625066**	**350828**		**1668084**

Denitrator Product

Option 3 (Stabilize to oxide in new building, ship as liquid to SRS)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **8,239,920**

Cost for Procurement = **$ 1,656,000**

Cost for Documentation (SAR, etc.) = **$ 166,800**

Cost for Procedure Preparation and Training = **$88,700**

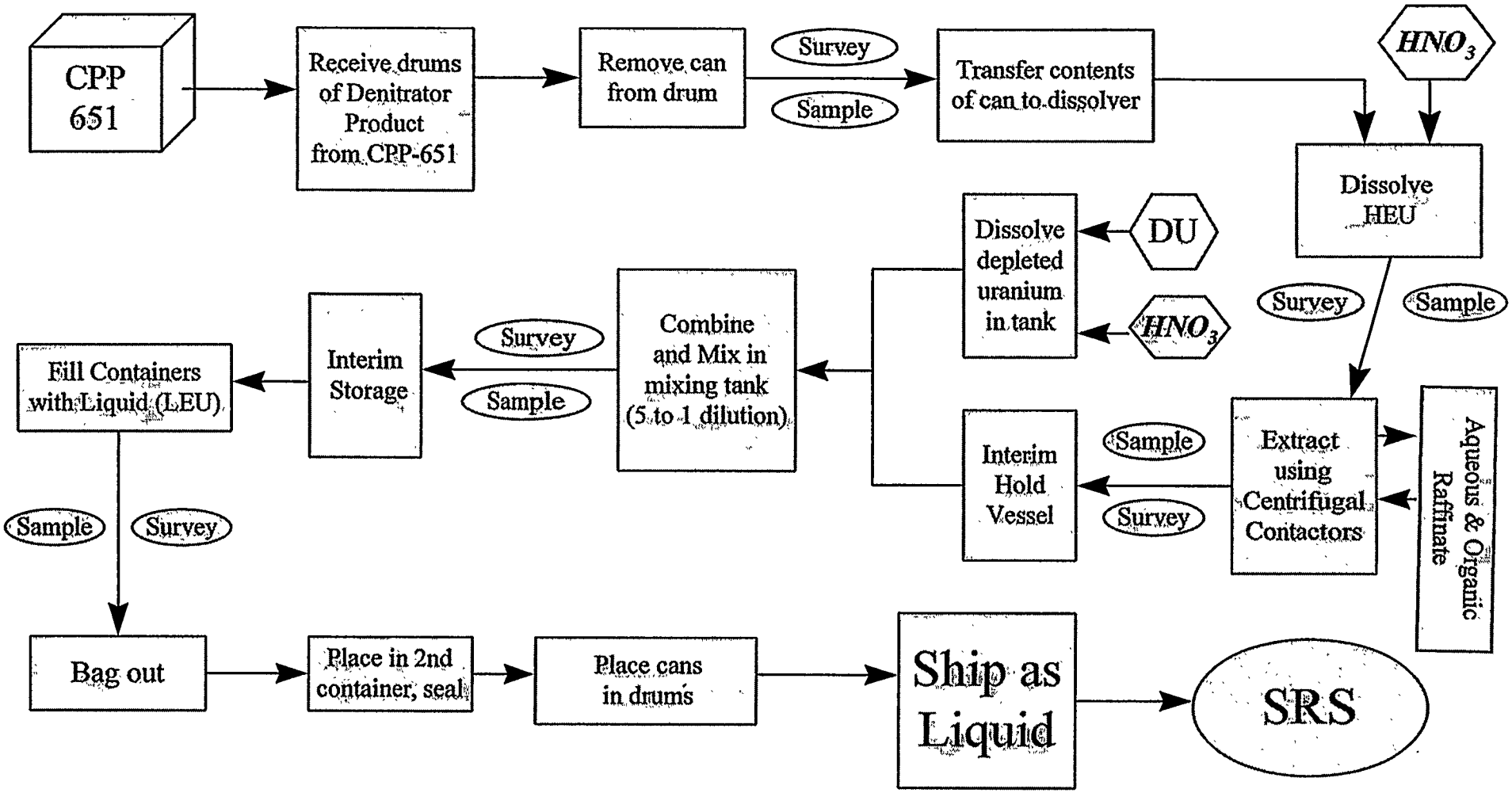
Cost to dissolve and repackage in new building and Ship = **$ 1,402,375**

Total Cost for Option 3 =

$8,239,920 + $1,656,000 + $166,800 +$88,700 + $1,402,375 = **$11,553,795**

Schedule: 20 months for planning, procurement and preparations
12 months for documentation, procedures and training
21 months to dissolve, repackage and ship
Total Duration for Option 3 = 53 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.



DISSOLVE, EXTRACT, DILUTE, AND SEND AS LIQUID USING NEW FACILITY

Denitrator Product - Option 3

Assumptions to:
Dissolve, Extract, Dilute, and Send As Liquid Using a New Facility

This process will be set up and operated in a new building at ICPP, specifically built for this process.

The building will have piping connections that tie in to current potable water, steam, condensate, treated water, nitric acid, high pressure air, service waste, and sanitary waste systems at ICPP.

The main process equipment will consist of dissolvers for both the Denitrator product and the depleted uranium, centrifugal contactors, aqueous and organic raffinate tanks, nitric acid tank, interim hold vessels in banks, and interim storage vessels in banks.

All the process equipment, except the nitric acid tank, will be critically safe.

Each day 1 container of Denitrator Product will be delivered from CPP-651 to the new building.

1 container of Denitrator Product will be dissolved per day.

Contact Rad Level reading range from 3 mr/hr to 900 mr/hr. The majority on in the 100 to 200 mr/hr range and only 14 of the bottles are at 500mr/hr or greater.

Shielding will be incorporated into the design of the dissolution and extraction (centrifugal contactors) portion of the process.

There will be a 5 to 1 dilution of the Denitrator Product.

For every one container (8 kg's) of highly enriched uranium (HEU) (Denitrator Product) at 350grams per liter, there will be 138 liters of low enriched uranium (LEU) produced.

One interim storage tank will be filled with 138 liters of LEU per day.

Liquid will be placed in DOT, Type A shipping packages, such as a VPS-BXKT-003B. Each shipping package can hold 4, one liter containers of liquid. It will take 35 packages to hold the liquid contained within one interim storage tank.

A total of approximately 38,100 liters of LEU will be produced for dilution of the 276 containers of Denitrator product.

A total of 9525 DOT, Type A shipping packages will be required.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
CPP-651 SNM Shipments					
+ Denitrator - Opt 3 (Dissolve Using New Bldg)					
	1,611	26MAY98	22OCT02	38,465.00	11,553,795.00

FY98 | FY99 | FY00 | FY01 | FY02

Project Start	01JUL97	Early Bar	
Project Finish	22OCT02	Progress Bar	
Data Date	01OCT97	Critical Activity	
Run Date	19AUG97		

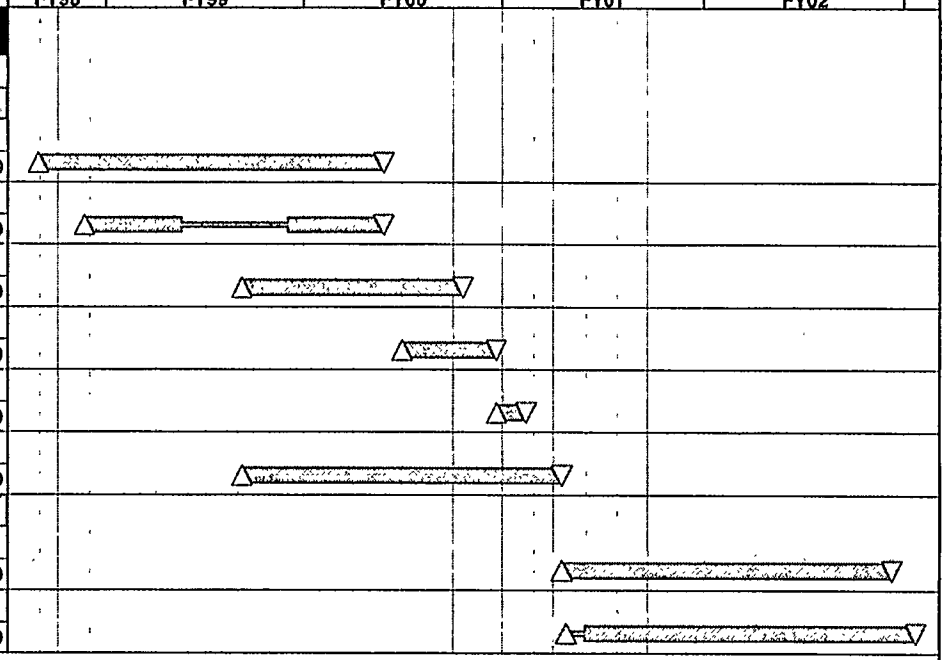
F651:DEN3

Sheet 1A of 1B

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 3 DISSOLVE (NEW BLDG)
Summary by Functional Area

CPP-651 SNM Shipments

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Denitrator - Opt 3 (Dissolve Using New Bldg)					
Conditioning					
+ Project Definition	354	26MAY98	24FEB00	1,760.00	8,088,800.00
+ Procurement	304	20AUG98	24FEB00	120.00	1,656,000.00
+ ES&H Documentation (SAR,NEPA,Permits)	226	09JUN99	20JUL00	3,120.00	166,800.00
+ Procedures	96	29MAR00	18SEP00	580.00	27,900.00
+ Training	32	19SEP00	13NOV00	1,280.00	60,800.00
+ S&S Plans for Repackaging	322	09JUN99	16JAN01	2,842.00	151,120.00
SNM Shipment					
+ Material Repackaging	600	17JAN01	08SEP02	25,408.00	1,244,400.00
+ Product Shipment	636	25JAN01	22OCT02	3,355.00	157,975.00



Project Start	01JUL97
Project Finish	22OCT02
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN3

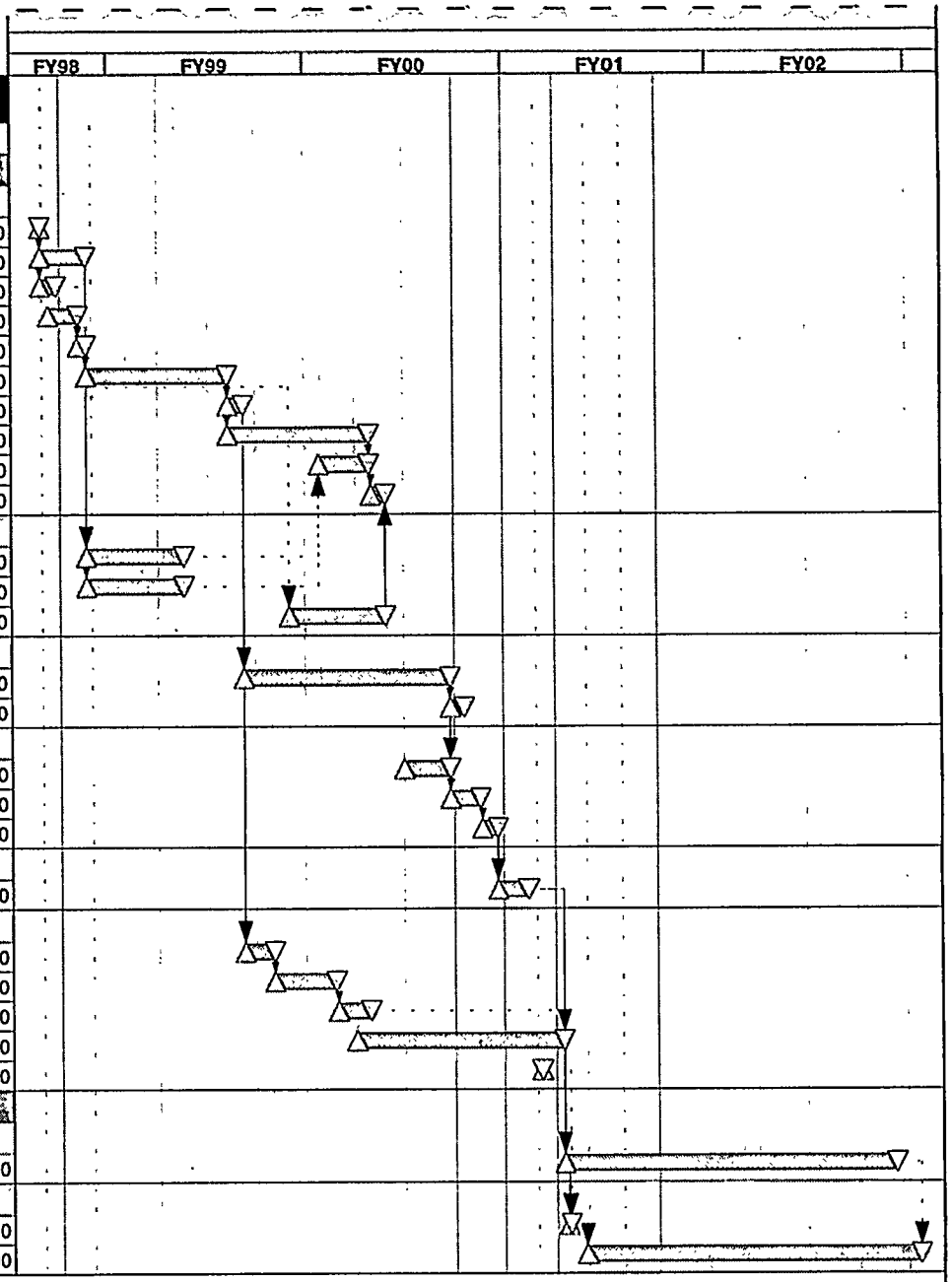
Sheet 1A of 1B

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 3 DISSOLVE (NEW BLDG)
Summary by Functional Area

CPP-651 SNM Shipments

Denitrator - Opt 3 (Dissolve Using New Bldg)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
Project Definition					
Conduct Value Engineering Sessions	2	26MAY98	27MAY98	280.00	14,200.00
Obtain Written Agreements as required (DOE,	48	28MAY98*	19AUG98	60.00	2,700.00
Identify On-site Representative	16	28MAY98*	24JUN98	20.00	900.00
Obtain Characterization Data (product & depleted	32	11JUN98	05AUG98	120.00	5,800.00
Obtain Peer Reviews & Approvals of Concepts	8	06AUG98	19AUG98	560.00	28,400.00
Develop Design Process Drawings (Title I & II)	144	20AUG98	10MAY99	80.00	504,000.00
Provide Input to SAR NEPA, Operating Permits	16	11MAY99*	08JUN99	160.00	8,800.00
Construct New Building	144	11MAY99	27JAN00	80.00	4,804,000.00
Install New Equipment in CPP-651	48	28OCT99	27JAN00	80.00	2,704,000.00
Inspection, Testing & Startup of New Equipment	16	31JAN00	24FEB00	320.00	16,000.00
Procurement					
Purchase Process Equipment	96	20AUG98*	15FEB99	40.00	752,000.00
Purchase Support Systems	96	20AUG98*	15FEB99	40.00	202,000.00
Purchase 600 Drums - 110 gal DOT-6M	96	01SEP99	24FEB00	40.00	702,000.00
ES&H Documentation (SAR,NEPA,Permits)					
Develop SAR/CSE	210	09JUN99	21JUN00	2,000.00	110,000.00
Final Review & Approval of SAR	16	22JUN00*	20JUL00	1,120.00	56,800.00
Procedures					
Develop Procedure	48	29MAR00	21JUN00	340.00	16,100.00
Review & Resolve Comments	32	22JUN00	17AUG00	190.00	9,200.00
Approve New Procedure	16	21AUG00	18SEP00	50.00	2,600.00
Training					
Practice Dry Run	32	19SEP00	13NOV00	1,280.00	60,800.00
S&S Plans for Repackaging					
Identify MC&A Requirements - Sampling Plan	32	09JUN99	03AUG99	320.00	15,200.00
Define Security Requirements & Modify	64	04AUG99	24NOV99	458.00	34,320.00
Develop Security Procedures & Implemt. Plans	32	29NOV99	27JAN00	240.00	11,200.00
Complete ORR & Obtain Approval to Operate	210	03JAN00	16JAN01	1,820.00	90,200.00
Request for Safe Secure Transport (SST)	1	06DEC00	06DEC00	4.00	200.00
SNM Shipment					
Material Repackaging					
Facility Operations - Dissolve & Extract	600	17JAN01	08SEP02	25,408.00	1,244,400.00
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	25JAN01	26JAN01	165.00	7,825.00
Load Truck and Ship to Receiver - (2 thru 23)	334	26FEB01	22OCT02	3,190.00	150,150.00



Project Start	01JUL97
Project Finish	22OCT02
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN3

Sheet 1A of 1B

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 3 DISSOLVE (NEW BLDG)
Detailed Activity Schedule

LMITCO

REPORT DATE 19AUG97 RUN NO. 329
22:13

RL-09 All Resource Estimates

PRIMAVERA PROJECT PLANNER

RESOURCE LOADING REPORT

TOTAL USAGE FOR YEAR

CPP 651 Denitrator Material - Opt 3

START DATE 01JUL97 FIN DATE 22OCT02

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
1341E140	Radiological Engineer	80		158	22			260
1342T050	Radiological Technician				857	1143		2000
1420E110	Quality Engineer	70	34	175	22			300
1420T060	Quality Inspector			120				120
1710P170	Environmental Engineer	80	195	484	22			780
3280E130	Transportation Engineer			58	22			80
3280P170	Transporation Coordinator	60		120	193	263	17	654
4110E010	Safety Analyst	60	155	425				640
4110E120	Criticality Safety Engineer	60	155	425				640
4110E130	Other/Technical Engineer	73	112	253	22			460
41E1R010	RAL Technician	20			709	947		1676
41E1S010	RAL Engineer		160		236	316		712
5100M4	Construction Purchases							
5100M6	Direct Purchases							
5100M8	Subcontracts							
5110M020	Fuel Manager	60	195	574	22			850
5112G050	Administration Support		62	204	54			320
5112M010	CPP 651 Operations Foreman			58	111	132	9	310
5112R040	CPP 651 Fuel Operators	60		240	6101	7844	34	14280
5113E070	Fuel Supervisor			58	22			80
5113E080	Facility Fuel Engineer	90	74	831	1936	2093	17	5040
5122E130	Design Engineer	60	61	99				220
5130P130	Trainer	60		170	250			480
5152P160	Procedure Writer			120				120
5213M010	CPP 602 Operations Foreman			58	22			80
5213R040	CPP 602 Fuel Operators	20		208	1642	1829		3700
5221E010	Technical Safety Engineer (TSE)			78	22			100
5432E130	Plant Systems Engineer			58	22			80
6100E130	Security Operations	60	21	258	22			360
6120P170	Safeguards & Accountability	160	160	258	923	1209	4	2715
6520C020	Electrician		15	15				30
6520M010	Craft Foreman		10	10	90	132	9	250
6520R080	Equipment Operator				359	527	34	920
6520T070	Instrument Technician		107	101				208
	REPORT TOTAL	**1072**	**1515**	**5617**	**13702**	**16435**	**124**	**38465**

LMITCO

PRIMAVERA PROJECT PLANNER

CPP 651 Denitrator Material - Opt 3

REPORT DATE 19AUG97 RUN NO. 330
22:25

COST LOADING REPORT

START DATE 01JUL97 FIN DATE 22OCT02

DATA DATE 01OCT97 PAGE NO. 1

Detailed by Resource

TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
1341E140	Radiological Engineer	4000		7914	1086			13000
1342T050	Radiological Technician				42833	57167		100000
1420E110	Quality Engineer	3479	1698	8737	1086			15000
1420T060	Quality Inspector			6000				6000
1710P170	Environmental Engineer	4000	9738	24176	1086			39000
3280E130	Transportation Engineer			2914	1086			4000
3280P170	Transporation Coordinator	3000		6000	9670	13174	856	32700
4110E010	Safety Analyst	3000	7738	21262				32000
4110E120	Criticality Safety Engineer	3000	7738	21262				32000
4110E130	Other/Technical Engineer	3639	5611	12664	1086			23000
41E1R010	RAL Technician	1000			35466	47334		83800
41E1S010	RAL Engineer		8000		11822	15778		35600
5100M4	Construction Purchases		2700000	4800000				7500000
5100M6	Direct Purchases		7838	7363				15200
5100M8	Subcontracts	307465	1266493	576042				2150000
5110M020	Fuel Manager	4200	13633	38547	1520			57900
5112G050	Administration Support		2475	8154	2171			12800
5112M010	CPP 651 Operations Foreman			2914	5571	6587	428	15500
5112R040	CPP 651 Fuel Operators	3000		11650	303823	392214	1713	712400
5113E070	Fuel Supervisor			3497	1303			4800
5113E080	Facility Fuel Engineer	4479	3698	41537	96789	104640	856	252000
5122E130	Design Engineer	3000	3031	4969				11000
5130P130	Trainer	3000		8500	12500			24000
5152P160	Procedure Writer			5400				5400
5213M010	CPP 602 Operations Foreman			2914	1086			4000
5213R040	CPP 602 Fuel Operators	900		9373	73907	82320		166500
5221E010	Technical Safety Engineer (TSE)			3914	1086			5000
5432E130	Plant Systems Engineer			2914	1086			4000
6100E130	Security Operations	2700	928	11595	977			16200
6120P170	Safeguards & Accountability	7200	7200	11623	41545	54414	193	122175
6520C020	Electrician		619	581				1200
6520M010	Craft Foreman		516	484	4485	6587	428	12500
6520R080	Equipment Operator				14352	21078	1370	36800
6520T070	Instrument Technician		4290	4030				8320
	REPORT TOTAL	**361063**	**4051244**	**5666930**	**667422**	**801292**	**5844**	**11553794**

Denitrator Product

Option 4 (Stabilize to oxide in CPP-637 and CPP-601, ship as liquid to SRS)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **1,422,391**

Cost for procurement = **$ 656,000**

Cost for Documentation (SAR, etc.) = **$ 166,800**

Cost for Procedure Preparation and Training = **$205,913**

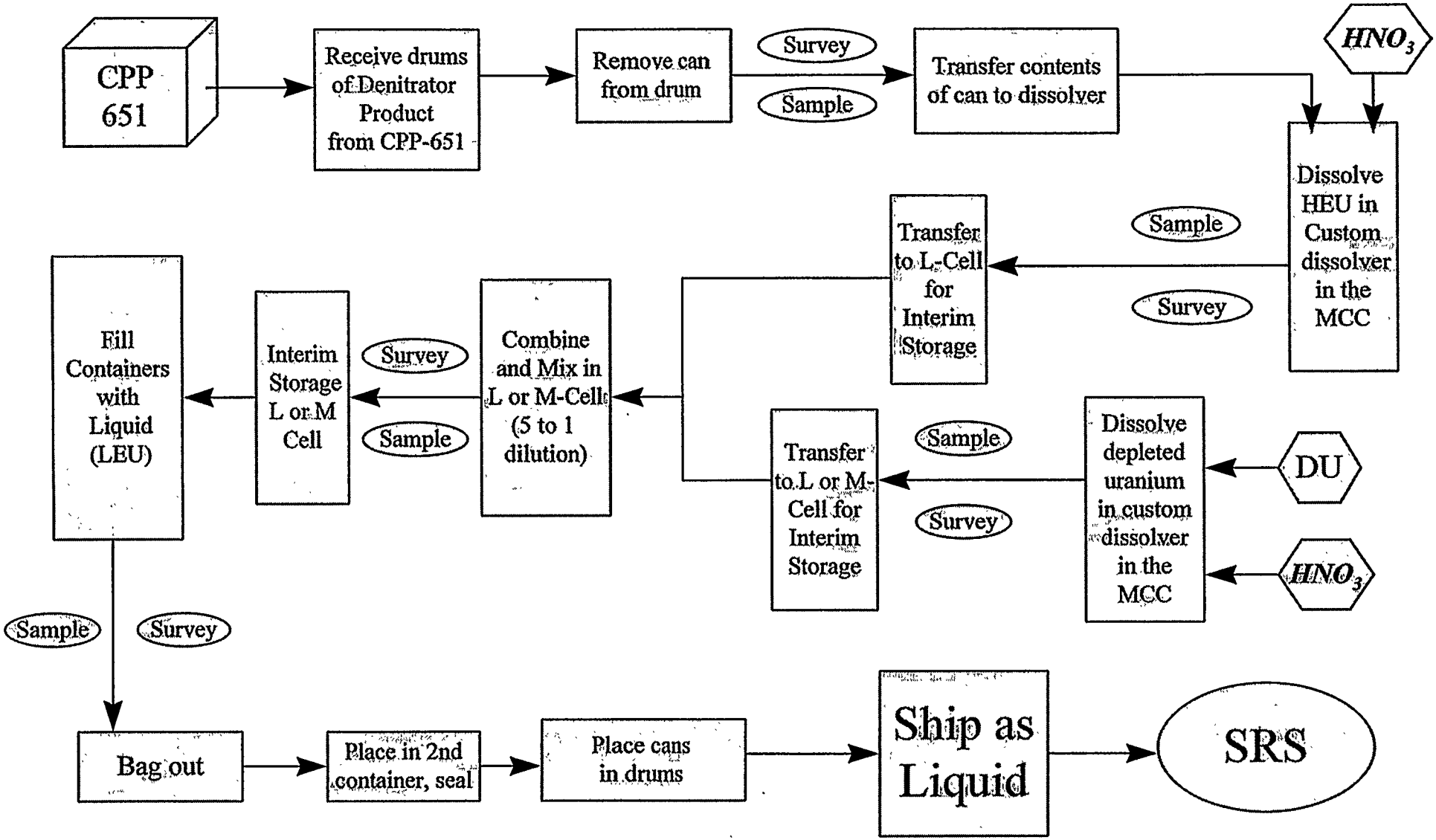
Cost to dissolve and repackage in CPP-651 and Ship = **$2,108,173**

Total Cost for Option 4 =

$1,422,391 + $656,000 + $166,800 + $205,913 +$2,108,173 = **$4,559,277**

Schedule: 24 months for planning, preparations and procurement
9 months for documentation, procedures and training
19 months to dissolve, repackage and ship
Total Duration for Option 4 = 52 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.



DISSOLVE, DILUTE, AND SEND AS LIQUID USING EXISTING FACILITIES

Denitrator Product - Option 4

Assumption to:
Dissolve, Extract, Dilute, and Send as Liquid Using Existing Facilities

CPP-601 and CPP-602, Cells P, Q, L, M, N, U, W, K, T and Z will be used along with the multicurie cell and the Denitrator area and vault.

The PEW will be used to handle the waste streams.

There will be a 5 to 1 dilution of the Denitrator Product

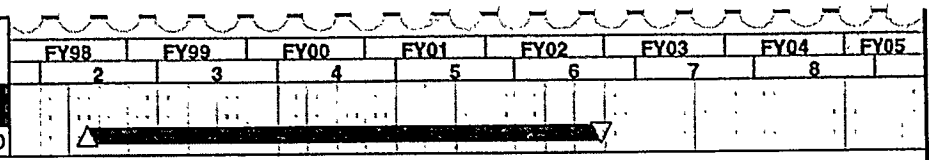
Contact Rad Level reading range from 3 mr/hr to 900 mr/hr. The majority are in the 100 to 200 mr/hr range and only 14 of the bottles are at 500mr/hr or greater.

Assuming a rate of one container of product being dissolved per day, the process will require about 1 ½ years.

The majority of the instrumentation and pumps will need to be refurbished.

An Operational Readiness Review (ORR) will be required.

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Cost
Denitrator Opt4 - Dissolve & Ship Existing Fac.					
		1,575	26MAY98	16SEP02	4,559,277.20



Project Start	01JUL97
Project Finish	24AUG09
Data Date	01JUL97
Run Date	20AUG97

Early Bar
Progress Bar
Critical Activity

DRYB:DEN4

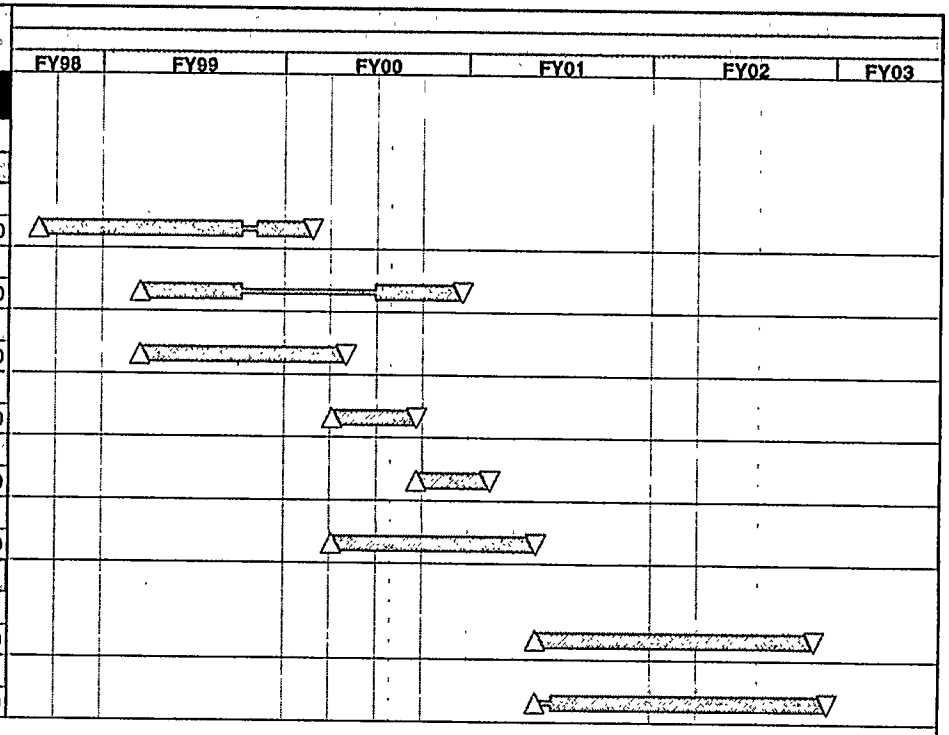
Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 4 DISSOLVE IN 651
Summary

CPP-651 SNM Shipments

Denitrator - Opt 4 (Dissolve Use Existing Fac)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
+ Project Definition	306	26MAY98	24NOV99	2,360.00	1,032,309.20
+ Procurement	354	15DEC98	18SEP00	120.00	656,000.00
+ ES&H Documentation (SAR,NEPA,Permits)	226	15DEC98	01FEB00	3,120.00	166,800.00
+ Procedures	96	05JAN00	21JUN00	840.00	42,331.00
+ Training	80	22JUN00	13NOV00	3,200.00	163,582.40
+ S&S Plans for Repackaging	226	05JAN00	15FEB01	2,918.00	390,081.60
SNM Shipment					
+ Material Repackaging	550	16FEB01	19AUG02	23,808.00	1,188,560.00
+ Product Shipment	578	16FEB01	16SEP02	17,635.00	919,613.00



Project Start	01JUL97
Project Finish	16SEP02
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN4

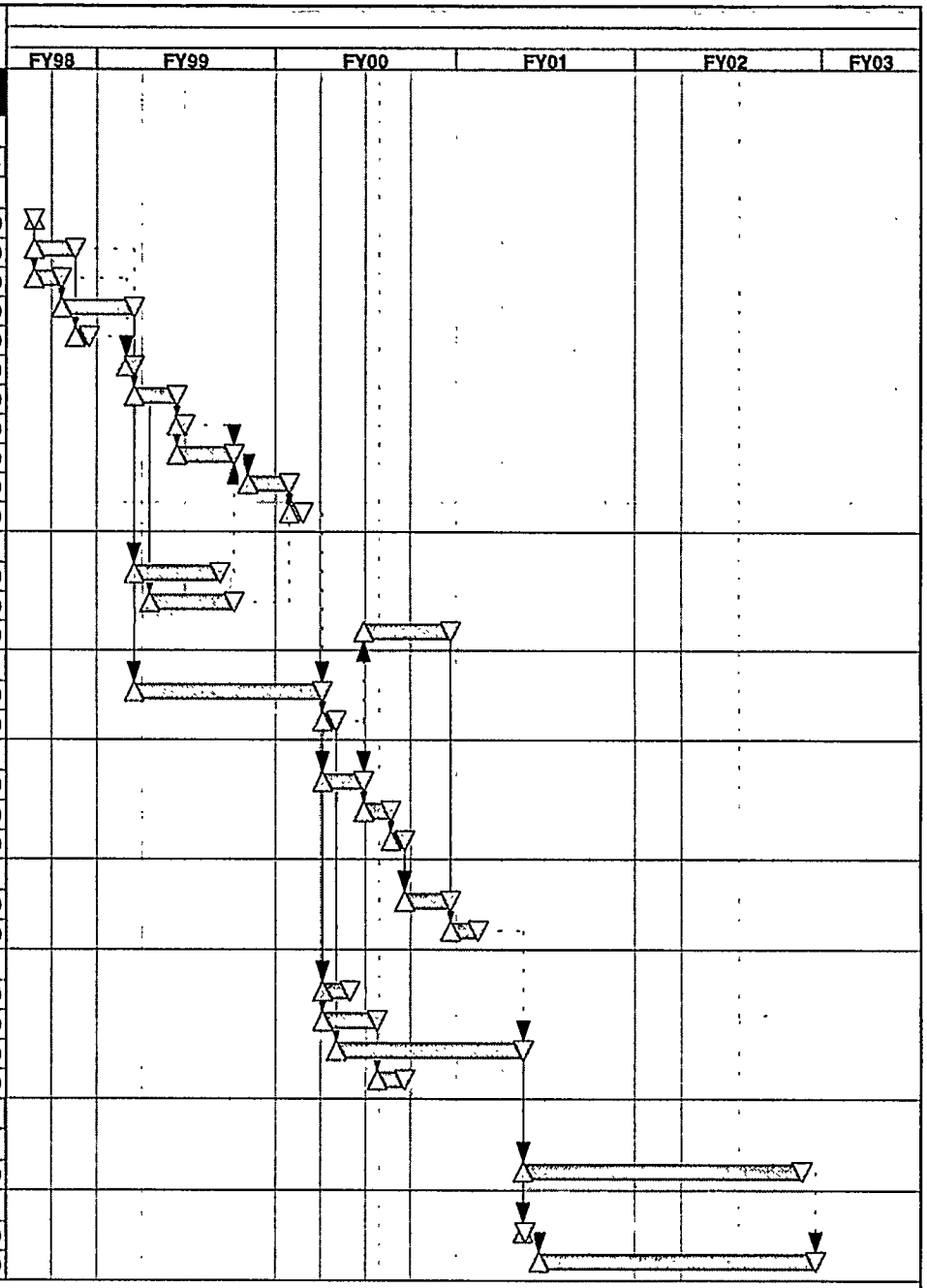
Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 4 DISSOLVE IN 651
Summary by Functional Area

CPP-651 SNM Shipments

Denitrator - Opt 4 (Dissolve Use Existing Fac)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
Project Definition					
Conduct Value Engineering Sessions	2	26MAY98	27MAY98	280.00	14,200.00
Obtain Written Agreements as required (DOE,	48	26MAY98*	17AUG98	60.00	2,700.00
Obtain Characterization Data (product & depleted	32	28MAY98	22JUL98	120.00	5,800.00
Identify Process to Condition Product (Dis/Dil)	80	23JUL98	14DEC98	600.00	43,509.20
Identify On-site Representative	16	18AUG98*	15SEP98	20.00	900.00
Obtain Peer Reviews & Approvals of Concepts	8	01DEC98	14DEC98	560.00	28,400.00
Develop Design Process Drawings (Title I & II)	48	15DEC98	15MAR99	80.00	504,000.00
Provide Input to SAR NEPA, Operating Permits	8	16MAR99*	29MAR99	160.00	8,800.00
Install New Equipment in CPP-651	64	16MAR99	06JUL99	80.00	204,000.00
Upgrade/Refurbish Existing Facility	48	04AUG99	27OCT99	80.00	154,000.00
Inspection, Testing & Startup of New Equipment	16	28OCT99	24NOV99	320.00	66,000.00
Procurement					
Purchase Process Equipment	96	15DEC98*	08JUN99	40.00	77,000.00
Purchase Support Systems	96	19JAN99*	06JUL99	40.00	77,000.00
Purchase 3648 Shipping Drums (152 x 24)	96	29MAR00	18SEP00	40.00	502,000.00
ES&H Documentation (SAR,NEPA,Permits)					
Develop SAR/CSE	210	15DEC98	04JAN00	2,000.00	110,000.00
Final Review & Approval of SAR	16	05JAN00*	01FEB00	1,120.00	56,800.00
Procedures					
Develop Procedure	48	05JAN00	28MAR00	600.00	30,531.00
Review & Resolve Comments	32	29MAR00	23MAY00	190.00	9,200.00
Approve New Procedure	16	24MAY00	21JUN00	50.00	2,600.00
Training					
Develop Training Program & Implement	48	22JUN00	18SEP00	1,920.00	102,782.40
Practice Dry Run	32	19SEP00	13NOV00	1,280.00	60,800.00
S&S Plans for Repackaging					
Identify MC&A Requirements - Sampling Plan	32	05JAN00	29FEB00	320.00	15,200.00
Define Security Requirements & Modify	64	05JAN00	25APR00	458.00	269,120.00
Complete ORR & Obtain Approval to Operate	210	02FEB00	15FEB01	1,900.00	94,561.60
Develop Security Procedures & Implemt. Plans	32	26APR00	21JUN00	240.00	11,200.00
SNM Shipment					
Material Repackaging					
Facility Operations - Dissolve & Extract	550	16FEB01	19AUG02	23,808.00	1,188,560.00
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	16FEB01	17FEB01	155.00	7,400.20
Load Truck and Ship to Receiver - (2 thru 152)	300	20MAR01	16SEP02	17,480.00	912,212.80



Project Start	01JUL97
Project Finish	16SEP02
Data Date	01OCT97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN4

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 4 DISSOLVE IN 651
Detailed Activity Schedule

LMITCO

REPORT DATE 19AUG97 RUN NO. 423
22:05

Detailed by Resource

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

CPP 651 Material Schedule - All Opts

START DATE 01JUL97 FIN DATE 16SEP02

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	TOTAL
1341E140	Radiological Engineer	3779	3870	7571	1429		16649
1342T050	Radiological Technician				41273	58727	100000
1420E110	Quality Engineer	1000	4000	8571	1429		15000
1420T060	Quality Inspector			6000			6000
1710P170	Environmental Engineer	2000	23167	12405	37815	51774	127160
3280E130	Transportation Engineer			2571	1429		4000
3280P170	Transporation Coordinator	1000	2000	9014	28937	48776	89727
4110E010	Safety Analyst	1000	21167	9833			32000
4110E120	Criticality Safety Engineer	2523	22768	9833			35124
4110E130	Other/Technical Engineer	14705	27158	7821	1429		51112
41E1R010	RAL Technician	5204	4420		34174	48626	92424
41E1S010	RAL Engineer			8000	11391	16209	35600
5100M4	Construction Purchases		303125	46875			350000
5100M6	Direct Purchases			250000			250000
5100M8	Subcontracts		650000	550000			1200000
5110M020	Fuel Manager	1400	32433	22067	2000		57900
5112G050	Administration Support			9943	2857		12800
5112M010	CPP 651 Operations Foreman			27474	30317	50469	108260
5112R040	CPP 651 Fuel Operators	1000	2000	13838	391026	577730	985594
5113E070	Fuel Supervisor			3086	1714		4800
5113E080	Facility Fuel Engineer	2000	6000	71586	154534	211420	445539
5122E130	Design Engineer	1000	4000	6000			11000
5130P130	Trainer	1000	2000	32500	12500		48000
5152P160	Procedure Writer			5928			5928
5213M010	CPP 602 Operations Foreman			2571	1429		4000
5213R040	CPP 602 Fuel Operators	900		36455	12536		49890
5221E010	Technical Safety Engineer (TSE)			3571	1429		5000
5432E130	Plant Systems Engineer			2571	1429		4000
6100E130	Security Operations	900	1800	12214	1286		16200
6120P170	Safeguards & Accountability	5400	1800	24494	67443	101261	200398
6520C020	Electrician			1200			1200
6520M010	Craft Foreman			1000	14082	24145	39226
6520R080	Equipment Operator				53737	92688	146426
6520T070	Instrument Technician			8320			8320
	REPORT TOTAL	**44811**	**1111707**	**1213315**	**907620**	**1281825**	**4559278**

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	TOTAL
1341E140	Radiological Engineer	69	71	151	29		320
1342T050	Radiological Technician				825	1175	2000
1420E110	Quality Engineer	20	80	171	29		300
1420T060	Quality Inspector			120			120
1710P170	Environmental Engineer	40	463	248	689	940	2380
3280E130	Transportation Engineer			51	29		80
3280P170	Transporation Coordinator	20	40	180	577	973	1790
4110E010	Safety Analyst	20	423	197			640
4110E120	Criticality Safety Engineer	40	444	197			680
4110E130	Other/Technical Engineer	196	440	156	29		820
41E1R010	RAL Technician	88	72		683	973	1816
41E1S010	RAL Engineer			160	228	324	712
5100M4	Construction Purchases						
5100M6	Direct Purchases						
5100M8	Subcontracts						
5110M020	Fuel Manager	20	463	338	29		850
5112G050	Administration Support			249	71		320
5112M010	CPP 651 Operations Foreman			531	586	973	2090
5112R040	CPP 651 Fuel Operators	20	40	280	7762	11408	19510
5113E070	Fuel Supervisor			51	29		80
5113E080	Facility Fuel Engineer	40	120	1311	2864	3825	8160
5122E130	Design Engineer	20	80	120			220
5130P130	Trainer	20	40	650	250		960
5152P160	Procedure Writer			140			140
5213M010	CPP 602 Operations Foreman			51	29		80
5213R040	CPP 602 Fuel Operators	20		721	279		1020
5221E010	Technical Safety Engineer (TSE)			71	29		100
5432E130	Plant Systems Engineer			51	29		80
6100E130	Security Operations	20	40	271	29		360
6120P170	Safeguards & Accountability	120	40	523	1435	2147	4265
6520C020	Electrician			30			30
6520M010	Craft Foreman			20	284	486	790
6520R080	Equipment Operator				1134	1946	3080
6520T070	Instrument Technician			208			208
	REPORT TOTAL	**773**	**2856**	**7251**	**17953**	**25169**	**54001**

Denitrator Product

Option 5 (Repackage into smaller cans in CPP-651, ship to SRS)

Cost:

Cost for planning and preparations (Project Definition and S&S plans) = $ **740,853**

Cost to procure drums = **$381,000**

Cost for Documentation (SAR, etc.) = **$ 166,800**

Cost for Procedure Preparation and Training = **$88,700**

Cost to Repackage in CPP-651 and Ship = **$781,916**

Total Cost for Option 5 =

$740,853 + $381,000 + $166,800 + $88,700 +$781,916 = **$2,159,269**

Schedule: 9 months for planning, SAR changes and preparations
13 months for procurement
5 months to develop procedures and training
11 months to repackage and ship
Total Duration for Option 5 = 38 months

Comments: See attached Primavera generated detailed resources, cost data and scheduled activities for this option.

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
CPP-651 SNM Shipments					
+ Denitrator Product Matl - Opt 5 (Repkg in 651)					
	1,155	26MAY98	23JUL01	24,461.00	2,159,268.60

FY98		FY99				FY00				FY01				FY02		
Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3

Project Start	01JUL97
Project Finish	23JUL01
Data Date	01JUL97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN5

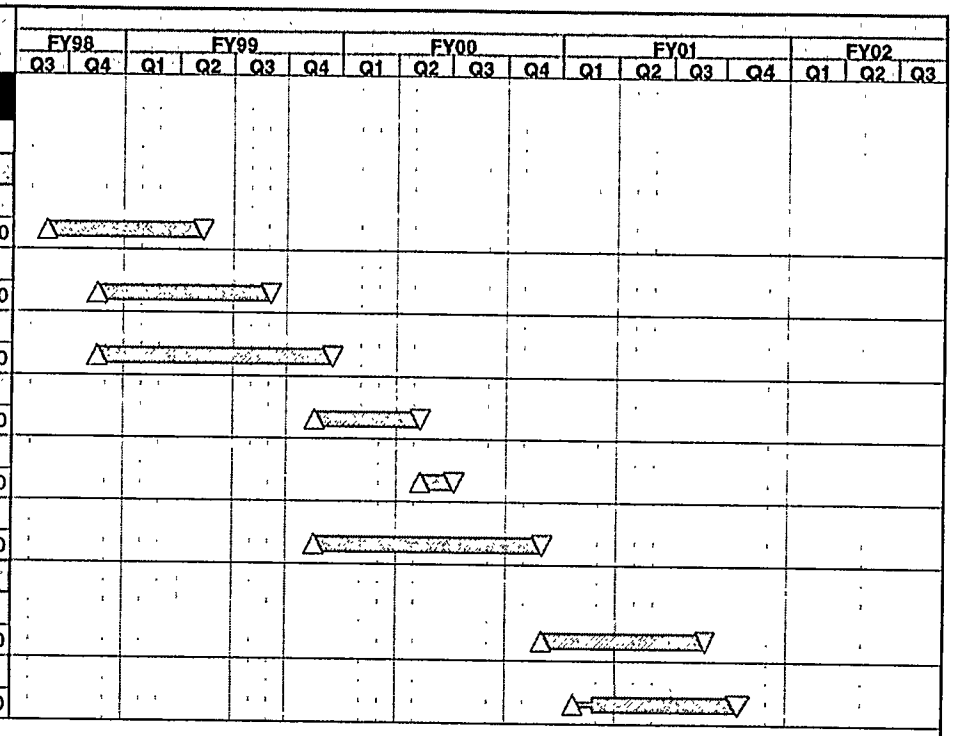
Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 5 REPACKAGE IN 651
Summary by Functional Area

CPP-651 SNM Shipments

Denitrator Product Matl - Opt 5 (Repkg in 651)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
+ Project Definition	144	26MAY98	10FEB99	1,640.00	583,000.00
+ Procurement	160	18AUG98	03JUN99	200.00	381,000.00
+ ES&H Documentation (SAR,NEPA,Permits)	217	18AUG98	14SEP99	3,120.00	166,800.00
+ Procedures	96	17AUG99	09FEB00	580.00	27,900.00
+ Training	32	10FEB00	05APR00	1,280.00	60,800.00
+ S&S Plans for Repackaging	210	17AUG99	30AUG00	2,898.00	157,852.60
SNM Shipment					
+ Material Repackaging	150	31AUG00	31MAY01	14,148.00	751,118.40
+ Product Shipment	272	25OCT00	23JUL01	595.00	30,797.60



Project Start	01JUL97
Project Finish	23JUL01
Data Date	01JUL97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN5

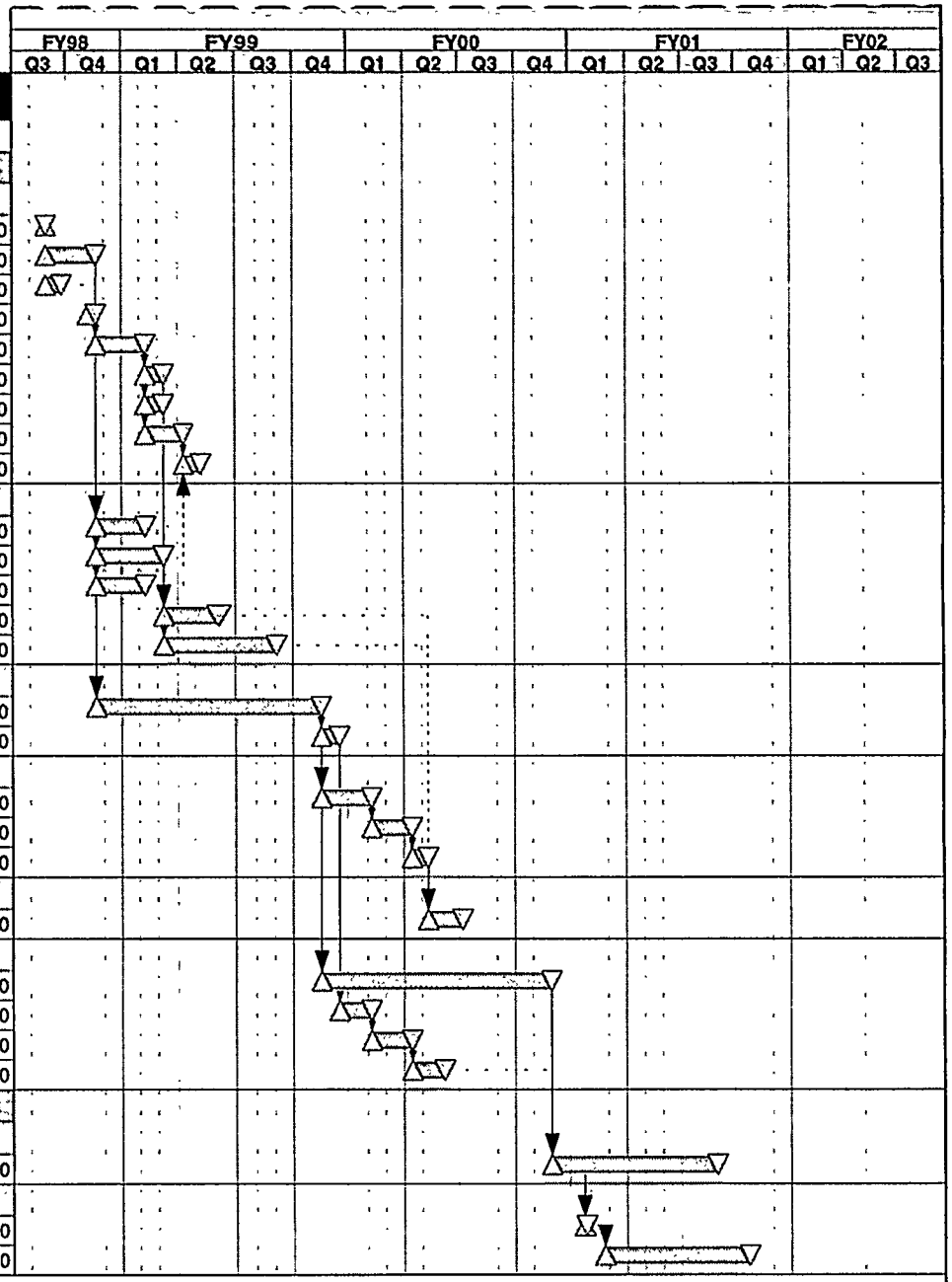
Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 5 REPACKAGE IN 651
Summary by Functional Area

CPP-651 SNM Shipments

Denitrator Product Matl - Opt 5 (Repkg in 651)

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Conditioning					
Project Definition					
Conduct Value Engineering Sessions	2	26MAY98	27MAY98	280.00	14,200.00
Obtain Written Agreements as required (DOE,	48	26MAY98*	17AUG98	60.00	2,700.00
Identify On-site Representative	16	26MAY98*	22JUN98	20.00	900.00
Obtain Peer Reviews & Approvals of Concepts	8	04AUG98	17AUG98	560.00	28,400.00
Develop Design Process Drawings (Title I & II)	48	18AUG98	10NOV98	80.00	254,000.00
Develop Design Process Drawings	16	11NOV98	09DEC98	80.00	54,000.00
Provide Input to SAR NEPA, Operating Permits	16	11NOV98*	09DEC98	160.00	8,800.00
Install New Equipment & Interfaces in 651	32	11NOV98	13JAN99	80.00	204,000.00
Inspection, Testing & Startup of New Equipment	16	14JAN99	10FEB99	320.00	16,000.00
Procurement					
Purchase Pre-fabricated Perma-Con Structure	48	18AUG98*	10NOV98	40.00	52,000.00
Purchase Process Equipment	64	18AUG98*	09DEC98	40.00	77,000.00
Purchase support systems (gloveboxes, HVAC,	48	18AUG98	10NOV98	40.00	77,000.00
Purchase New cans to Repackage Product In	48	10DEC98	10MAR99	40.00	3,000.00
Purchase 276 6M Drums - 55 gallon	96	10DEC98	03JUN99	40.00	172,000.00
ES&H Documentation (SAR,NEPA,Permits)					
Develop SAR/CSE	201	18AUG98	16AUG99	2,000.00	110,000.00
Final Review & Approval of SAR	16	17AUG99*	14SEP99	1,120.00	56,800.00
Procedures					
Develop Procedure	48	17AUG99	09NOV99	340.00	16,100.00
Review & Resolve Comments	32	10NOV99	12JAN00	190.00	9,200.00
Approve New Procedure	16	13JAN00	09FEB00	50.00	2,600.00
Training					
Practice Dry Run	32	10FEB00	05APR00	1,280.00	60,800.00
S&S Plans for Repackaging					
Complete ORR & Obtain Approval to Operate	210	17AUG99	30AUG00	1,880.00	97,132.60
Identify MC&A Requirements - Sampling Plan	32	15SEP99	09NOV99	320.00	15,200.00
Define Security Requirements & Modify	32	10NOV99	12JAN00	458.00	34,320.00
Develop Security Procedures & Implemt. Plans	32	13JAN00	08MAR00	240.00	11,200.00
SNM Shipment					
Material Repackaging					
Facility Operations - Repackage 280 Bottles	150	31AUG00	31MAY01	14,148.00	751,118.40
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	25OCT00	26OCT00	95.00	4,737.60
Load Truck and Ship to Receiver - (2 thru 6)	240	26NOV00	23JUL01	500.00	26,060.00



Project Start	01JUL97
Project Finish	23JUL01
Data Date	01JUL97
Run Date	19AUG97

Early Bar
Progress Bar
Critical Activity

F651:DEN5

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE
DENITRATOR OPT 5 REPACKAGE IN 651
Detailed Activities Schedule

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	TOTAL
1341E140	Radiological Engineer	3000	4495	4505		12000
1342T050	Radiological Technician			7585	63522	71107
1420E110	Quality Engineer	4432	8063	4505		17000
1420T060	Quality Inspector		6000			6000
1710P170	Environmental Engineer	6109	28386	3505		38000
3280E130	Transportation Engineer		495	3505		4000
3280P170	Transporation Coordinator	3000	5083	917	3008	12008
4110E010	Safety Analyst	6109	25891			32000
4110E120	Criticality Safety Engineer	6109	25891			32000
4110E130	Other/Technical Engineer	5083	15270	9579		29933
41E1R010	RAL Technician			5914	49526	55440
41E1S010	RAL Engineer		2500	7392	15848	25741
5100M4	Construction Purchases		200000			200000
5100M6	Direct Purchases			15200		15200
5100M8	Subcontracts	224609	446391			671000
5110M020	Fuel Manager	8553	43740	5607		57900
5112G050	Administration Support		990	11810		12800
5112M010	CPP 651 Operations Foreman		495	3505	3094	7094
5112R040	CPP 651 Fuel Operators	3000	5625	57119	339918	405662
5113E070	Fuel Supervisor		594	4206		4800
5113E080	Facility Fuel Engineer	4432	20288	54553	84697	163970
5122E130	Design Engineer	3000	6000	2000		11000
5130P130	Trainer	3000	4000	17000		24000
5152P160	Procedure Writer		1950	3450		5400
5213M010	CPP 602 Operations Foreman		495	3505		4000
5213R040	CPP 602 Fuel Operators		1908	27661	66738	96307
5221E010	Technical Safety Engineer (TSE)		495	4505		5000
5432E130	Plant Systems Engineer		495	3505		4000
6100E130	Security Operations	2700	4046	9454		16200
6120P170	Safeguards & Accountability	6300	7271	20172	66997	100740
6520C020	Electrician			1200		1200
6520M010	Craft Foreman			1000	2730	3730
6520R080	Equipment Operator				5717	5717
6520T070	Instrument Technician			8320		8320
	REPORT TOTAL	**289439**	**866858**	**301175**	**701797**	**2159269**

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	TOTAL
1341E140	Radiological Engineer	60	90	90		240
1342T050	Radiological Technician			154	1286	1440
1420E110	Quality Engineer	89	161	90		340
1420T060	Quality Inspector		120			120
1710P170	Environmental Engineer	122	568	70		760
3280E130	Transportation Engineer		10	70		80
3280P170	Transporation Coordinator	60	102	18	60	240
4110E010	Safety Analyst	122	518			640
4110E120	Criticality Safety Engineer	122	518			640
4110E130	Other/Technical Engineer	102	296	123		520
41E1R010	RAL Technician			96	804	900
41E1S010	RAL Engineer		50	141	257	448
5100M4	Construction Purchases					
5100M6	Direct Purchases					
5100M8	Subcontracts					
5110M020	Fuel Manager	122	648	80		850
5112G050	Administration Support		25	295		320
5112M010	CPP 651 Operations Foreman		10	70	60	140
5112R040	CPP 651 Fuel Operators	60	113	1146	6552	7870
5113E070	Fuel Supervisor		10	70		80
5113E080	Facility Fuel Engineer	89	406	1059	1406	2960
5122E130	Design Engineer	60	120	40		220
5130P130	Trainer	60	80	340		480
5152P160	Procedure Writer		43	77		120
5213M010	CPP 602 Operations Foreman		10	70		80
5213R040	CPP 602 Fuel Operators		42	591	1286	1920
5221E010	Technical Safety Engineer (TSE)		10	90		100
5432E130	Plant Systems Engineer		10	70		80
6100E130	Security Operations	60	90	210		360
6120P170	Safeguards & Accountability	140	162	432	1346	2080
6520C020	Electrician			30		30
6520M010	Craft Foreman			20	55	75
6520R080	Equipment Operator				120	120
6520T070	Instrument Technician			208		208
	REPORT TOTAL	**1268**	**4209**	**5750**	**13234**	**24461**

Appendix B

Dry Blending Test and Evaluation:

Development of a UO3 grinding/blending process using RM-2 Mill

DEVELOPMENT OF A UO_3 GRINDING/BLENDING PROCESS USING RM-2 MILL

Prepared by

Raj K. Rajamani

August 1997

Includes a special report on grinding/blending evaluation by
Professor M. E. Wadsworth

Department of Metallurgical Engineering
University of Utah
Salt Lake City, UT 84112

Report to:

Bob Harmon
Lockheed Martin Idaho Technologies Company
Idaho Falls, ID 83415

SCOPE OF THE PROJECT

The ultimate objective is to show that highly enriched uranium powder (HEU) can be blended with depleted uranium powder (DU) such that the final product cannot be physically separated. The feasibility of this process is demonstrated with surrogate powders instead of uranium powders for obvious reasons.

The principal requirement of the process is that HEU and DU can be dry blended in a cylindrical canister that is 5 inches in diameter and 17 inches long. The second requirement is HEU mass accountability. That is, the mass of HEU going into the grinding/blending process and coming out of the process must be accounted for within fractions of a gram. Third, the handling of HEU in open air be as minimal as possible with the least number of handling steps. Fourth, the process must be robust so that the production process can be designed to be safe, with minimal operator exposure. Finally, the blended product must be small enough in particle size and mixed well enough that it would be extremely difficult to separate the product by physical separation techniques.

Let us consider each of the mills that is available in the market for this process to review its merits and shortcomings.

Ball Mill: This is a cylindrical mill fitted with lifter bars on the shell. HEU plus DU material along with 1/4-inch steel media would be placed in the mill and tightly closed with a lid. This mill passes mass accounting requirements, minimum handling and can be made in the size of 5-inch diameter by 27-inches long. The mill would be lying on its shell surface over rollers that would spin the mill at 105 rpm. The obvious drawback is that with the mill diameter being so small, the impact forces of the ball on the HEU/DU powder is at best very little. Hence, it would take many days time to achieve some level of grinding and such small diameter mills would never grind powders to submicron (1-5 micron) sizes. Hence this mill is unsuitable for this purpose.

Vibration Mill: The ball mill described above would be vibrated back and forth about an axis such that the balls rub against the powder and the shearing action would cause grinding. In this mill also the rate of grinding is so slow that it would take a few days to achieve a reasonable level of grinding. On this account this mill is unsuitable.

Attrition Mill: The 5-inch diameter by 17-inches long cylinder would be standing upright and the canister would be filled with 3-mm steel spheres. In the interstitial space the HEU/DU powder would be filled up. Furthermore, a central shaft with radial blades would pass through the top lid and the shaft would be located within the ball and powder mix. A motor spins the

shaft at about 600 rpm and the resulting shearing action grinds the powder. First, the packing of powder will occur against the shell walls and corners. In these regions the powder will not be mixed at all as the powder has compacted by itself against the walls. Secondly, after the grinding is done, the lid must be opened and the stirrer shaft removed for use again. This step leads to spillage and hence mass accounting would require an extremely tedious cleaning step. Finally, the entire canister must be filled with 3-mm steel spheres for the milling action to be efficient. This leaves only 40% of the canister volume for the powder.

The RM-2 Mill: The RM-2 mill is a ball mill operating in a very high gravitational field, for instance 100 G on the average and the mill can be designed to withstand even higher G-fields if necessary. Here 45% of the canister volume is filled with 2-mm steel spheres or any other heavier metal spheres. Then the HEU/DU powder, amounting to 30% of the canister volume, is added to the mill and the mill is shut tightly with a lid. Then the canister is fitted in the mill cage and allowed to experience 100 G centrifugal field while self-rotating. In an hour or so, as demonstrated later, the particle size of the powder reaches ultrafine sizes (1-5 microns). The canister is then ready for transportation to a reprocessing facility.

During grinding, the steel media continuously scours the mill shell and, hence, there is no segregation of powder in the mill. This fact assures that mixing is complete. The processing steps are: filling the canister with a set amount of steel media and powder, closing it with a lid, fitting it in the mill cage, and grinding, and the canister is ready for shipping. At the Savannah reprocessing facility the steel balls would be dissolved in the nitric used for processing HEU. Therefore, the RM-2 mill involves minimal processing steps, full mass accountability, and the least exposure of HEU to room atmosphere. Hence, this mill is chosen for blending/grinding.

Blending by Grinding

There are a number of challenges in this blending by grinding process. First of all, grinding should take place in as small a cylinder as 5 inches in diameter. Grinding should proceed at a reasonable rate so that the mixing of a batch of HEU/DU can be done in an hour or two. The size distribution of the final powder should reach 1-5 micron size, which ensures that the particles of HEU/DU have increased several thousand fold in number. The mill should provide complete mixing without presenting corners and crevices where powder can deposit and stay unmixed. Grinding to micron sizes is not a trivial task as very high forces are needed to fracture the particles to these sizes. As the particles become small, they tend to escape the grinding action within the mill and hence the mill has to apply repeated actions to further fracture these particles.

Blending by grinding in a mill is an attractive technique for the mixing of HEU with DU. First of all, blending could be done in a dry process. Secondly, as grinding proceeds, particles multiply in number and this fact alone brings about more blending. Finally, when numerous particles of HEU are mixed with even more numerous particles of DU, it is extremely difficult to separate without the use of conventional enrichment techniques, for example the gaseous diffusion process or the gas centrifuge enrichment process.

In the grinding/blending test described below the HEU and DU powders are mixed in a 1:5 mass ratio totaling to 100 gms. The mill canister, which is 4.75 inches in diameter and 4 inches long is first filled with 400 grams of alumina ceramic balls. These balls are 2-3 mm in diameter. Steel bearing balls of the same diameter could have been used but were unavailable at the time of the test. The powder is milled for 75 minutes. During milling the average particle size is reduced from 70 microns to less than 1.0 micron thereby increasing the number of particles by a factor of two million. The alumina or steel balls penetrate and come out of powder charge during milling many thousand times, hence, contributing to a good blending of the powders. The entire process is done dry to minimize nuclear criticality concerns.

Grinding HEU with EU is an attractive option for blending the two materials. Since size reduction of both HEU and EU particles occurs in the mill, in addition to bulk blending brought about by mill rotation, intimate mixing of the powder takes place. Suppose the bulk density of uranium powder is 0.7 gm/cc and the average particle size is 70 microns and upon grinding the particle size is 0.5 microns, which is readily possible in the RM-2 mill, then the number of particles in the feed is 9.1×10^5 per cc and in the product is 2.5×10^{12} per cc. In other words, there is a two million fold increase in particles of HEU and DU. Such a numerous population of particles ensures that a grain of HEU is surrounded by many grains of DU. Furthermore, separation of these particles by known extractive techniques requires considerably more effort than from a mixture of coarser grains.

During grinding, particle fracture occurs, which raises the temperature at the fracture tip to a few thousand degrees. As a result, mechanical fusion of one material over another occurs. In this case, since DU is larger in number, it is expected to coat the surface of HEU. In fact the mechanofusion occurring in mills is exploited in mechanical alloying, for instance, in the manufacture of nickel and copper alloys. In the dry process, mechanofusion is enhanced due to the intimate contact between the grains of DU and HEU. In a wet process this would not be the case, because the intervening liquid (usually water) film would give rise to other chemical reactions in the liquid phase. Thus particle size reduction to submicron sizes and mechanofusion are two overwhelming reasons for adopting grinding mills for blending.

RM-2 Mill

The mill is based on the principle of a planetary ball mill operation. In other words, a ball mill operates in a very high gravitational field. The high gravitational field is developed by a gyration arm spinning at high speed. A ball mill situated on the gyration arm rotates on its own axis, thus experiencing the centrifugal field.

The RM-2 Concept mill, which is being patented here in the U.S., uses novel mechanical parts to effect the centrifugal field and mill rotation. This novel design enables the mill to operate at very high centrifugal fields not possible with the state-of-the-art mill. The centrifugal field and the critical speed of the mill shell can be independently varied. The concept mill is extremely quiet in operation, almost no more than the swishing sound of a fan. Due to the enormous centrifugal field, size reduction to ultrafine sizes occurs within a matter of an hour or so. Furthermore, this mill is uniquely suited for a mill shell diameter of a few inches. Even in a very small diameter, the concept mill imposes a heavy centrifugal force to effect size reduction. Finally, the mill end can be tightly sealed, as anyone would do with a canister, and is held in a protective cage during mill operation, which assures zero leakage.

The can used in the RM-2 mill is a cylindrical can of a diameter of 4.75 inches and a length of 4.0 inches. In the actual blending work using the 5-inch by 17-inch can, the design must take a few factors into account. First the mill wall can be made thin, as low as one-eighth of an inch, but the mill cage surrounding the can will provide the necessary mechanical strength. The internal shell must be fitted with lifters to effect more mixing. A leak-proof design of the canister lid is needed for prevention of HEU/DU leakage. The grinding media are simply metal spheres, especially small-diameter spheres. The diameter of the media is in the range of 1-6 mm and a further study would be required to optimize the process. Metallic media are preferable in view of the fact that the Savannah facility uses nitric acid to dissolve the blended powder.

The mill has two motors, one to drive the gyration arm and the other to spin the mill itself. These speeds should be chosen so that the mill operates at as high a centrifugal field as is mechanically possible. This requirement imposes a careful design of the mill shaft and bearings, in which the Principal Investigator has good experience. The whole milling process operates in the dry mode. The powder stays dry during the entire process.

EXPERIMENTAL WORK

Materials

A pair of surrogate powders was sought, which could stand in for DU and HEU in the grinding/blending experimental work. In particular, powders of different colors were sought as such a mixture could be examined under an optical microscope upon blending. Although many candidate materials such as copper oxide, copper sulfate, nickel oxide and silicon carbide are available, the choice finally came down to titanium dioxide and titanium monoxide. These oxides would be referred to as dioxide and monoxide hereinafter for the sake of brevity. The dioxide is pure white in color and the monoxide is a dark greenish-brown, and exhibit a density of 4.26 gm/cc and 4.9 gm/cc respectively. Hence, they are ideal candidates in place of DU and HEU. However, the monoxide turned out to be lot more hard (higher grinding harness index) than the dioxide because the monoxide is made by reducing dioxide with hydrogen at around 450°C temperature. Thus, the monoxide undergoes sintering during its manufacture and hence the hardness. This fact should be kept in mind while reviewing the results of grinding.

In the experimental tests, titanium dioxide and titanium monoxide were used as surrogate material for DU and HEU respectively. It is well known that pure powders of titanium oxides are extremely hard to grind, that is, they exhibit a very high grinding hardness index. Uranium ore has a grinding index of 14.6 and can fall anywhere in the range 10-20 depending on the source. Hence, the actual uranium oxide particles have about 10% of the strength of titanium oxide particles. Hence, it would be expected that the true mixture of HEU and DU can be ground to micron sizes in half the time it took to grind titanium oxide. In other words, the true mixture can be milled and blended in 40 minutes approximately.

The particle density of titanium dioxide is 4.26 gm/cc and that of titanium monoxide is 4.90 gm/cc. It would have been preferable to have two oxides of differing color but the same density. Anyhow, this density compares well with that of compacted uranium oxide which is 3.5 gm/cc.

Grinding Test

The mill canister is first filled with 20 gms of monoxide and 80 gms of dioxide. Then alumina media of size 0.6-1.0 mm is added to a filling level of 35%. The bulk volume of alumina media used in this test is 350 cc and the mass is 700 gms. If steel media had been used, the mass of steel balls would have been 1680 gms. The canister is then set into the cage of the RM-2 mill. A centrifugal field of 68 G is exerted by the gyration arm and the canister speed is set at 80% of critical speed. The mixture sample is ground for exactly 75 minutes after

which the canister is opened. The contents are sieved on a 150 mesh screen to separate the powder from the alumina grinding media. Then the powder is riffled to take four representative samples. One portion of a sample is used for size analysis and all four samples are then analyzed in an X-ray diffractometer.

RESULTS

Analysis

The size analysis of fresh samples as well as the ground mixture is done with the Microtrac SPA particle analyzer. This analyzer is based on the optical laser diffraction principle. The X-ray work is done on a Siemens X-ray diffraction machine.

The RM-2 mill is capable of reducing even submicron powder to an ultrafine size powder. The following table gives the feed and product size distribution of the monoxide and dioxide mixture. The average size of the feed is one micron and the maximum size is 75 microns, whereas in the product, the average size is 0.5 microns. The size distribution of feed and product mixture is shown in the attached figure. The figure shows percentage by weight below a given particle size which is termed "cumulative percent passing." The feed size distribution is a bimodal distribution because part of it is made up of fine titanium dioxide and part of it is made up of coarse monoxide. The starting powder size distribution spans the range 1 to 75 microns with 15% over 10 microns in size. The product is 100% finer than 1.69 microns as seen in Table 1. Hence a large degree of size reduction has been brought about in about an hour. Simply the 68 G centrifugal field imposes very high stresses on the particles, and hence the fast kinetics. Under visual observation, the powder is a light-gray powder showing intimate mixing. Even under an optical microscope the white grains of dioxide cannot be distinguished from the dark-grayish grains of monoxide. Rather agglomerated clumps of dioxide are seen.

Visual inspection of the blended powder shows no apparent streaks of dark color anywhere within the powder mass. Even when the powder is spread out on a piece of paper, no streaks could be seen. The blended powder is a very light-gray color as contrasted with the stark white of dioxide and dark gray. Professor Milton Wadsworth's evaluation of blending with X-ray is detailed in his memo-report, which is attached. Professor Wadsworth concludes that "if the mixed U^{235}/U^{238} oxides are of uniform composition, density, and size distribution in the final blended (ground) product ... the separation of the isotope by physical means will not be possible."

Blending/grinding criteria met in RM-2 mill:

(1) Only one step of loading the mill with surrogate powders and grinding media.

(2) There was no leakage out of the mill in any of the tests conducted here.

(3) The product particle size meets the 1-5 micron size criterion established.

(4) The process uses mill shell and grinding media readily dissolvable in nitric acid. (Although actual tests here used an alumina can and media, it could have been readily done in aluminum or steel cans).

(5) The material did not stick to the corners or mill shell wall, thus ensuring complete mixing.

CONCLUSIONS

(1) The RM-2 mill exerts a very high centrifugal field on the mill and hence an extremely fast grinding rate of the monoxide-dioxide mixture is observed.

(2) During 75 minutes of grinding, the starting mixture of an average size of one micron and a maximum size of 75 microns is reduced to an average size of 0.5 micron and the maximum size in the product is only 1.69 microns.

(3) Under an optical microscope, individual grains of dioxide and monoxide could not be readily identified.

(4) It would have been ideal to have two powders of identical hardness (grinding index) to conduct the surrogate mixture grinding experiments. The readily available choice was titanium monoxide and titanium dioxide. The monoxide being a sintered powder is much harder than dioxide when it comes to grinding. This difficulty would not arise when dealing with DU and HEU as they are mineral particles of nearly the same hardness. Hence, they would grind down to nearly the same size distribution producing an even greater degree of mixing.

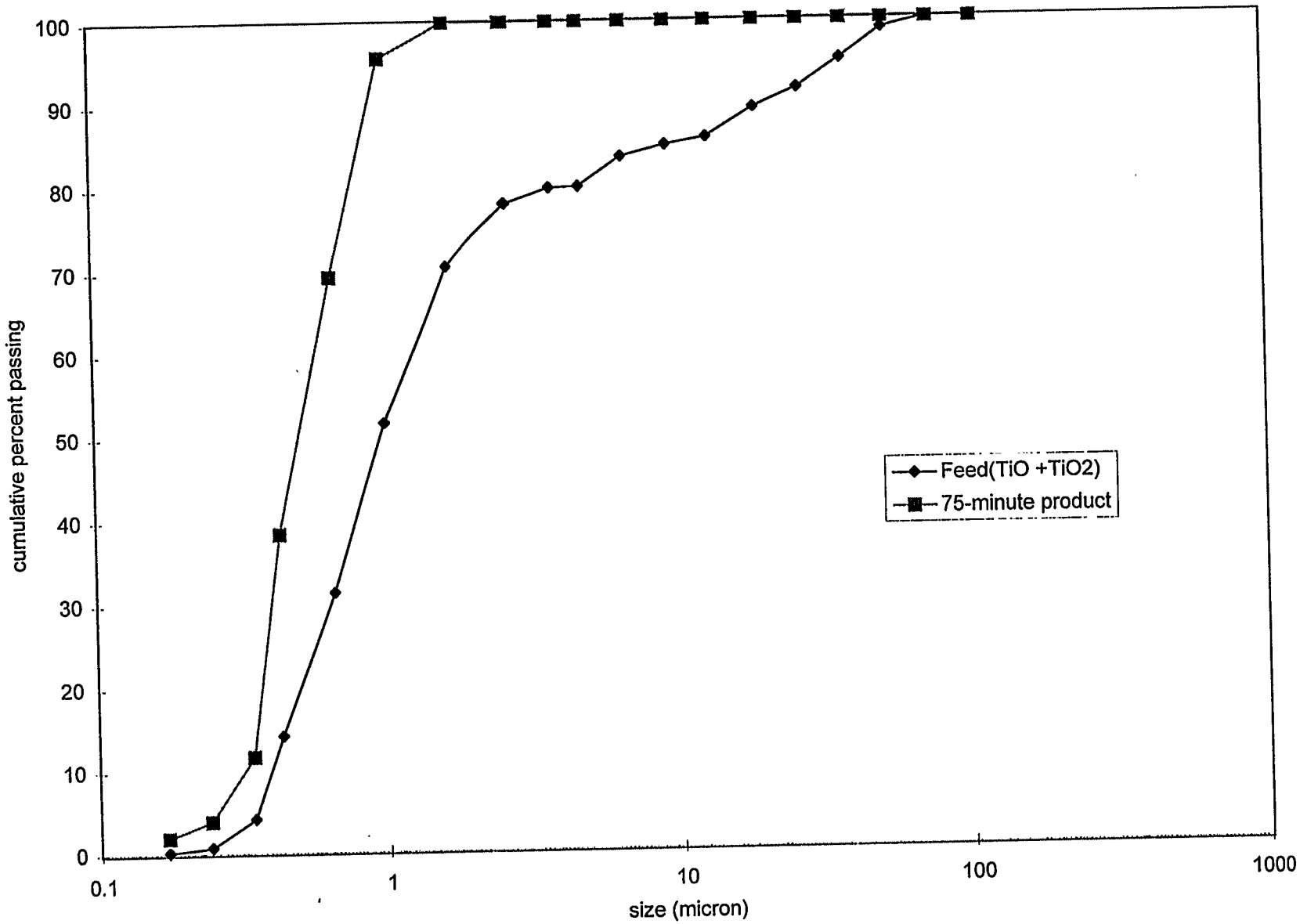
(5) The grind time chosen in this study is 75 minutes. This time could be doubled to produce an even greater degree of mixing.

(6) The operating conditions of the mill can be optimized to produce a high degree of mixing.

Table 1. Feed and Product Size Distributions of Dioxide-Monoxide Mixture Grinding

Size microns	Cumulative Feed	Percent passing 75-minute product
75	100	100
53	98.74	100
38	95.08	100
27	91.62	100
19	89.30	100
13	85.76	100
9.4	84.88	100
6.6	83.50	100
4.7	79.94	100
3.73	79.80	100
2.63	77.96	100
1.69	70.52	100
1.01	51.72	95.7
0.66	31.44	69.4
0.43	14.24	38.5
0.34	4.24	11.8
0.24	.80	4.0
0.17	.24	2.0

Feed and ground product size distribution of dioxide-monoxide mixture



Memo

To: Dr. Raj K. Rajamani

From: Milton Wadsworth Milton E. Wadsworth

Subject: Separation of Mixed Isotope Powders

Date: August 26, 1997

The effectiveness of mixing oxides of uranium for the purpose of diluting enriched uranium (U^{235}) for safe shipment consists of two parts: 1) the ability to mix the enriched oxide to extensive dilution by your new grinding process; and, 2) once mixed, the denial of any possibility of recovering enriched U^{235} selectively by conventional chemical separation technology or by conventional mineral separation processes.

To address the first of these questions, you have simulated the effectiveness of grind-mixing to blend two oxides of titanium, TiO and TiO_2. The selection of these oxides places a special burden on the test because of the great difference in hardness, TiO being much harder than TiO_2. The x-ray results demonstrated effective blending using your equipment. Clearly grind-mixing for the blending of oxides of essentially the same hardness and density will be even more effective. I am convinced results obtained for your tests assure even more effective results for mixed oxides of the same hardness and density.

X-ray results for the mixed oxides you have provided, indicate extensive blending of the two titanium oxides to a degree of uniformity to support the use of this technique for the blending of mixed oxides of uranium. To assure that the mixed oxides of uranium cannot be treated by some readily available mineral process technology, such as gravity separation or centrifuging, it is essential that the mixed oxide each be of the same chemical composition and density before the grind-blending treatment. Further, it is essential that in the ground product each oxide have the same size distribution. The latter is important so that separation techniques based on size or on size and density cannot be used separate the isotope selectively.

To address the second issue, I assume the mixed U^{235}/U^{238} oxides meet the above conditions; namely thorough, uniform blending and oxides of identical composition, density and size distribution in the final product. If these conditions are met, I concur with you that separation of the isotope by physical means will not be possible. Similarly we can conclude, because of the identical chemical properties of each of the mixed oxides, that chemical separations by conventional dissolution, extraction and recovery using aqueous processes as well as high

temperature processes such as molten phase separations will be ineffective as a means to separate the isotope.

The above conclusions do not, however, eliminate any of the recognized techniques used for isotope separation used or proposed historically. The attached table lists proposed as well as developed isotope separation processes and the principles upon which each is based. These methods require a major national effort with extensive cost implications. The attached figure illustrates some comparative costs. Converting these costs to constant dollars illustrates the financial commitment required.

SOME URANIUM ISOTOPE SEPARATION PROCESSES

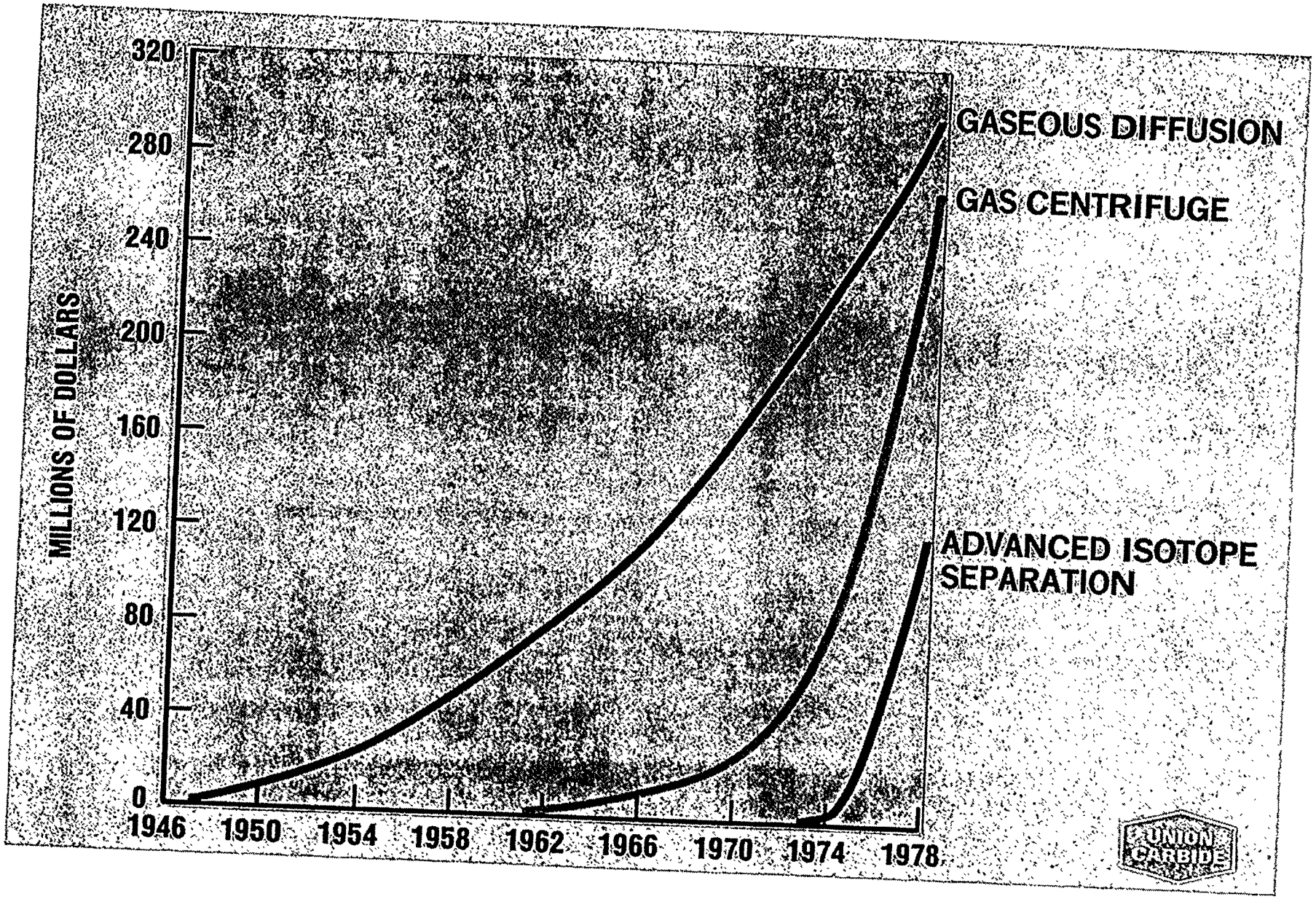
BASED ON	EXAMPLES
DIFFUSION PRINCIPLES	GASEOUS DIFFUSION MASS DIFFUSION THERMAL DIFFUSION CARRIER DIFFUSION
CENTRIFUGE PRINCIPLES	GAS CENTRIFUGE
AERODYNAMIC PRINCIPLES	SEPARATION NOZZLE UCOR PROCESS
PHASE EQUILIBRIUM PRINCIPLES	FRACTIONAL DISTILLATION
CHEMICAL PRINCIPLES	CHEMICAL EXCHANGE ION EXCHANGE
PHOTOEXCITATION PRINCIPLES	LASER ISOTOPE SEPARATION
ELECTROMAGNETIC PRINCIPLES	PLASMA SEPARATION CALUTRON CHEMI-IONIZATION WITH QUADRUPOLE MASS FILTER

DWG. NO. K/G-79-672

- EARLY 1940'S:
  - RESEARCH CONDUCTED ON ELECTROMAGNETIC SEPARATION, GASEOUS DIFFUSION, THERMAL DIFFUSION, GAS CENTRIFUGATION, PHOTOCHEMICAL METHODS.
  - THREE PRODUCTION-SCALE PLANTS BUILT IN OAK RIDGE:
    - THERMAL DIFFUSION
    - ELECTROMAGNETIC
    - GASEOUS DIFFUSION
  - IN VIEW OF GASEOUS DIFFUSION ECONOMICS, THERMAL DIFFUSION AND ELECTROMAGNETIC PLANTS WERE SHUT DOWN.
- EARLY 1950'S:
  - OAK RIDGE GASEOUS DIFFUSION PLANT EXPANDED
  - NEW GASEOUS DIFFUSION PLANTS BUILT AT PADUCAH, KY, AND PORTSMOUTH, OH.

UNION CARBIDE

HISTORICAL PERSPECTIVE



CUMULATIVE EXPENDITURES FOR ENRICHMENT TECHNOLOGY DEVELOPMENT

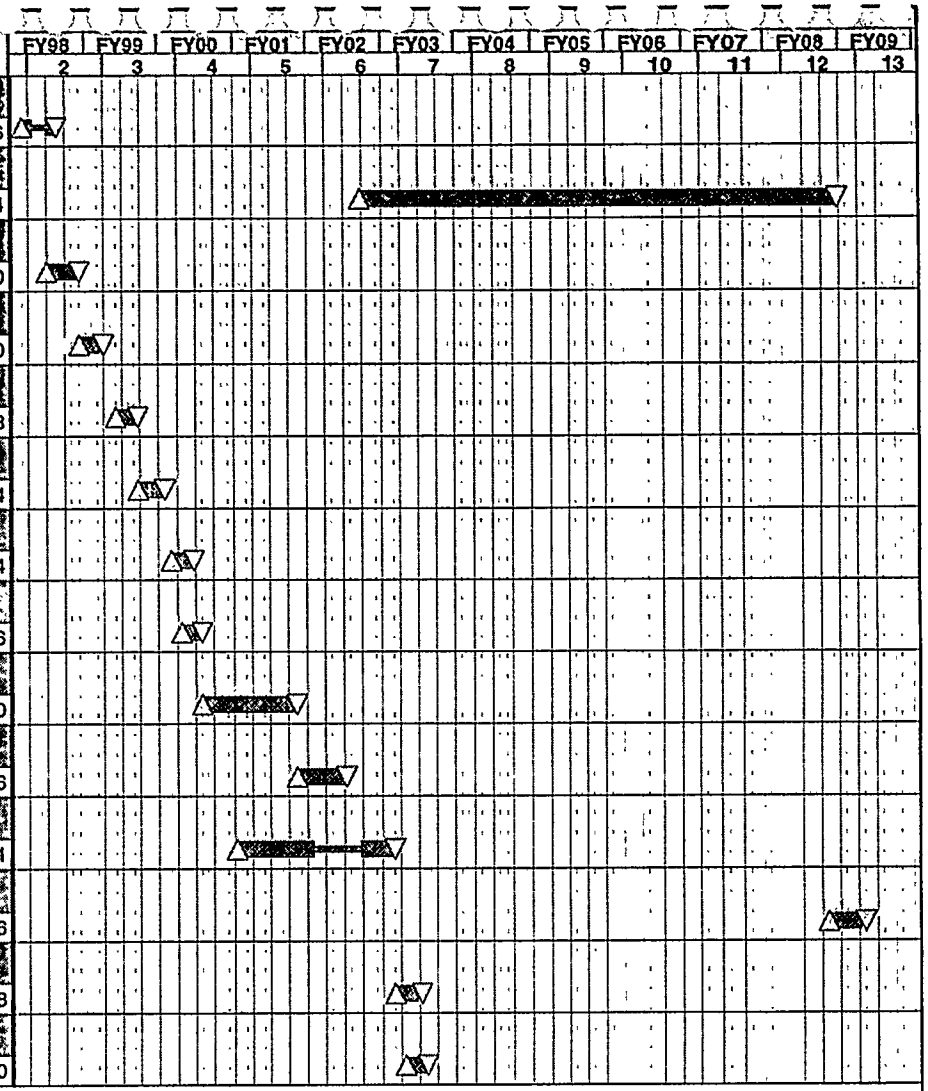
Appendix C

Detailed cost and schedule activities

for

current budget, base case, and options A, B, C, and D

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
+ LANL Material					
	178	25NOV97	21MAY98	2,964.00	159,385.76
+ Denitrator Material - Ship As Is					
	2,292	12JUN02	19SEP08	13,616.00	1,679,431.24
+ ANL-W Material					
	163	31MAR98	09SEP98	1,308.00	76,376.70
+ Custom Material					
	120	10SEP98	07JAN99	1,313.00	76,446.90
+ U of Wisconsin					
	101	09MAR99	17JUN99	747.00	43,168.88
+ GEFAST Material					
	136	21JUN99	03NOV99	1,095.00	63,416.14
+ U of Washington					
	113	01DEC99	22MAR00	772.00	40,308.34
+ Rocky Flats Material - Ship As Is					
	100	19JAN00	27APR00	1,214.00	63,532.76
+ PWR Material					
	462	01MAY00	05AUG01	3,446.00	182,329.30
+ PWR (-1 full assembly)					
	242	06AUG01	04APR02	1,174.00	66,302.46
+ Fluorinel Material					
	776	19OCT00	03DEC02	8,354.00	545,747.81
+ VYCOR Glass Material					
	177	07AUG08	30JAN09	634.00	578,801.56
+ Janus Material					
	126	04DEC02	08APR03	883.00	46,334.88
+ ANL-E Material					
	105	23JAN03	07MAY03	936.00	48,762.60



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	20AUG97

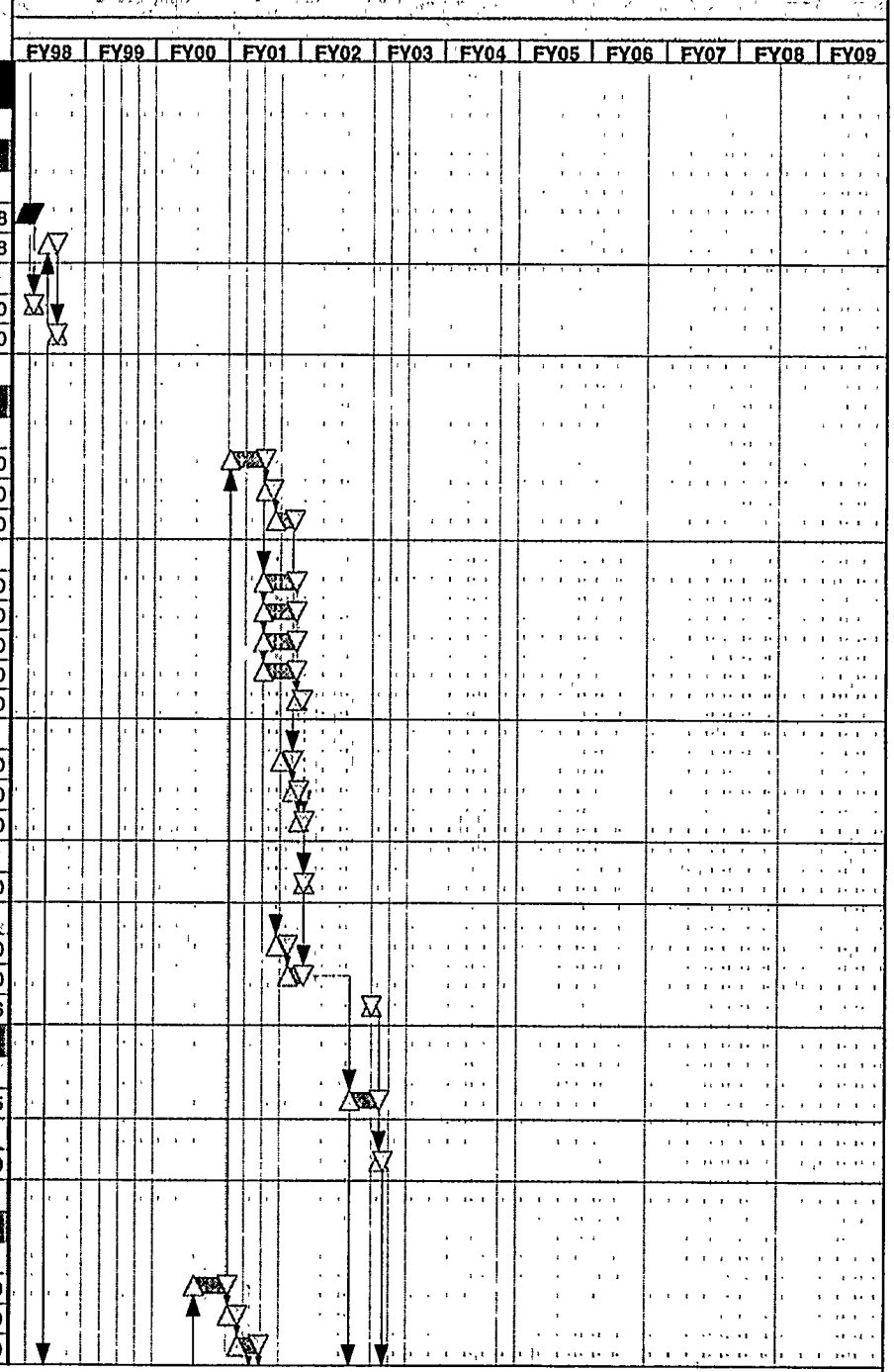
Early Bar
Progress Bar
Critical Activity

COMP:ASIS

Sheet 1A of 1B

LMITCO - CPP 651 MATERIALS SCHEDULE
CURRENT BUDGET - SHIP AS IS
Summarized by Material Type

Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
CPP-651 SNM Shipments					
LANL Material					
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	16	25NOV97*	21JAN98	1,402.00	75,485.48
Place shipping pkg in certified container	16	31MAR98*	20MAY98	1,402.00	75,485.48
Product Shipment					
Load Truck and Ship to Receiver	1	22JAN98	22JAN98	80.00	4,207.40
Load Truck and Ship to Receiver	1	21MAY98	21MAY98	80.00	4,207.40
Fluorinel Material					
Preparations					
Project Definition					
Characterize Material to Meet Customer Req.	96	19OCT00*	12APR01	260.00	13,581.60
Evaluate & Develop Customer Receiving Criteria	24	16APR01*	24MAY01	140.00	7,186.20
Design/Fabricate Aluminum Shipping Cans	60	29MAY01	12SEP01	520.00	29,586.40
Procurement					
Purchase Twenty-one 110 gal, DOT-6M Drums -	96	02APR01*	19SEP01	180.00	40,139.40
Purchase Five 110 gal, DOT-6M Drums 58"	96	02APR01*	19SEP01	180.00	16,139.40
Purchase Four 55 gal, DOT-6M Drums 23"	96	02APR01*	19SEP01	180.00	13,339.40
Purchase Sixty 85 gal, DOT-6M Drums 43"	96	02APR01*	19SEP01	180.00	70,139.40
Inspect & PM New Shipping Containers	16	20SEP01	17OCT01	160.00	8,277.20
Procedures					
Develop Procedures - all Drums	32	03JUL01	28AUG01	320.00	15,509.60
Review & Resolve Comments - all drums	16	29AUG01	26SEP01	200.00	11,208.60
Approve New Procedures - all drums	16	27SEP01	24OCT01	60.00	3,240.40
Training					
Practice Dry Run	4	25OCT01	31OCT01	280.00	15,205.60
S&S Plans for Repackaging					
Material Control & Accountability Work	32	12JUN01	07AUG01	120.00	5,971.20
Complete Materials Management Plan Activities	48	08AUG01	31OCT01	80.00	3,980.80
Request for Safe Secure Transport (SST)	1	01OCT02	01OCT02	4.00	200.56
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	45	12JUN02	13NOV02	4,090.00	219,794.05
Product Shipment					
Load Truck and Ship to Receiver	20	14NOV02	03DEC02	1,400.00	72,248.00
PWR (6 SPERT Boxes)					
Preparations					
Project Definition					
Characterize Material to Meet Customer Req.	96	01MAY00*	18OCT00	240.00	12,578.80
Evaluate & Develop Customer Receiving Criteria	24	19OCT00*	30NOV00	100.00	4,976.00
Design/Fabricate 44 Aluminum Shipping Cans	60	04DEC00*	22MAR01	520.00	29,586.40



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	20AUG97

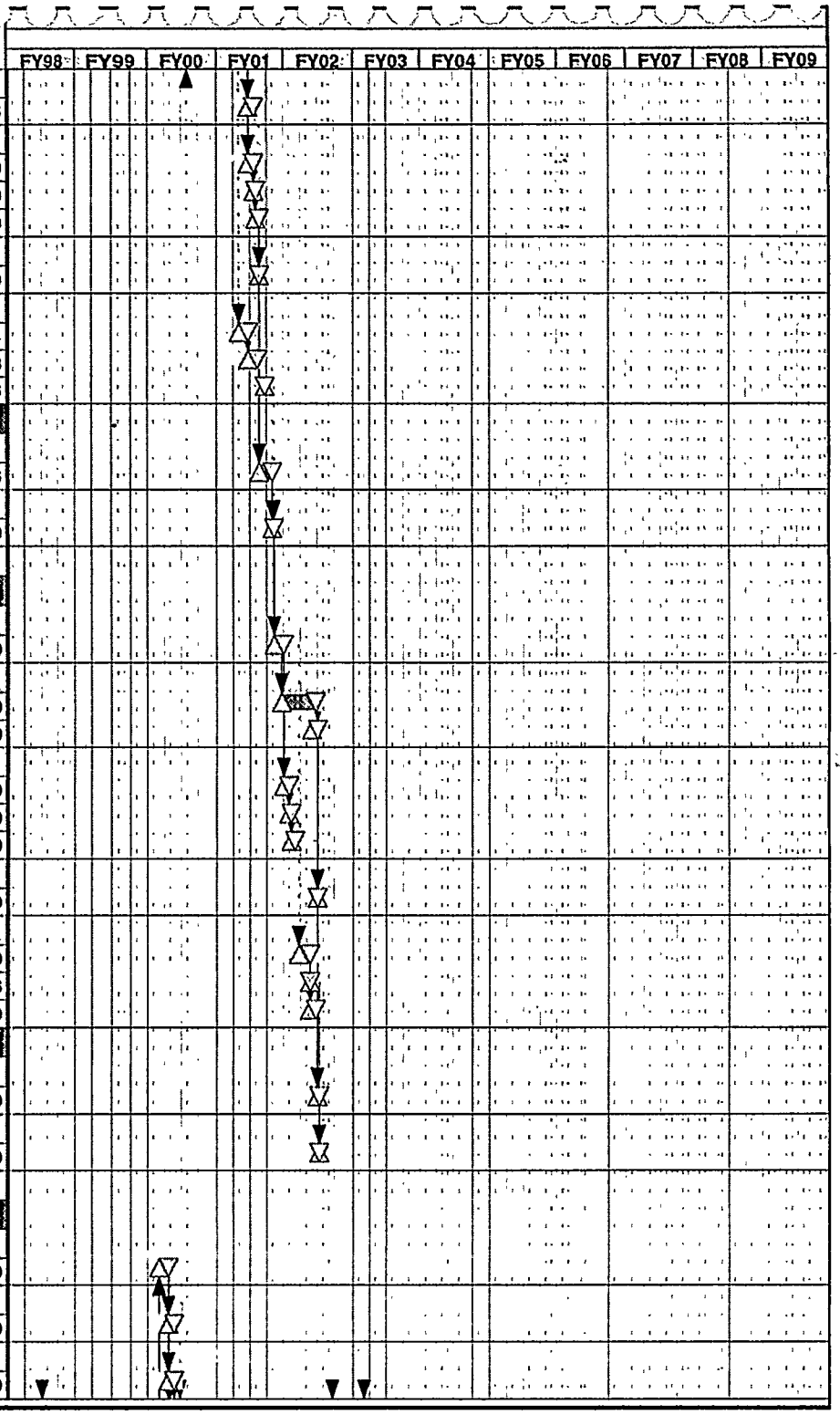
Early Bar
Progress Bar
Critical Activity

COMP:ASIS

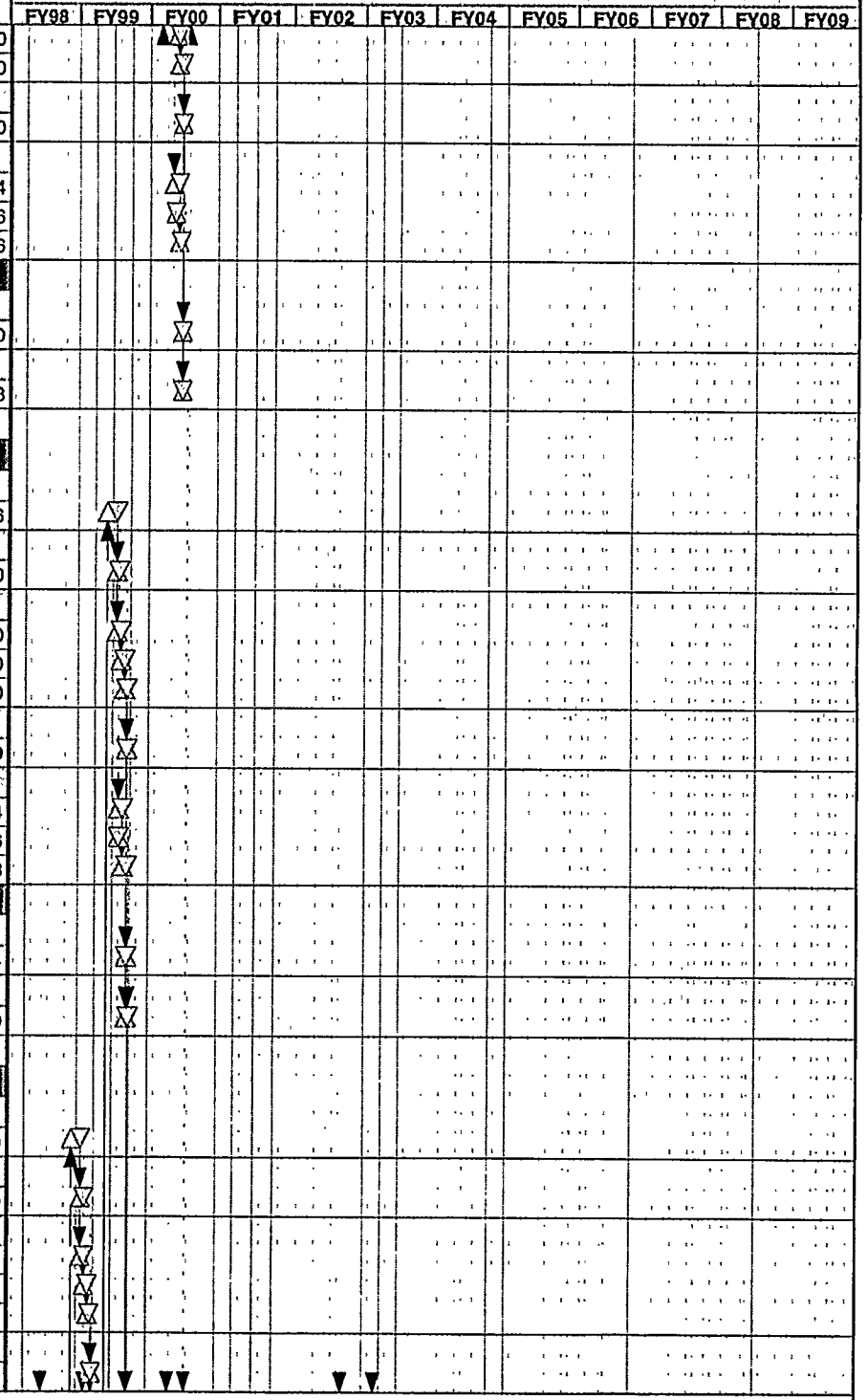
Sheet 1 of 7

LMITCO CPP 651 MATERIALS SCHEDULE
CURRENT BUDGET - SHIP AS IS
Detailed Activity Schedule

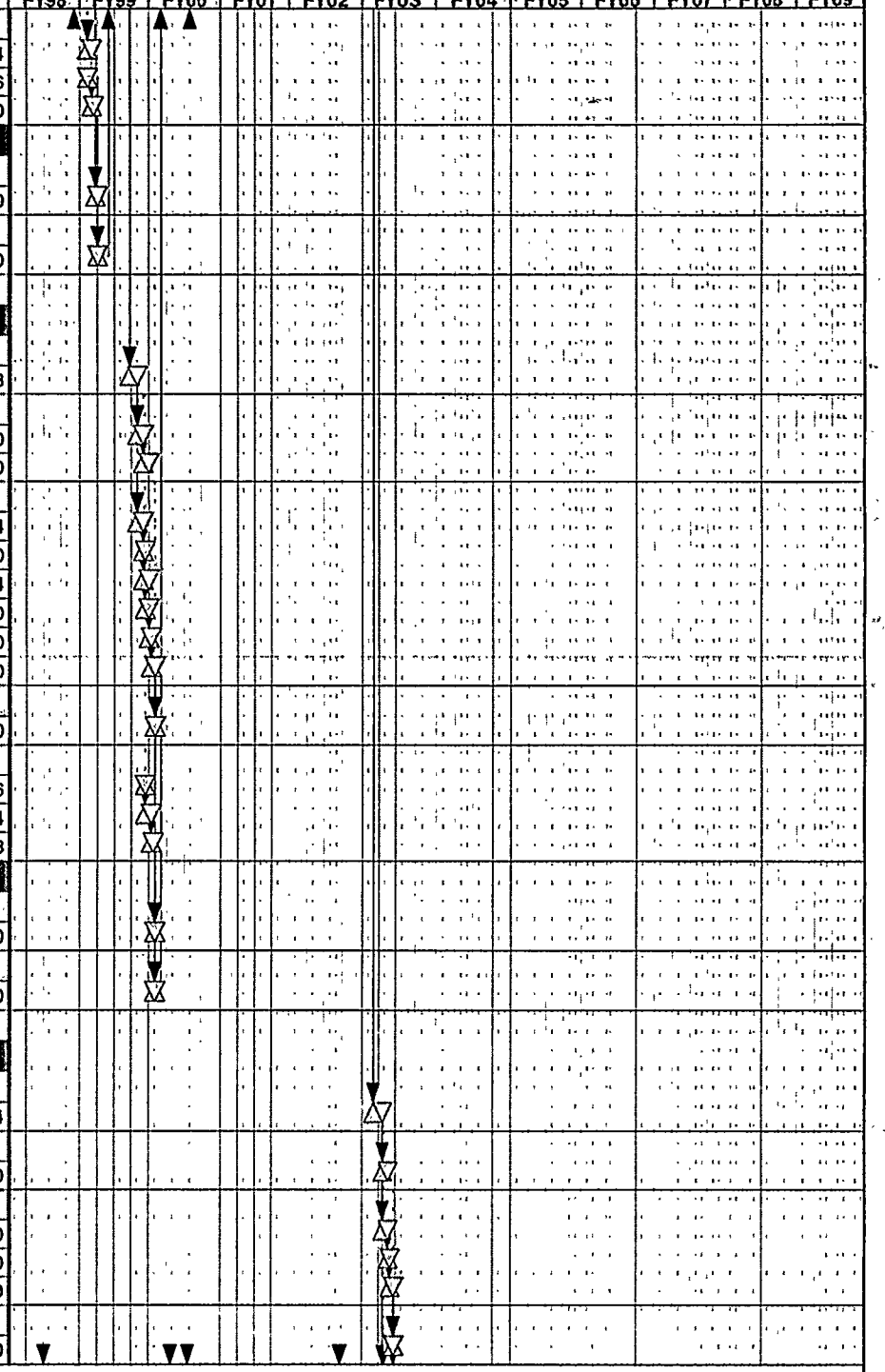
Activity Description	Orig Dur	Early Start	Early Finish	budgeted Quantity	budgeted Cost
Procurement					
Inspect & PM Shipping Containers	16	26MAR01	19APR01	116.00	5,955.56
Procedures					
Develop Procedure	16	26MAR01	19APR01	160.00	7,754.80
Review & Resolve Comments	8	23APR01	03MAY01	110.00	6,110.70
Approve New Procedure	8	07MAY01	17MAY01	30.00	1,620.20
Training					
Practice Dry Run	1	21MAY01	21MAY01	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	30JAN01	26MAR01	74.00	3,682.24
Complete Materials Management Plan Activities	24	27MAR01	07MAY01	28.00	1,393.28
Request for Safe Secure Transport (SST)	1	19JUN01	19JUN01	4.00	200.56
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	22	22MAY01	01AUG01	1,724.00	90,717.36
Product Shipment					
Load Truck and Ship to Receiver	4	02AUG01	05AUG01	270.00	13,952.00
PWR Material 1 Full Assembly					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	32	06AUG01*	01OCT01	180.00	9,396.40
Procurement					
Obtain Certification of Shipping Container	96	18SEP01*	13MAR02	60.00	8,440.40
Inspect & PM Shipping Container	16	28FEB02	27MAR02	60.00	3,185.80
Procedures					
Develop Procedure	16	02OCT01	29OCT01	160.00	7,754.80
Review & Resolve Comments	8	30OCT01	12NOV01	110.00	6,110.70
Approve New Procedure	8	13NOV01	26NOV01	30.00	1,620.20
Training					
Practice Dry Run	1	27MAR02	27MAR02	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	19DEC01	20FEB02	120.00	5,971.20
Request for Safe Secure Transport (SST)	1	20FEB02	20FEB02	4.00	200.56
Complete Materials Management Plan Activities	16	21FEB02	20MAR02	80.00	3,980.80
SNM Shipment from CPP					
Material Repackaging					
Place shipping pkg in certified container	2	02APR02	03APR02	190.00	10,087.00
Product Shipment					
Load Truck and Ship to Receiver	1	04APR02	04APR02	110.00	5,753.20
U of Washington Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	01DEC99*	18JAN00	100.00	5,188.20
Procurement					
Inspect & PM Shipping Container	16	19JAN00	15FEB00	40.00	2,196.60
Procedures					
Develop Procedure	16	19JAN00	15FEB00	160.00	7,754.80



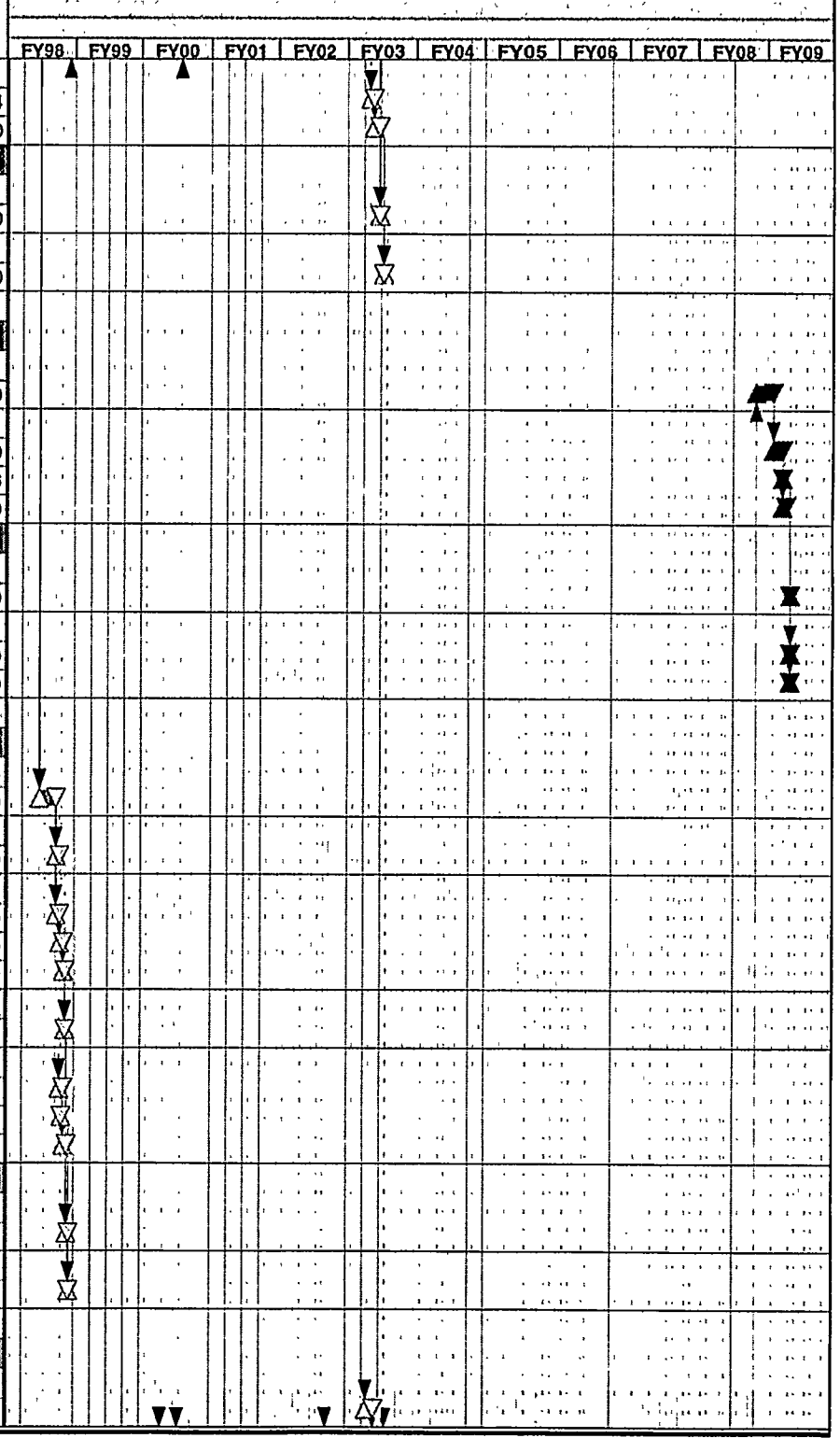
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Review & Resolve Comments	8	16FEB00	29FEB00	110.00	6,110.70
Approve New Procedure	8	01MAR00	14MAR00	30.00	1,620.20
Training					
Practice Dry Run	1	15MAR00	15MAR00	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	12	02FEB00	22FEB00	24.00	1,194.24
Request for Safe Secure Transport (SST)	1	08FEB00	08FEB00	4.00	200.56
Complete Materials Management Plan Activities	8	23FEB00	07MAR00	16.00	796.16
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	1	21MAR00	21MAR00	110.00	5,791.80
Product Shipment					
Load Truck and Ship to Receiver	1	22MAR00	22MAR00	108.00	5,653.68
U of Wisconsin Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	09MAR99*	19APR99	72.00	3,837.36
Procurement					
Inspect & PM (1) Shipping Container	8	20APR99	03MAY99	50.00	2,673.00
Procedures					
Develop Procedure 85 gal DOT-6M	16	20APR99	17MAY99	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M	8	18MAY99	01JUN99	110.00	6,110.70
Approve New Procedure 85 gal DOT-6M	8	02JUN99	15JUN99	30.00	1,620.20
Training					
Practice Dry Run	1	16JUN99	16JUN99	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	12	29APR99	19MAY99	24.00	1,194.24
Request for Safe Secure Transport (SST)	1	04MAY99	04MAY99	4.00	200.56
Complete Materials Management Plan Activities	10	20MAY99	08JUN99	8.00	398.08
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	1	16JUN99	16JUN99	114.00	10,074.14
Product Shipment					
Load Truck and Ship to Receiver	1	17JUN99	17JUN99	105.00	5,504.40
Custom Product Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	10SEP98*	21OCT98	250.00	13,076.60
Procurement					
Inspect & PM New Shipping Container	16	22OCT98	18NOV98	80.00	4,393.20
Procedures					
Develop Procedure 55 gal. DOT-6M Drum	16	22OCT98	18NOV98	160.00	7,754.80
Review & Resolve Comments 55 DOT-6M	8	19NOV98	03DEC98	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	07DEC98	17DEC98	30.00	1,620.20
Training					
Practice Dry Run	1	21DEC98	21DEC98	70.00	3,801.40



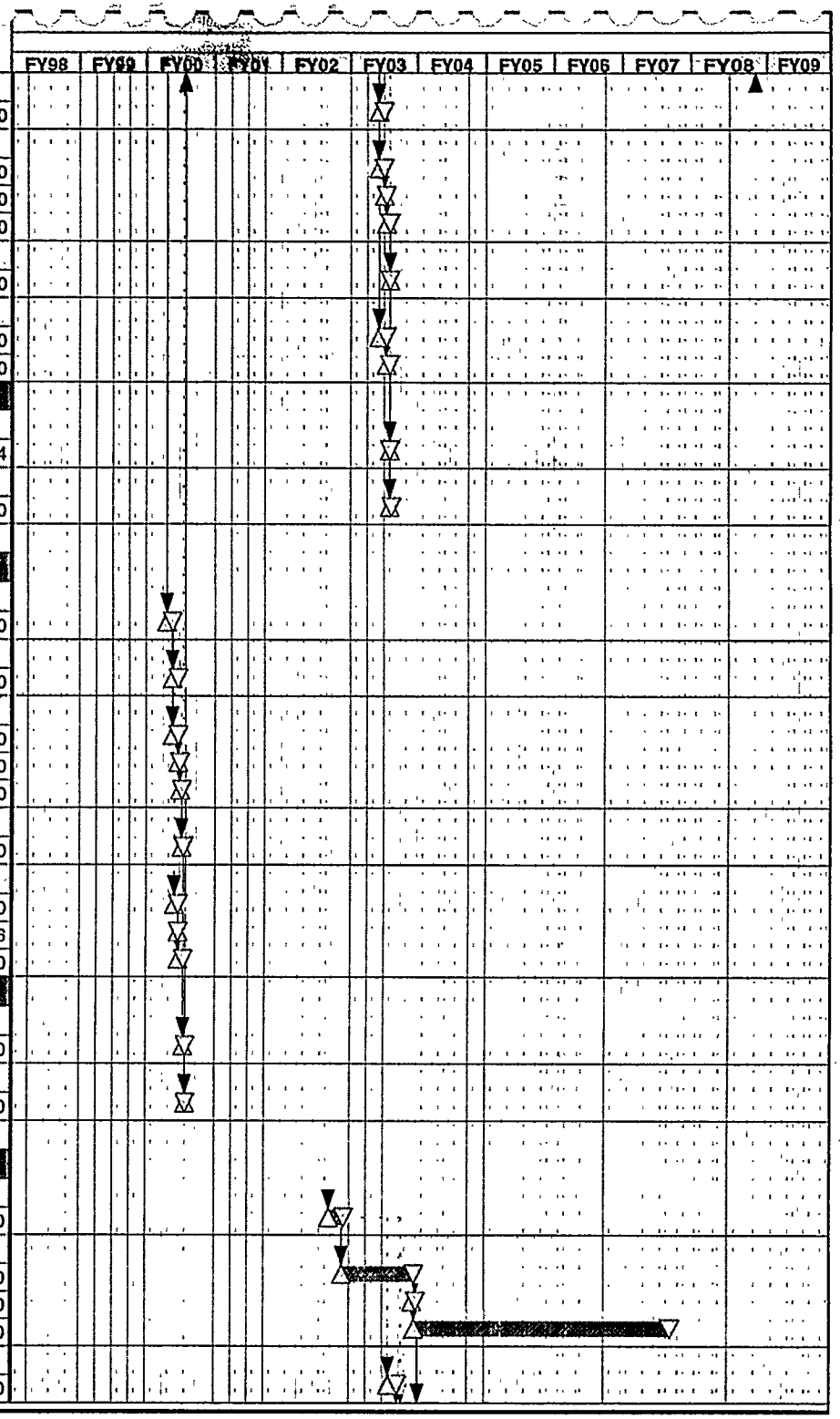
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging					
Material Control & Accountability Work	12	11NOV98	02DEC98	44.00	2,189.44
Request for Safe Secure Transport (SST)	1	16NOV98	16NOV98	4.00	200.56
Complete Materials Management Plan Activities	8	03DEC98	16DEC98	20.00	995.20
SNM Shipment					
Material Repackaging					
Load Nine 55 gal. DOT-6M Shipping Containers	4	22DEC98	06JAN99	440.00	30,800.40
Product Shipment					
Load Truck and Ship to Receiver	1	07JAN99	07JAN99	105.00	5,504.40
GFAST - AWF-1					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	21JUN99*	29JUL99	68.00	3,595.88
Procurement					
Purchase One 35 gal. UN1A2 Shipping Container	16	02AUG99*	26AUG99	10.00	853.70
Inspect & PM Shipping Containers	16	30AUG99	27SEP99	60.00	3,185.80
Procedures					
Develop Procedure 35 gal DOT UN1A2 Shipping	16	02AUG99	26AUG99	128.00	6,433.84
Review & Resolve Comments UN1A2 Pkg.	8	30AUG99	13SEP99	110.00	6,110.70
Develop Procedure 55 gal. DOT-6M Drum	16	30AUG99	27SEP99	128.00	6,433.84
Approve New Procedure UN1A2 Pkg.	11	14SEP99	30SEP99	30.00	1,620.20
Review & Resolve Comments 55 DOT-6M	8	28SEP99	11OCT99	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	12OCT99	25OCT99	30.00	1,620.20
Training					
Practice Dry Run	1	26OCT99	26OCT99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	13SEP99	13SEP99	4.00	200.56
Material Control & Accountability Work	12	15SEP99	05OCT99	14.00	696.64
Complete Materials Management Plan Activities	8	06OCT99	19OCT99	8.00	398.08
SNM Shipment					
Material Repackaging					
Load 5 Containers in 5 DOT Shipping Containers	2	27OCT99	02NOV99	220.00	16,850.20
Product Shipment					
Load Truck and Ship to Receiver	1	03NOV99	03NOV99	105.00	5,504.40
JANUS Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	04DEC02*	22JAN03	134.00	7,092.24
Procurement					
Inspect & PM Shipping Containers	16	23JAN03	19FEB03	60.00	3,185.80
Procedures					
Develop Procedure 85 gal DOT-6M Drum	16	23JAN03	19FEB03	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M	8	20FEB03	05MAR03	120.00	6,623.50
Approve New Procedure 85 gal DOT-6M Drum	8	06MAR03	19MAR03	30.00	1,620.20
Training					
Practice Dry Run	1	20MAR03	20MAR03	70.00	3,801.40



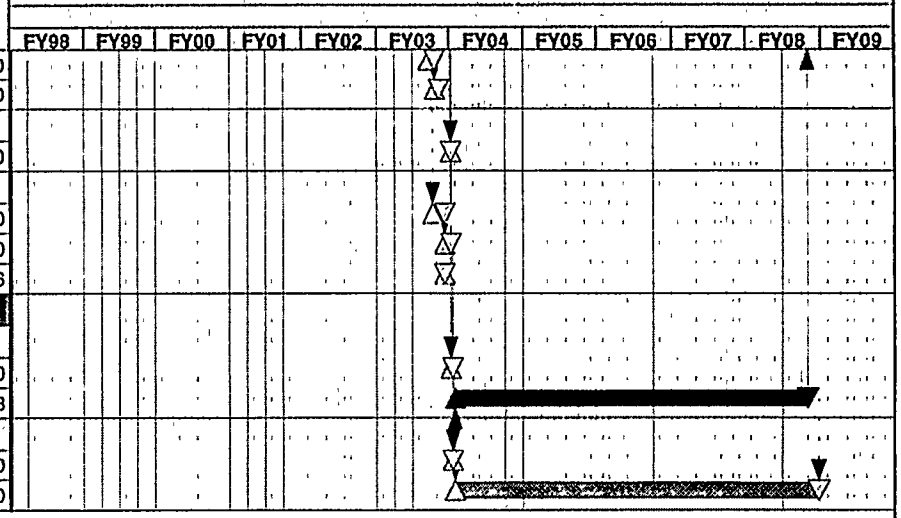
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging					
Material Control & Accountability Work	16	28JAN03	24FEB03	44.00	2,189.44
Complete Materials Management Plan Activities	16	25FEB03	24MAR03	40.00	1,990.40
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	1	25MAR03	25MAR03	110.00	6,075.10
Product Shipment					
Load Truck and Ship to Receiver	1	08APR03	08APR03	115.00	6,002.00
VYCOR Glass Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	07AUG08	29OCT08	130.00	6,897.00
S&S Plans for Repackaging					
Material Control & Accountability Work	32	30OCT08	24DEC08	120.00	5,971.20
Request for Safe Secure Transport (SST)	1	17DEC08	17DEC08	4.00	200.56
Complete Materials Management Plan Activities	12	25DEC08	14JAN09	80.00	3,980.80
SNM Shipment to Argonne					
Material Repackaging					
Safeguards Inventory of Material	2	28JAN09	29JAN09	220.00	12,150.20
Product Shipment					
Load Truck and Ship to Receiver	1	29JAN09	29JAN09	80.00	4,196.80
Processing Costs at Argonne Lab.	1	30JAN09	30JAN09	0.00	545,405.00
ANL-W Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	31MAR98	23JUN98	200.00	10,376.40
Procurement					
Inspect & PM 6 Shipping Containers	16	24JUN98	21JUL98	60.00	3,185.80
Procedures					
Develop Procedure 55 gal DOT-6M Drum	16	24JUN98	21JUL98	160.00	7,754.80
Review & Resolve Comments 55 gal DOT-6M	8	22JUL98	04AUG98	110.00	6,110.70
Approve New Procedure 55 gal DOT-6M Drum	8	05AUG98	18AUG98	30.00	1,620.20
Training					
Practice Dry Run	1	19AUG98	19AUG98	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	12	21JUL98	10AUG98	44.00	2,189.44
Request for Safe Transport (SST)	1	27JUL98	27JUL98	4.00	200.56
Complete Materials Management Plan Activities	8	11AUG98	24AUG98	20.00	995.20
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	5	25AUG98	08SEP98	525.00	35,675.40
Product Shipment					
Load Truck and Ship to Receiver	1	09SEP98	09SEP98	85.00	4,466.80
ANL-E Material					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	23JAN03*	05MAR03	82.00	4,338.76



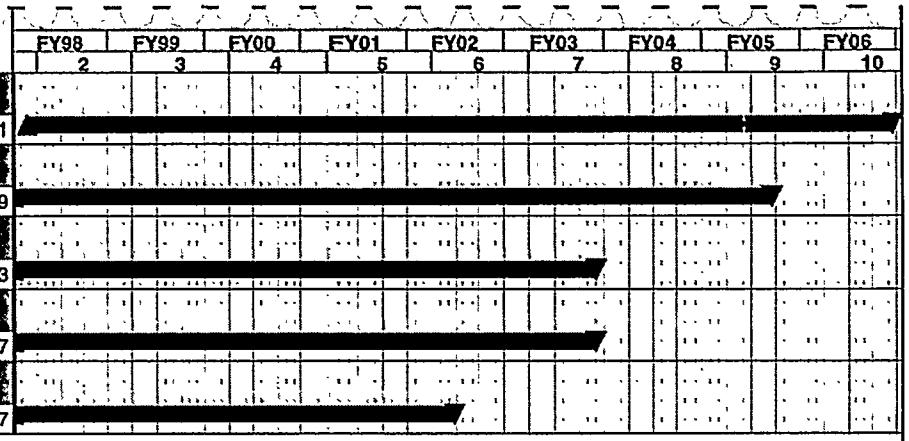
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Procurement					
Inspect & PM Shipping Containers	16	06MAR03	02APR03	60.00	3,185.80
Procedures					
Develop Procedure	16	06MAR03	02APR03	160.00	7,754.80
Review & Resolve Comments	8	03APR03	16APR03	120.00	6,623.50
Approve New Procedure	8	17APR03	30APR03	30.00	1,620.20
Training					
Practice Dry Run	1	01MAY03	01MAY03	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	20	06MAR03	09APR03	120.00	5,971.20
Complete Materials Management Plan Activities	12	10APR03	30APR03	80.00	3,980.80
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container at CPP	1	06MAY03	06MAY03	114.00	6,274.14
Product Shipment					
Load Truck and Ship to Argonne	1	07MAY03	07MAY03	100.00	5,212.00
Rocky Flats Material - Option 1 (As Is)					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	16	19JAN00*	15FEB00	80.00	4,200.60
Procurement					
Inspect & PM Shipping Container	16	16FEB00	14MAR00	60.00	3,185.80
Procedures					
Develop Procedure	16	16FEB00	14MAR00	160.00	7,754.80
Review & Resolve Comments	8	15MAR00	28MAR00	120.00	6,623.50
Approve New Procedure	8	29MAR00	11APR00	30.00	1,620.20
Training					
Practice Dry Run	1	12APR00	12APR00	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	16	23FEB00	21MAR00	160.00	7,961.60
Request for Safe Secure Transport (SST)	1	14MAR00	14MAR00	4.00	200.56
Complete Materials Management Plan Activities	15	22MAR00	17APR00	80.00	3,980.80
SNM Shipment					
Material Repackaging					
Place shipping pkg in certified container	4	18APR00	26APR00	360.00	19,487.90
Product Shipment					
Load Truck and Ship to Receiver	1	27APR00	27APR00	90.00	4,715.60
Denitrator Product Material - Option 2 (As Is)					
Preparations					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	12JUN02*	05SEP02	240.00	12,806.40
Procurement					
Purchase 25 DC-1 Shipping Containers	216	22AUG02*	18SEP03	200.00	261,346.80
Inspect & PM New Shipping Container	16	08SEP03	02OCT03	80.00	4,138.60
Purchase 71 DC-1 Shipping Containers	761	22SEP03*	18JUN07	200.00	721,346.80
Procedures					
Develop Procedure	32	30APR03	25JUN03	240.00	11,057.20



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Review & Resolve Comments	12	26JUN03	16JUL03	120.00	6,623.50
Approve New Procedure	12	17JUL03	06AUG03	30.00	1,620.20
Training					
Practice Dry Run	2	06OCT03	07OCT03	140.00	7,602.80
S&S Plans for Repackaging					
Material Control & Accountability Work	32	15JUL03	09SEP03	200.00	9,952.00
Complete Materials Management Plan Activities	16	10SEP03	07OCT03	120.00	5,971.20
Request for Safe Secure Transport (SST)	1	10SEP03	10SEP03	4.00	200.56
SNM Shipment					
Material Repackaging					
Place shipping pkg in DC1's - (1- 7)	4	08OCT03	21OCT03	505.00	27,387.50
Place remaining containers in DC-1's (8- 280)	494	28OCT03	06AUG08	9,232.00	490,968.88
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	22OCT03	23OCT03	145.00	7,455.00
Load Truck and Ship to Receiver - (2 thru 40)	1,789	28OCT03	19SEP08	2,160.00	110,953.80



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Cost
+ BASE CASE SCHEDULE - DRY BLENDING					
		3,213	25NOV97	11SEP06	6,612,066.81
+ OPTION A - TRANSFER NEGOTIATIONS TEAM					
		2,818	01OCT97	18JUN05	8,615,989.49
+ OPTION B - SHIP AS IS & TNT					
		2,163	01OCT97	02SEP03	6,187,446.53
+ OPTION C - BASE CASE & TNT & DEDICATED OPS CREW					
		2,165	01OCT97	04SEP03	10,250,286.37
+ OPTION D - SHIP AS IS & TNT & DEDICATED OPS CREW					
		1,639	01OCT97	27MAR02	7,301,719.97



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	20AUG97

Early Bar
Progress Bar
Critical Activity

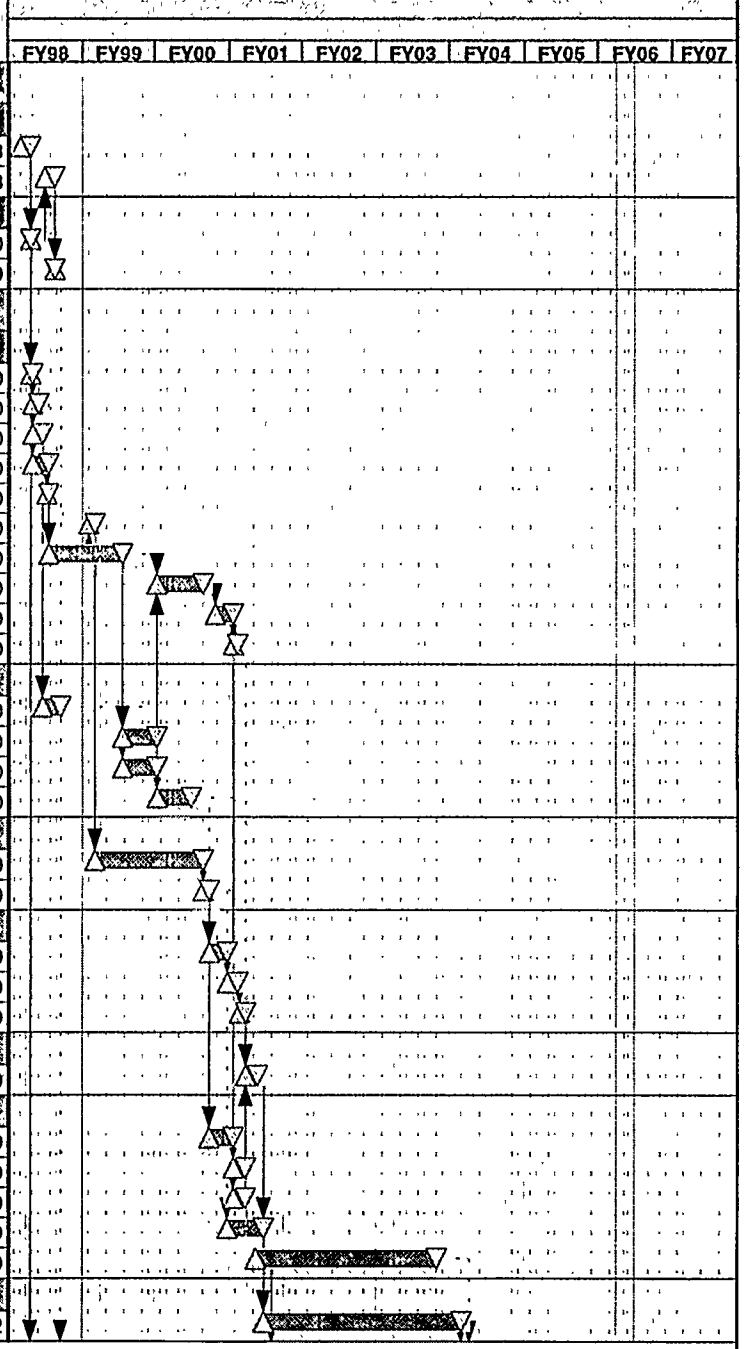
COM1

Sheet 1 of 1

LMITCO CPP 651 MATERIALS SCHEDULE

SUMMARY COMPARISON OF OPTIONS

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
LANL Material						
Material Repackaging						
BCAA01A	Place shipping pkg in certified container	16	25NOV97*	21JAN98	1,402.00	75,485.48
BCAA01B	Place shipping pkg in certified container	16	31MAR98*	20MAY98	1,402.00	75,485.48
Product Shipment						
BCAA05A	Load Truck and Ship to Receiver	1	22JAN98	22JAN98	80.00	4,207.40
BCAA05C	Load Truck and Ship to Receiver	1	21MAY98	21MAY98	80.00	4,207.40
Denitrator Material - Dry Blending						
Project Definition						
BCA0D101B	Conduct Value Engineering Sessions	2	22JAN98*	26JAN98	280.00	14,200.00
BCA0D102	Identify On-site Representative	16	27JAN98*	23FEB98	20.00	900.00
BCA0D104	Obtain Characterization Data (product & depleted	32	27JAN98	23MAR98	120.00	5,800.00
BCA0D101	Obtain Written Agreements as required (DOE, etc)	48	27JAN98*	20APR98	60.00	2,700.00
BCA0D101E	Obtain Peer Reviews & Approvals of Concepts	8	07APR98	20APR98	560.00	28,400.00
BCA0D101D	Provide Input to SAR NEPA, Operating Permits	16	03NOV98	01DEC98	160.00	8,800.00
BCA0D101F	Develop Design Process Drawings (Title I & II)	201	21APR98	19APR99	80.00	254,000.00
BCA0D101G	Construction, Testing and Startup at U. of Utah	128	07OCT99	25MAY00	80.00	254,000.00
BCA0D101H	Install New Equipment in CPP-651	48	27JUL00	19OCT00	80.00	254,000.00
BCA0D101J	Inspection, Testing & Startup of New Equipment	16	23OCT00	16NOV00	80.00	54,000.00
Procurement						
BCA0D103	Purchase Perma-Con Structure	48	24MAR98	16JUN98	40.00	152,000.00
BCA0D103A	Purchase Process Equipment	96	20APR99	06OCT99	40.00	752,000.00
BCA0D103B	Purchase Support Systems	96	20APR99	06OCT99	40.00	202,000.00
BCA0D103D	Purchase 600 Drums - 110 gal DOT-6M Containers	96	07OCT99	30MAR00	40.00	702,000.00
ES&H Documentation (SAR,NEPA,Permits)						
BCA0D106	Develop SAR/CSE	300	02DEC98	30MAY00	2,690.00	200,354.10
BCA0D106A	Final Review & Approval of SAR	16	31MAY00	27JUN00	1,120.00	56,800.00
Procedures						
BCA0D107	Develop Procedure	48	28JUN00	21SEP00	280.00	13,400.00
BCA0D109	Review & Resolve Comments	32	25SEP00	16NOV00	160.00	7,700.00
BCA0D111	Approve New Procedure	16	20NOV00	18DEC00	50.00	2,600.00
Training						
BCA0D113	Practice Dry Run	32	19DEC00	19FEB01	1,280.00	60,800.00
S&S Plans for Repackaging						
BCA0D117	Define Security Requirements & Modify Equipment	64	28JUN00	19OCT00	150.00	7,366.80
BCA0D115	Identify MC&A Requirements - Sampling Plan	32	23OCT00	18DEC00	320.00	15,200.00
BCA0D118	Develop Security Procedures & Implemt. Plans	32	23OCT00	18DEC00	240.00	11,200.00
BCA0D118A	Complete RA & Obtain Approval to Operate	96	25SEP00	19MAR01	1,920.00	97,509.20
BCA0D123	Request for Safe Secure Transport (SST)	254	07FEB01	29JUL03	495.00	24,819.30
Material Repackaging						
BCA0D120D	Facility Operations - Dry Blending (1-23)	278	20MAR01	26NOV03	24,564.00	1,256,467.92



roject Start	01JUL97
roject Finish	11SEP06
ata Date	01OCT97
un Date	20AUG97

Early Bar
Progress Bar
Critical Activity

COMP:BASE

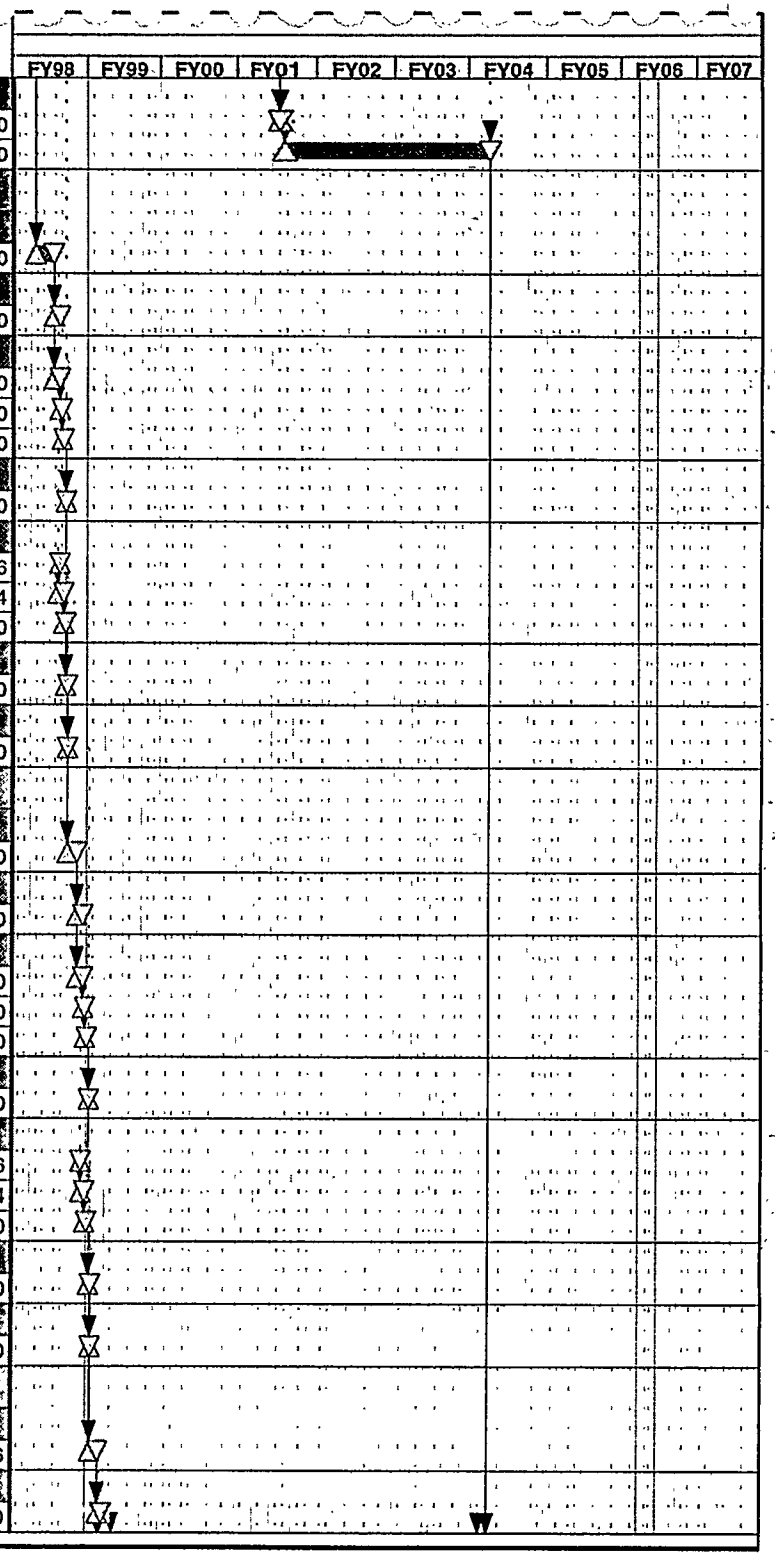
Sheet 1 of 7

LMITCO - CPP 651 MATERIALS SCHEDULE

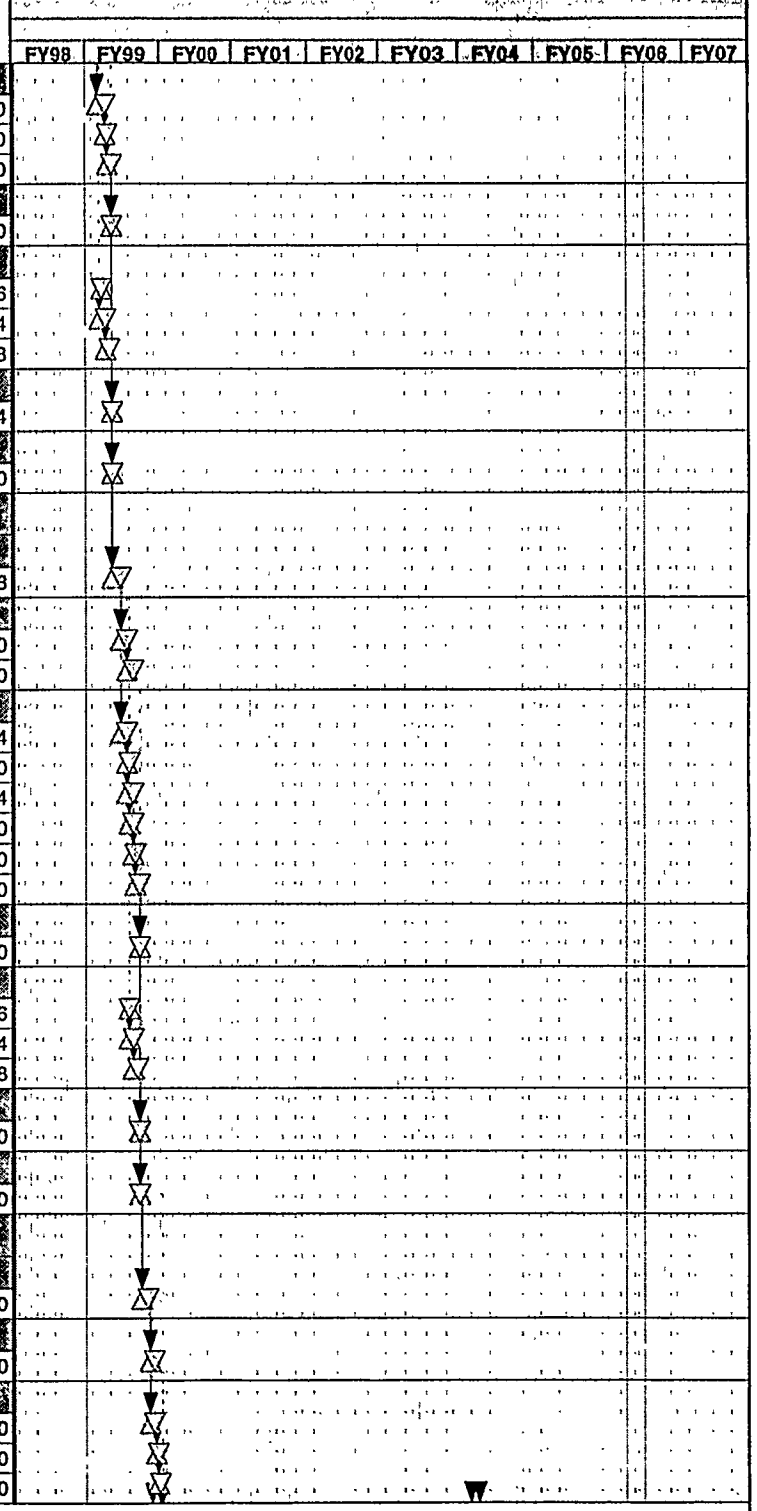
BASE CASE SCHEDULE

Detailed Activity Schedule

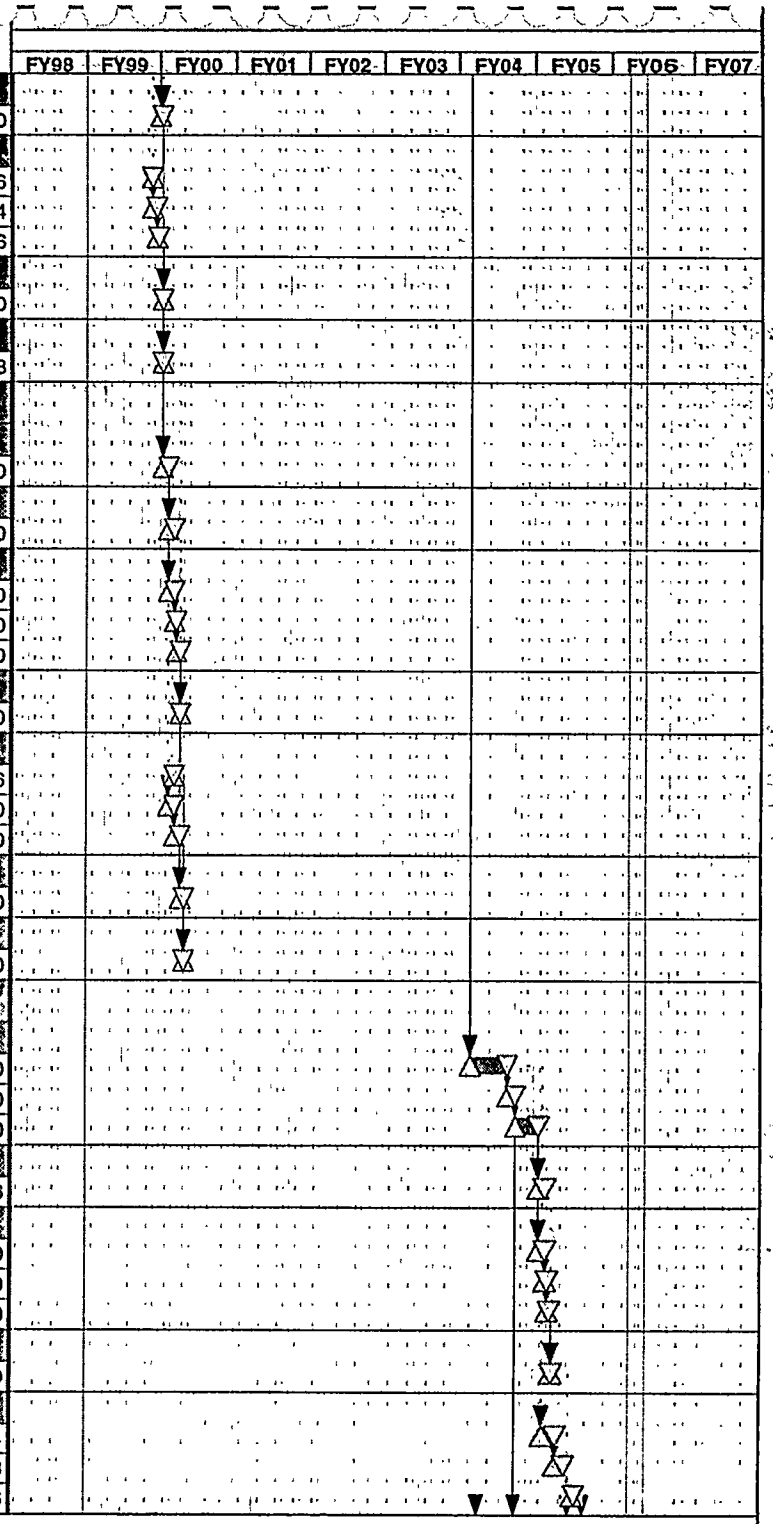
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Product Shipment						
BCA0D125	Load Truck and Ship to Receiver - 1st Shipment	2	03MAY01	04MAY01	165.00	7,825.00
BCA0D127	Load Truck and Ship to Receiver - (2 thru 23)	960	19MAY01	03JAN04	3,630.00	174,310.40
ANL-W Material						
Project Definition						
BCA0A03	Evaluate & Develop Customer Receiving Criteria	48	22JAN98	15APR98	200.00	10,376.40
Procurement						
BCA0A10	Inspect & PM 6 Shipping Containers	16	16APR98	13MAY98	60.00	3,185.80
Procedures						
BCA0A13	Develop Procedure 55 gal DOT-6M Drum	16	16APR98	13MAY98	160.00	7,754.80
BCA0A16	Review & Resolve Comments 55 gal DOT-6M Drum	8	14MAY98	28MAY98	110.00	6,110.70
BCA0A19	Approve New Procedure 55 gal DOT-6M Drum	8	01JUN98	11JUN98	30.00	1,620.20
Training						
BCA0A22	Practice Dry Run	1	15JUN98	15JUN98	70.00	3,801.40
S&S Plans for Repackaging						
BCA0A34	Request for Safe Transport (SST)	1	18MAY98	18MAY98	4.00	200.56
BCA0A25	Material Control & Accountability Work	12	12MAY98	02JUN98	44.00	2,189.44
BCA0A28	Complete Materials Management Plan Activities	8	03JUN98	16JUN98	20.00	995.20
Material Repackaging						
BCA0A31	Place shipping pkg in certified container	5	16JUN98	30JUN98	525.00	35,675.40
Product Shipment						
BCA0A37	Load Truck and Ship to Receiver	1	01JUL98	01JUL98	85.00	4,466.80
Custom Material						
Project Definition						
BCA01	Evaluate & Develop Customer Receiving Criteria	24	02JUL98*	12AUG98	250.00	13,076.60
Procurement						
BCA03	Inspect & PM New Shipping Container	16	13AUG98	10SEP98	80.00	4,393.20
Procedures						
BCA044	Develop Procedure 55 gal. DOT-6M Drum	16	13AUG98	10SEP98	160.00	7,754.80
BCA045	Review & Resolve Comments 55 DOT-6M	8	14SEP98	24SEP98	110.00	6,110.70
BCA046	Approve New Procedure 55 DOT-6M	8	28SEP98	08OCT98	30.00	1,620.20
Training						
BCA07	Practice Dry Run	1	12OCT98	12OCT98	70.00	3,801.40
S&S Plans for Repackaging						
BCA012	Request for Safe Secure Transport (SST)	1	08SEP98	08SEP98	4.00	200.56
BCA08	Material Control & Accountability Work	12	02SEP98	23SEP98	44.00	2,189.44
BCA09	Complete Materials Management Plan Activities	8	24SEP98	07OCT98	20.00	995.20
Material Repackaging						
BCA011A	Load Nine 55 gal. DOT-6M Shipping Containers	4	13OCT98	21OCT98	440.00	30,800.40
Product Shipment						
BCA014	Load Truck and Ship to Receiver	1	22OCT98	22OCT98	105.00	5,504.40
U. of Wisconsin						
Project Definition						
BCA051	Evaluate & Develop Customer Receiving Criteria	24	26OCT98*	07DEC98	72.00	3,837.36
Procurement						
BCA0300	Inspect & PM (1) Shipping Container	8	08DEC98	21DEC98	50.00	2,673.00



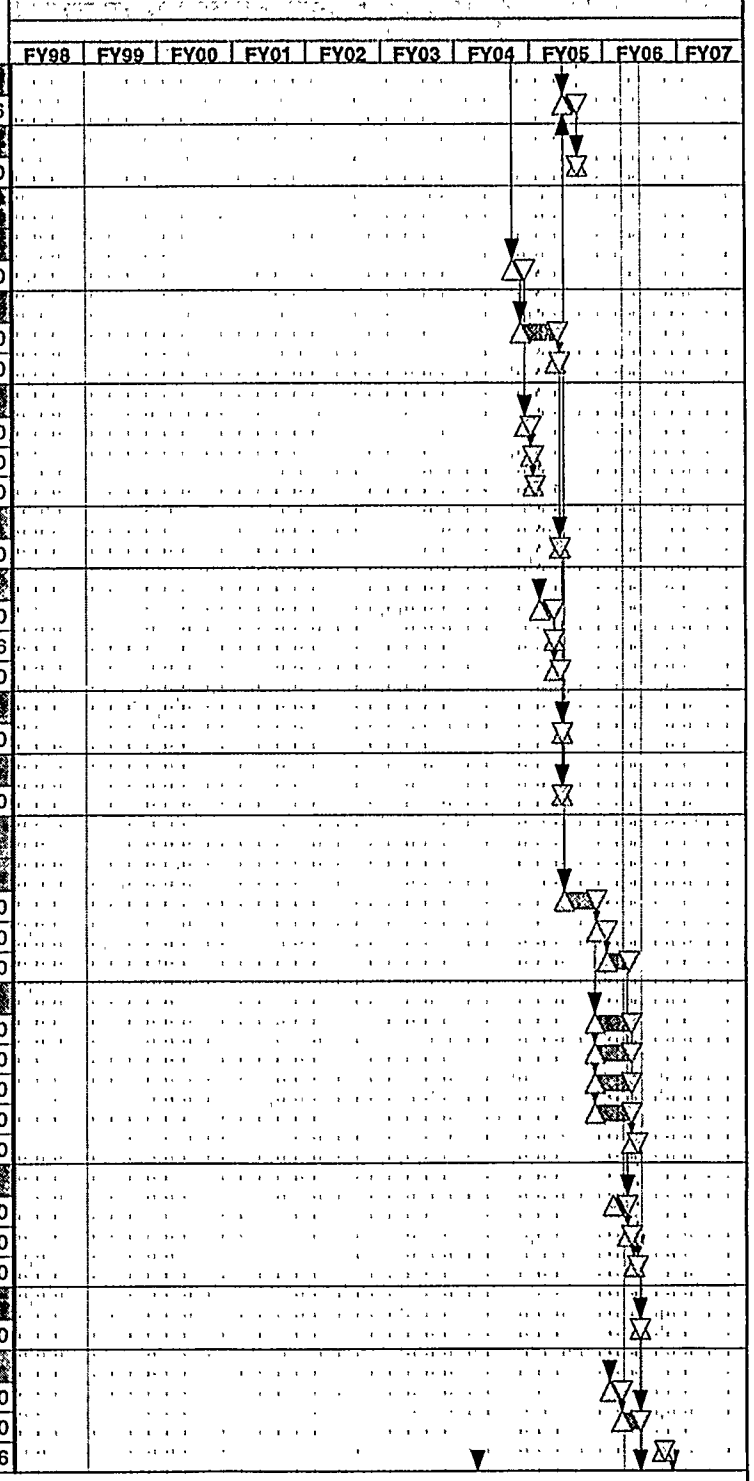
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Procedures						
BCA0350	Develop Procedure 85 gal DOT-6M	16	08DEC98	11JAN99	160.00	7,754.80
BCA0360	Review & Resolve Comments 85 gal DOT-6M	8	12JAN99	25JAN99	110.00	6,110.70
BCA0320	Approve New Procedure 85 gal DOT-6M	8	26JAN99	08FEB99	30.00	1,620.20
Training						
BCA0310	Practice Dry Run	1	09FEB99	09FEB99	70.00	3,801.40
S&S Plans for Repackaging						
BCA0390	Request for Safe Secure Transport (SST)	1	22DEC98	22DEC98	4.00	200.56
BCA0370	Material Control & Accountability Work	12	17DEC98	13JAN99	24.00	1,194.24
BCA0380	Complete Materials Management Plan Activities	10	14JAN99	01FEB99	8.00	398.08
Material Repackaging						
BCA0330	Place shipping pkg in certified container	1	09FEB99	09FEB99	114.00	10,074.14
Product Shipment						
BCA0340	Load Truck and Ship to Receiver	1	10FEB99	10FEB99	105.00	5,504.40
GEFAST Material						
Project Definition						
BCA080	Evaluate & Develop Customer Receiving Criteria	24	11FEB99*	24MAR99	68.00	3,595.88
Procurement						
BCA0V1	Purchase One 35 gal. UN1A2 Shipping Container	16	25MAR99*	21APR99	10.00	853.70
BCA0A	Inspect & PM Shipping Containers	16	22APR99	19MAY99	60.00	3,185.80
Procedures						
BCA0F1	Develop Procedure 35 gal DOT UN1A2 Shipping Pkg.	16	25MAR99	21APR99	128.00	6,433.84
BCA0F2	Review & Resolve Comments UN1A2 Pkg.	8	22APR99	05MAY99	110.00	6,110.70
BCA0F4	Develop Procedure 55 gal. DOT-6M Drum	16	22APR99	19MAY99	128.00	6,433.84
BCA0F3	Approve New Procedure UN1A2 Pkg.	11	06MAY99	26MAY99	30.00	1,620.20
BCA0F5	Review & Resolve Comments 55 DOT-6M	8	20MAY99	03JUN99	110.00	6,110.70
BCA0F6	Approve New Procedure 55 DOT-6M	8	07JUN99	17JUN99	30.00	1,620.20
Training						
BCA0U	Practice Dry Run	1	21JUN99	21JUN99	70.00	3,801.40
S&S Plans for Repackaging						
BCA0O	Request for Safe Secure Transport (SST)	1	03MAY99	03MAY99	4.00	200.56
BCA0Z	Material Control & Accountability Work	12	05MAY99	26MAY99	14.00	696.64
BCA0E	Complete Materials Management Plan Activities	8	27MAY99	09JUN99	8.00	398.08
Material Repackaging						
BCA0J	Load 5 Containers in 5 DOT Shipping Containers	2	22JUN99	23JUN99	220.00	16,850.20
Product Shipment						
BCA0T	Load Truck and Ship to Receiver	1	24JUN99	24JUN99	105.00	5,504.40
U. of Washington						
Project Definition						
BCA040	Evaluate & Develop Customer Receiving Criteria	24	28JUN99*	05AUG99	100.00	5,188.20
Procurement						
BCA010	Inspect & PM Shipping Container	16	09AUG99	02SEP99	40.00	2,196.60
Procedures						
BCA013	Develop Procedure	16	09AUG99	02SEP99	160.00	7,754.80
BCA016	Review & Resolve Comments	8	07SEP99	20SEP99	110.00	6,110.70
BCA019	Approve New Procedure	8	21SEP99	04OCT99	30.00	1,620.20



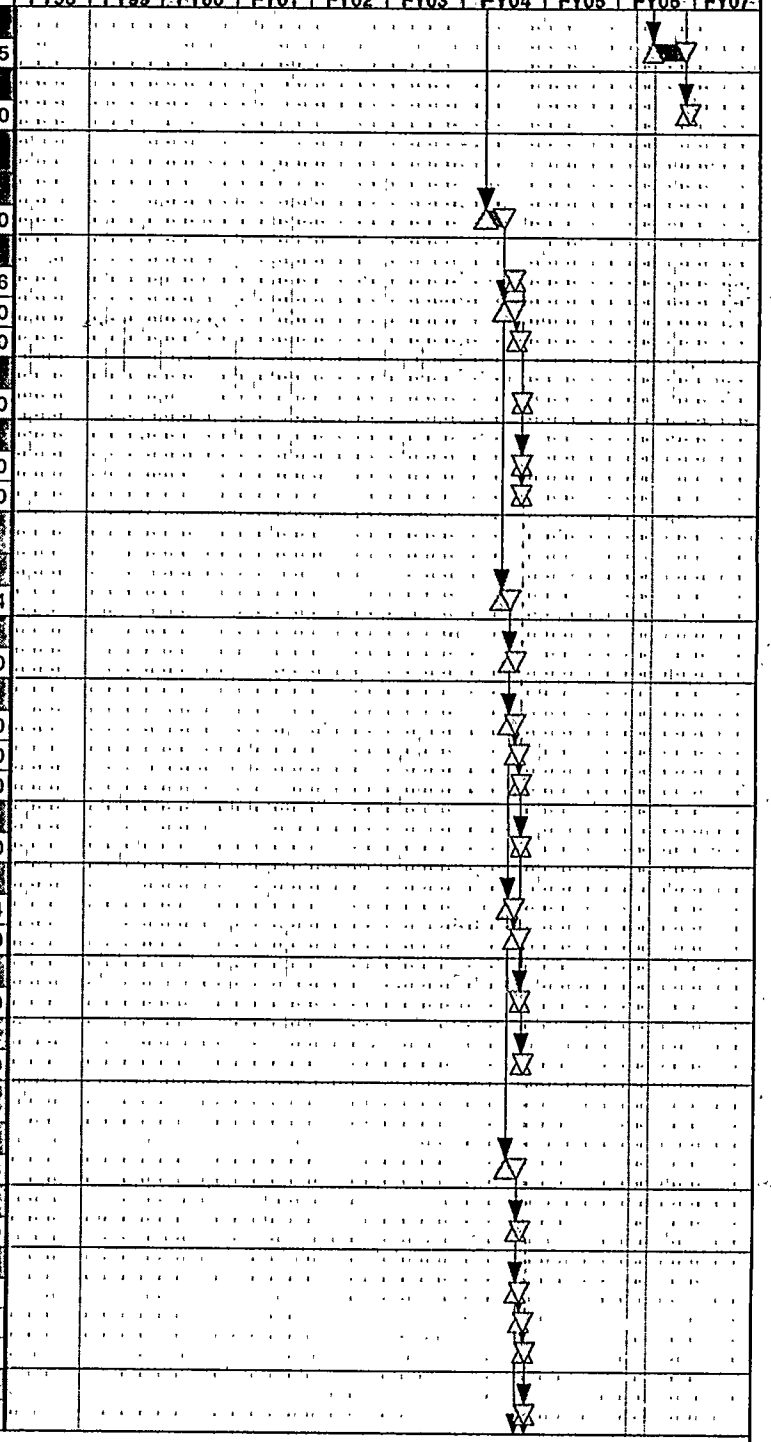
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Training						
BCA022	Practice Dry Run	1	05OCT99	05OCT99	70.00	3,801.40
S&S Plans for Repackaging						
BCA034	Request for Safe Secure Transport (SST)	1	24AUG99	24AUG99	4.00	200.56
BCA025	Material Control & Accountability Work	12	18AUG99	08SEP99	24.00	1,194.24
BCA028	Complete Materials Management Plan Activities	8	09SEP99	22SEP99	16.00	796.16
Material Repackaging						
BCA031	Place shipping pkg in certified container	1	06OCT99	06OCT99	110.00	5,791.80
Product Shipment						
BCA037	Load Truck and Ship to Receiver	1	07OCT99	07OCT99	108.00	5,653.68
Rocky Flats Material - Ship As Is						
Project Definition						
BCA0RF40	Evaluate & Develop Customer Receiving Criteria	16	11OCT99*	04NOV99	80.00	4,200.60
Procurement						
BCA0RF10	Inspect & PM Shipping Container	16	08NOV99	06DEC99	60.00	3,185.80
Procedures						
BCA0RF13	Develop Procedure	16	08NOV99	06DEC99	160.00	7,754.80
BCA0RF16	Review & Resolve Comments	8	07DEC99	20DEC99	120.00	6,623.50
BCA0RF19	Approve New Procedure	8	21DEC99	10JAN00	30.00	1,620.20
Training						
BCA0RF22	Practice Dry Run	1	11JAN00	11JAN00	70.00	3,801.40
S&S Plans for Repackaging						
BCA0RF38	Request for Safe Secure Transport (SST)	1	06DEC99	06DEC99	4.00	200.56
BCA0RF25	Material Control & Accountability Work	16	10NOV99	08DEC99	160.00	7,961.60
BCA0RF28	Complete Materials Management Plan Activities	15	09DEC99	11JAN00	80.00	3,980.80
Material Repackaging						
BCA0RF31	Place shipping pkg in certified container	4	12JAN00	25JAN00	360.00	19,487.90
Product Shipment						
BCA0RF37	Load Truck and Ship to Receiver	1	26JAN00	26JAN00	90.00	4,715.60
PWR Material						
Project Definition						
BCA0P40	Characterize Material to Meet Customer Req.	96	01DEC03*	25MAY04	240.00	12,578.80
BCA0P40A	Evaluate & Develop Customer Receiving Criteria	24	26MAY04*	06JUL04	100.00	4,976.00
BCA0P41	Design/Fabricate 44 Aluminum Shipping Cans	60	07JUL04*	20OCT04	520.00	29,586.40
Procurement						
BCA0P10	Inspect & PM Shipping Containers	16	21OCT04	17NOV04	116.00	5,955.56
Procedures						
BCA0P13	Develop Procedure	16	21OCT04	17NOV04	160.00	7,754.80
BCA0P16	Review & Resolve Comments	8	18NOV04	02DEC04	110.00	6,110.70
BCA0P19	Approve New Procedure	8	06DEC04	16DEC04	30.00	1,620.20
Training						
BCA0P22	Practice Dry Run	1	20DEC04	20DEC04	70.00	3,801.40
S&S Plans for Repackaging						
BCA0P25	Material Control & Accountability Work	32	08NOV04	10JAN05	74.00	3,682.24
BCA0P28	Complete Materials Management Plan Activities	24	11JAN05	21FEB05	28.00	1,393.28
BCA0P34	Request for Safe Secure Transport (SST)	1	06APR05	06APR05	4.00	200.56



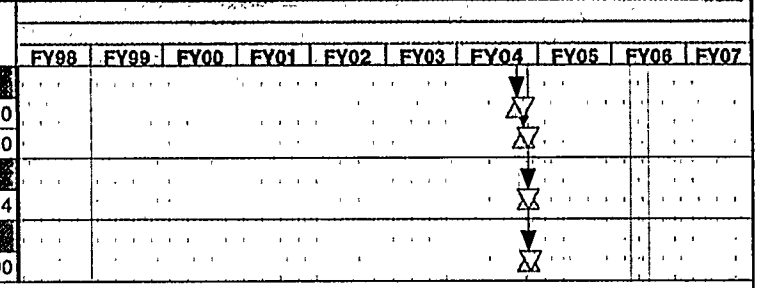
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
aterial Repackaging						
CA0P31	Place shipping pkg in certified container	22	08MAR05	18MAY05	1,724.00	90,717.36
oduct Shipment						
CA0P37	Load Truck and Ship to Receiver	4	19MAY05	22MAY05	270.00	13,952.00
WR (-1 full assembly)						
oject Definition						
CA0P140	Evaluate & Develop Customer Receiving Criteria	32	07JUL04*	31AUG04	180.00	9,396.40
ocurement						
CA0P107	Obtain Certification of Shipping Container	96	18AUG04*	10FEB05	60.00	8,440.40
CA0P110	Inspect & PM Shipping Container	16	31JAN05	24FEB05	60.00	3,185.80
ocedures						
CA0P113	Develop Procedure	16	01SEP04	29SEP04	160.00	7,754.80
CA0P116	Review & Resolve Comments	8	30SEP04	13OCT04	110.00	6,110.70
CA0P119	Approve New Procedure	8	14OCT04	27OCT04	30.00	1,620.20
aining						
CA0P122	Practice Dry Run	1	24FEB05	24FEB05	70.00	3,801.40
&S Plans for Repackaging						
CA0P125	Material Control & Accountability Work	32	17NOV04	19JAN05	120.00	5,971.20
CA0P134	Request for Safe Secure Transport (SST)	1	19JAN05	19JAN05	4.00	200.56
CA0P128	Complete Materials Management Plan Activities	16	20JAN05	16FEB05	80.00	3,980.80
aterial Repackaging						
CA0P131	Place shipping pkg in certified container	2	01MAR05	02MAR05	190.00	10,087.00
oduct Shipment						
CA0P137	Load Truck and Ship to Receiver	1	03MAR05	03MAR05	110.00	5,753.20
uorihel Material						
oject Definition						
CA0F41	Characterize Material to Meet Customer Req.	96	08MAR05	23AUG05	260.00	13,581.60
CA0F41A	Evaluate & Develop Customer Receiving Criteria	24	24AUG05*	05OCT05	140.00	7,186.20
CA0210	Design/Fabricate Aluminum Shipping Cans	60	06OCT05	26JAN06	520.00	29,586.40
ocurement						
CA0F07	Purchase Twenty-one 110 gal, DOT-6M Drums - 72"	96	10AUG05*	02FEB06	180.00	40,139.40
CA0F08	Purchase Five 110 gal, DOT-6M Drums 58"	96	10AUG05*	02FEB06	180.00	16,139.40
CA0F09	Purchase Four 55 gal, DOT-6M Drums 23"	96	10AUG05*	02FEB06	180.00	13,339.40
CA0F091	Purchase Sixty 85 gal, DOT-6M Drums 43"	96	10AUG05*	02FEB06	180.00	70,139.40
CA0F10	Inspect & PM New Shipping Containers	16	06FEB06	02MAR06	160.00	8,277.20
ocedures						
CA0F13	Develop Procedures - all Drums	32	10NOV05	12JAN06	320.00	15,509.60
CA0F16	Review & Resolve Comments - all drums	16	16JAN06	09FEB06	200.00	11,208.60
CA0F19	Approve New Procedures - all drums	16	13FEB06	09MAR06	60.00	3,240.40
aining						
CA0F22	Practice Dry Run	4	13MAR06	16MAR06	280.00	15,205.60
&S Plans for Repackaging						
CA0F25	Material Control & Accountability Work	32	20OCT05	15DEC05	120.00	5,971.20
CA0F28	Complete Materials Management Plan Activities	48	19DEC05	16MAR06	80.00	3,980.80
CA0F34	Request for Safe Secure Transport (SST)	1	10JUL06	10JUL06	4.00	200.56



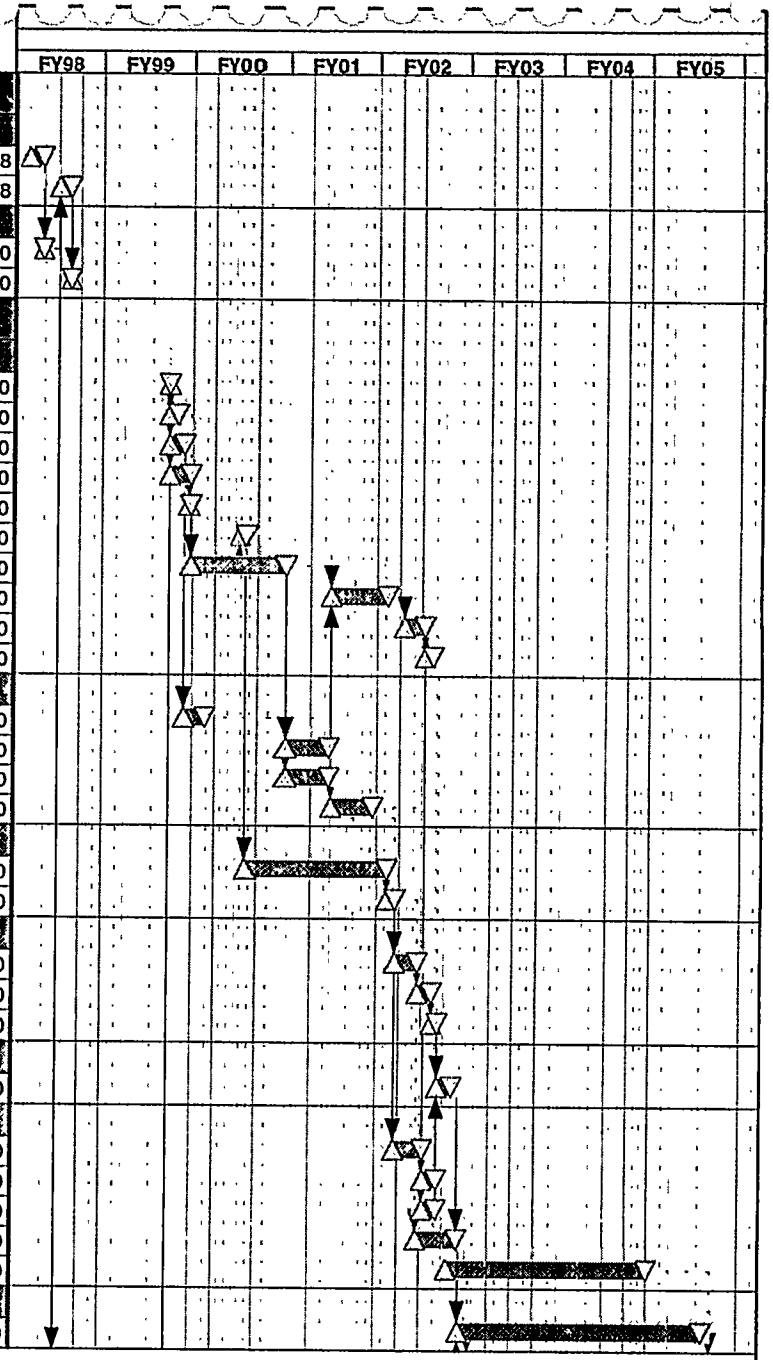
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Material Repackaging						
BCA0F31	Place shipping pkg in certified container	45	21MAR06	22AUG06	4,090.00	219,794.05
Product Shipment						
BCA0F37	Load Truck and Ship to Receiver	20	23AUG06	11SEP06	1,400.00	72,248.00
VYCOR Glass Material						
Project Definition						
BCA0V11	Evaluate & Develop Customer Receiving Criteria	48	05JAN04	25MAR04	130.00	6,897.00
S&S Plans for Repackaging						
BCA0V34	Request for Safe Secure Transport (SST)	1	13MAY04	13MAY04	4.00	200.56
BCA0V25	Material Control & Accountability Work	32	29MAR04	20MAY04	120.00	5,971.20
BCA0V28	Complete Materials Management Plan Activities	12	25MAY04	14JUN04	80.00	3,980.80
Material Repackaging						
BCA0V31	Safeguards Inventory of Material	2	28JUN04	29JUN04	220.00	12,150.20
Product Shipment						
BCA0V37	Load Truck and Ship to Receiver	1	29JUN04	29JUN04	80.00	4,196.80
BC01	Processing Costs at Argonne Lab.	1	29JUN04	29JUN04	0.00	545,405.00
Janus Material						
Project Definition						
BCA0J10	Evaluate & Develop Customer Receiving Criteria	24	29MAR04*	06MAY04	134.00	7,092.24
Procurement						
BCA0J30	Inspect & PM Shipping Containers	16	10MAY04	07JUN04	60.00	3,185.80
Procedures						
BCA0J25	Develop Procedure 85 gal DOT-6M Drum	16	10MAY04	07JUN04	160.00	7,754.80
BCA0J35	Review & Resolve Comments 85 gal DOT-6M Drum	8	08JUN04	21JUN04	120.00	6,623.50
BCA0J45	Approve New Procedure 85 gal DOT-6M Drum	8	22JUN04	05JUL04	30.00	1,620.20
Training						
BCA0J50	Practice Dry Run	1	06JUL04	06JUL04	70.00	3,801.40
S&S Plans for Repackaging						
BCA0J55	Material Control & Accountability Work	16	10MAY04	07JUN04	44.00	2,189.44
BCA0J60	Complete Materials Management Plan Activities	16	08JUN04	05JUL04	40.00	1,990.40
Material Repackaging						
BCA0J65	Place shipping pkg in certified container	1	07JUL04	07JUL04	110.00	6,075.10
Product Shipment						
BCA0J70	Load Truck and Ship to Receiver	1	20JUL04	20JUL04	115.00	6,002.00
ANL-E Material						
Project Definition						
BCA0E40	Evaluate & Develop Customer Receiving Criteria	24	10MAY04*	21JUN04	82.00	4,338.76
Procurement						
BCA0E10	Inspect & PM Shipping Containers	16	22JUN04	19JUL04	60.00	3,185.80
Procedures						
BCA0E13	Develop Procedure	16	22JUN04	19JUL04	160.00	7,754.80
BCA0E16	Review & Resolve Comments	8	20JUL04	02AUG04	120.00	6,623.50
BCA0E19	Approve New Procedure	8	03AUG04	16AUG04	30.00	1,620.20
Training						
BCA0E22	Practice Dry Run	1	17AUG04	17AUG04	70.00	3,801.40



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging						
BCA0E25	Material Control & Accountability Work	20	22JUN04	26JUL04	120.00	5,971.20
BCA0E28	Complete Materials Management Plan Activities	12	27JUL04	16AUG04	80.00	3,980.80
Material Repackaging						
BCA0E31	Place shipping pkg in certified container at CPP	1	18AUG04	18AUG04	114.00	6,274.14
Product Shipment						
BCA0E37	Load Truck and Ship to Argonne	1	19AUG04	19AUG04	100.00	5,212.00



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
LANL Material						
Material Repackaging						
CCAA01A	Place shipping pkg in certified container	16	25NOV97*	21JAN98	1,402.00	75,485.48
CCAA01B	Place shipping pkg in certified container	16	31MAR98*	20MAY98	1,402.00	75,485.48
Product Shipment						
CCAA05A	Load Truck and Ship to Receiver	1	22JAN98	22JAN98	80.00	4,207.40
CCAA05B	Load Truck and Ship to Receiver	1	21MAY98	21MAY98	80.00	4,207.40
Denitrator Material - Dry Blending						
Project Definition						
CCA0D101B	Conduct Value Engineering Sessions	2	01JUL99*	05JUL99	280.00	14,200.00
CCA0D102	Identify On-site Representative	16	06JUL99*	02AUG99	20.00	900.00
CCA0D104	Obtain Characterization Data (product & depleted	32	06JUL99	30AUG99	120.00	5,800.00
CCA0D101	Obtain Written Agreements as required (DOE, etc)	48	06JUL99*	28SEP99	60.00	2,700.00
CCA0D101E	Obtain Peer Reviews & Approvals of Concepts	8	15SEP99	28SEP99	560.00	28,400.00
CCA0D101D	Provide Input to SAR NEPA, Operating Permits	16	18APR00*	15MAY00	160.00	8,800.00
CCA0D101F	Develop Design Process Drawings (Title I & II)	201	29SEP99	27SEP00	80.00	254,000.00
CCA0D101G	Construction, Testing and Startup at U. of Utah	128	26MAR01	07NOV01	80.00	254,000.00
CCA0D101H	Install New Equipment in CPP-651	48	16JAN02	09APR02	80.00	254,000.00
CCA0D101J	Inspection, Testing & Startup of New Equipment	16	10APR02	07MAY02	80.00	54,000.00
Procurement						
CCA0D103	Purchase Perma-Con Structure	48	31AUG99*	23NOV99	40.00	152,000.00
CCA0D103A	Purchase Process Equipment	96	28SEP00*	22MAR01	40.00	752,000.00
CCA0D103B	Purchase Support Systems	96	28SEP00*	22MAR01	40.00	202,000.00
CCA0D103D	Purchase 600 Drums - 110 gal DOT-6M Containers	96	26MAR01*	12SEP01	40.00	702,000.00
ES&H Documentation (SAR,NEPA,Permits)						
CCA0D106	Develop SAR/CSE	300	16MAY00	08NOV01	2,690.00	200,354.10
CCA0D106A	Final Review & Approval of SAR	16	12NOV01*	10DEC01	1,120.00	56,800.00
Procedures						
CCA0D107	Develop Procedure	48	11DEC01	12MAR02	280.00	13,400.00
CCA0D109	Review & Resolve Comments	32	13MAR02	07MAY02	170.00	8,300.00
CCA0D111	Approve New Procedure	16	08MAY02	05JUN02	50.00	2,600.00
Training						
CCA0D113	Practice Dry Run	32	06JUN02	01AUG02	960.00	46,400.00
S&S Plans for Repackaging						
CCA0D117	Define Security Requirements & Modify Equipment	64	11DEC01	09APR02	180.00	8,796.00
CCA0D115	Identify MC&A Requirements - Sampling Plan	32	10APR02	05JUN02	320.00	15,200.00
CCA0D118	Develop Security Procedures & Implemt. Plans	32	10APR02	05JUN02	240.00	11,200.00
CCA0D118A	Complete RA & Obtain Approval to Operate	96	13MAR02	29AUG02	1,920.00	97,909.20
CCA0D123	Request for Safe Secure Transport (SST)	443	18JUL02	29SEP04	495.00	24,819.30
Material Repackaging						
CCA0D120D	Facility Operations - Dry Blending	278	03SEP02	17MAY05	24,558.00	1,249,203.00



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	20AUG97

Early Bar
Progress Bar
Critical Activity

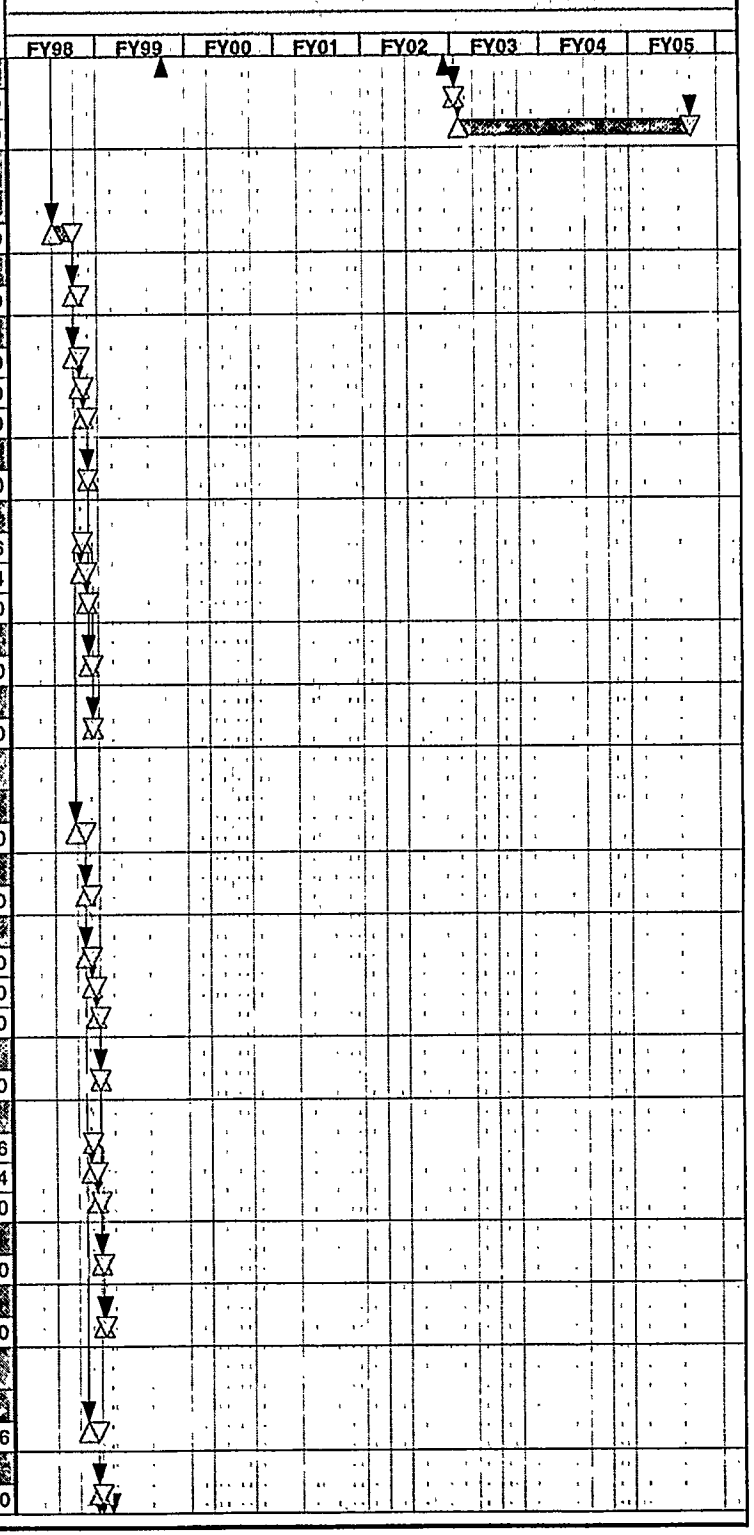
COMP:DRY1

LMITCO - CPP 651 MATERIALS SCHEDULE

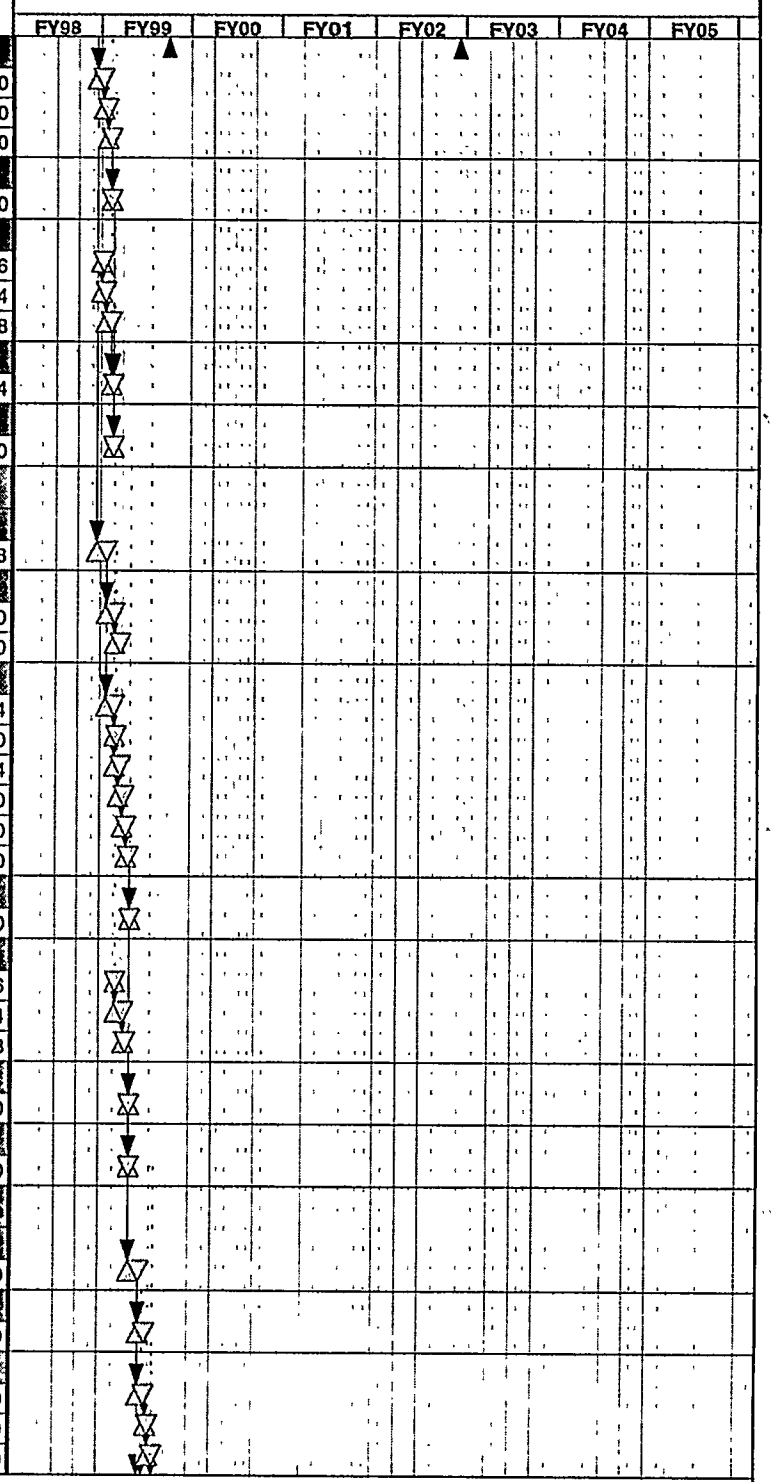
OPTION A - BASE CASE & TRANSFER TEAM

Detailed Activity Schedule

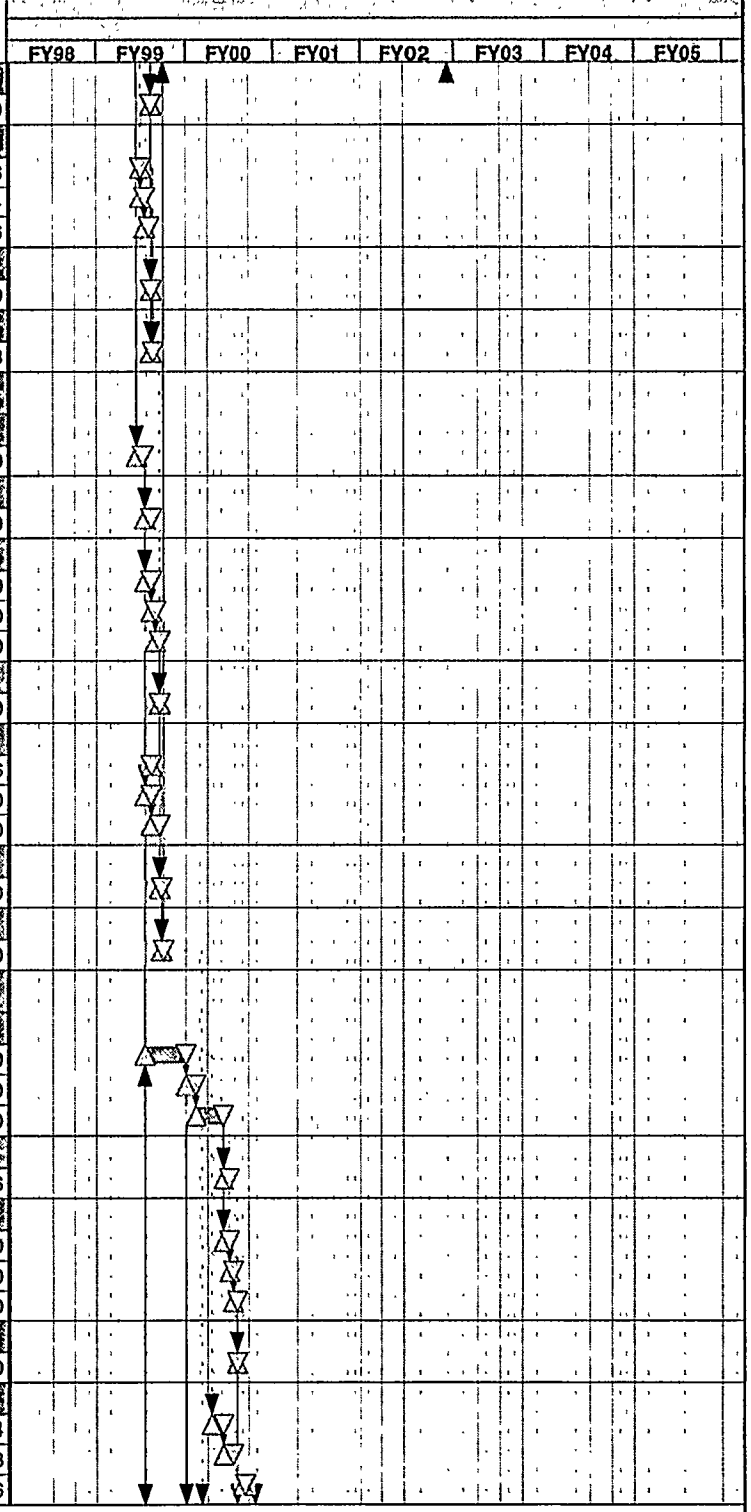
Activity ID	Activity Description	Orig. Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Product Shipment						
CCA0D125	Load Truck and Ship to Receiver - 1st Shipment	2	17OCT02	18OCT02	165.00	7,825.00
CCA0D127	Load Truck and Ship to Receiver - (2 thru 23)	960	02NOV02	18JUN05	3,630.00	174,310.40
ANL-W Material						
Project Definition						
CCA0A03	Evaluate & Develop Customer Receiving Criteria	48	31MAR98	23JUN98	200.00	10,376.40
Procurement						
CCA0A10	Inspect & PM 6 Shipping Containers	16	24JUN98	21JUL98	60.00	3,185.80
Procedures						
CCA0A13	Develop Procedure 55 gal DOT-6M Drum	16	24JUN98	21JUL98	160.00	7,754.80
CCA0A16	Review & Resolve Comments 55 gal DOT-6M Drum	8	22JUL98	04AUG98	110.00	6,110.70
CCA0A19	Approve New Procedure 55 gal DOT-6M Drum	8	05AUG98	18AUG98	30.00	1,620.20
Training						
CCA0A22	Practice Dry Run	1	19AUG98	19AUG98	70.00	3,801.40
S&S Plans for Repackaging						
CCA0A34	Request for Safe Transport (SST)	1	27JUL98	27JUL98	4.00	200.56
CCA0A25	Material Control & Accountability Work	12	21JUL98	10AUG98	44.00	2,189.44
CCA0A28	Complete Materials Management Plan Activities	8	11AUG98	24AUG98	20.00	995.20
Material Repackaging						
CCA0A31	Place shipping pkg in certified container	5	25AUG98	08SEP98	525.00	35,675.40
Product Shipment						
CCA0A37	Load Truck and Ship to Receiver	1	09SEP98	09SEP98	85.00	4,466.80
Custom Material						
Project Definition						
CCA01	Evaluate & Develop Customer Receiving Criteria	24	24JUN98*	04AUG98	250.00	13,076.60
Procurement						
CCA03	Inspect & PM New Shipping Container	16	05AUG98	01SEP98	80.00	4,393.20
Procedures						
CCA044	Develop Procedure 55 gal. DOT-6M Drum	16	05AUG98	01SEP98	160.00	7,754.80
CCA045	Review & Resolve Comments 55 DOT-6M	8	02SEP98	16SEP98	110.00	6,110.70
CCA046	Approve New Procedure 55 DOT-6M	8	17SEP98	30SEP98	30.00	1,620.20
Training						
CCA07	Practice Dry Run	1	01OCT98	01OCT98	70.00	3,801.40
S&S Plans for Repackaging						
CCA012	Request for Safe Secure Transport (SST)	1	31AUG98	31AUG98	4.00	200.56
CCA08	Material Control & Accountability Work	12	26AUG98	16SEP98	44.00	2,189.44
CCA09	Complete Materials Management Plan Activities	8	17SEP98	30SEP98	20.00	995.20
Material Repackaging						
CCA011A	Load Nine 55 gal. DOT-6M Shipping Containers	4	06OCT98	14OCT98	440.00	30,800.40
Product Shipment						
CCA014	Load Truck and Ship to Receiver	1	15OCT98	15OCT98	105.00	5,504.40
U. of Wisconsin						
Project Definition						
CCA051	Evaluate & Develop Customer Receiving Criteria	24	05AUG98*	16SEP98	72.00	3,837.36
Procurement						
CCA0300	Inspect & PM (1) Shipping Container	8	17SEP98	30SEP98	50.00	2,673.00



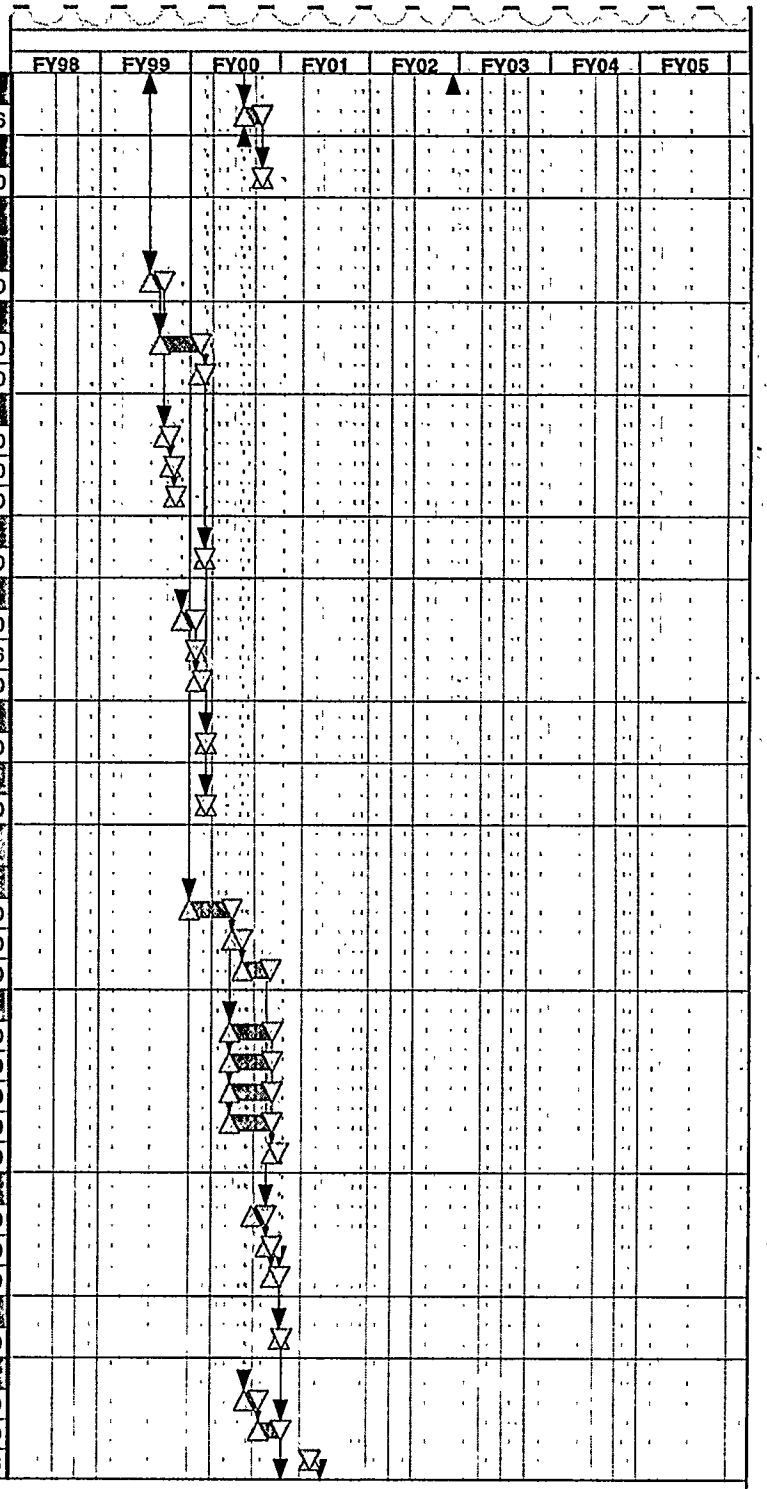
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Procedures						
CCA0350	Develop Procedure 85 gal DOT-6M	16	17SEP98	14OCT98	160.00	7,754.80
CCA0360	Review & Resolve Comments 85 gal DOT-6M	8	15OCT98	28OCT98	110.00	6,110.70
CCA0320	Approve New Procedure 85 gal DOT-6M	8	29OCT98	11NOV98	30.00	1,620.20
Training						
CCA0310	Practice Dry Run	1	12NOV98	12NOV98	70.00	3,801.40
S&S Plan for Repackaging						
CCA0390	Request for Safe Secure Transport (SST)	1	06OCT98	06OCT98	4.00	200.56
CCA0370	Material Control & Accountability Work	12	01OCT98	21OCT98	24.00	1,194.24
CCA0380	Complete Materials Management Plan Activities	10	22OCT98	09NOV98	8.00	398.08
Material Repackaging						
CCA0330	Place shipping pkg in certified container	1	17NOV98	17NOV98	114.00	10,074.14
Product Shipment						
CCA0340	Load Truck and Ship to Receiver	1	18NOV98	18NOV98	105.00	5,504.40
GEFAST Material						
Project Definition						
CCA080	Evaluate & Develop Customer Receiving Criteria	24	17SEP98*	28OCT98	68.00	3,595.88
Procurement						
CCA0V1	Purchase One 35 gal. UN1A2 Shipping Container	16	29OCT98*	25NOV98	10.00	853.70
CCA0A	Inspect & PM Shipping Containers	16	30NOV98	24DEC98	60.00	3,185.80
Procedures						
CCA0F1	Develop Procedure 35 gal DOT UN1A2 Shipping Pkg.	16	29OCT98	25NOV98	128.00	6,433.84
CCA0F2	Review & Resolve Comments UN1A2 Pkg.	8	30NOV98	10DEC98	110.00	6,110.70
CCA0F4	Develop Procedure 55 gal. DOT-6M Drum	16	30NOV98	24DEC98	128.00	6,433.84
CCA0F3	Approve New Procedure UN1A2 Pkg.	11	14DEC98	06JAN99	30.00	1,620.20
CCA0F5	Review & Resolve Comments 55 DOT-6M	8	04JAN99	14JAN99	110.00	6,110.70
CCA0F6	Approve New Procedure 55 DOT-6M	8	18JAN99	28JAN99	30.00	1,620.20
Training						
CCA0U	Practice Dry Run	1	01FEB99	01FEB99	70.00	3,801.40
S&S Plans for Repackaging						
CCA0O	Request for Safe Secure Transport (SST)	1	08DEC98	08DEC98	4.00	200.56
CCA0Z	Material Control & Accountability Work	12	10DEC98	06JAN99	14.00	696.64
CCA0E	Complete Materials Management Plan Activities	8	07JAN99	20JAN99	8.00	398.08
Material Repackaging						
CCA0J	Load 5 Containers in 5 DOT Shipping Containers	2	02FEB99	03FEB99	220.00	16,850.20
Product Shipment						
CCA0T	Load Truck and Ship to Receiver	1	04FEB99	04FEB99	105.00	5,504.40
U of Washington						
Project Definition						
CCA040	Evaluate & Develop Customer Receiving Criteria	24	08FEB99*	18MAR99	100.00	5,188.20
Procurement						
CCA010	Inspect & PM Shipping Container	16	22MAR99	15APR99	40.00	2,196.60
Procedures						
CCA013	Develop Procedure	16	22MAR99	15APR99	160.00	7,754.80
CCA016	Review & Resolve Comments	8	19APR99	29APR99	110.00	6,110.70
CCA019	Approve New Procedure	8	03MAY99	13MAY99	30.00	1,620.20



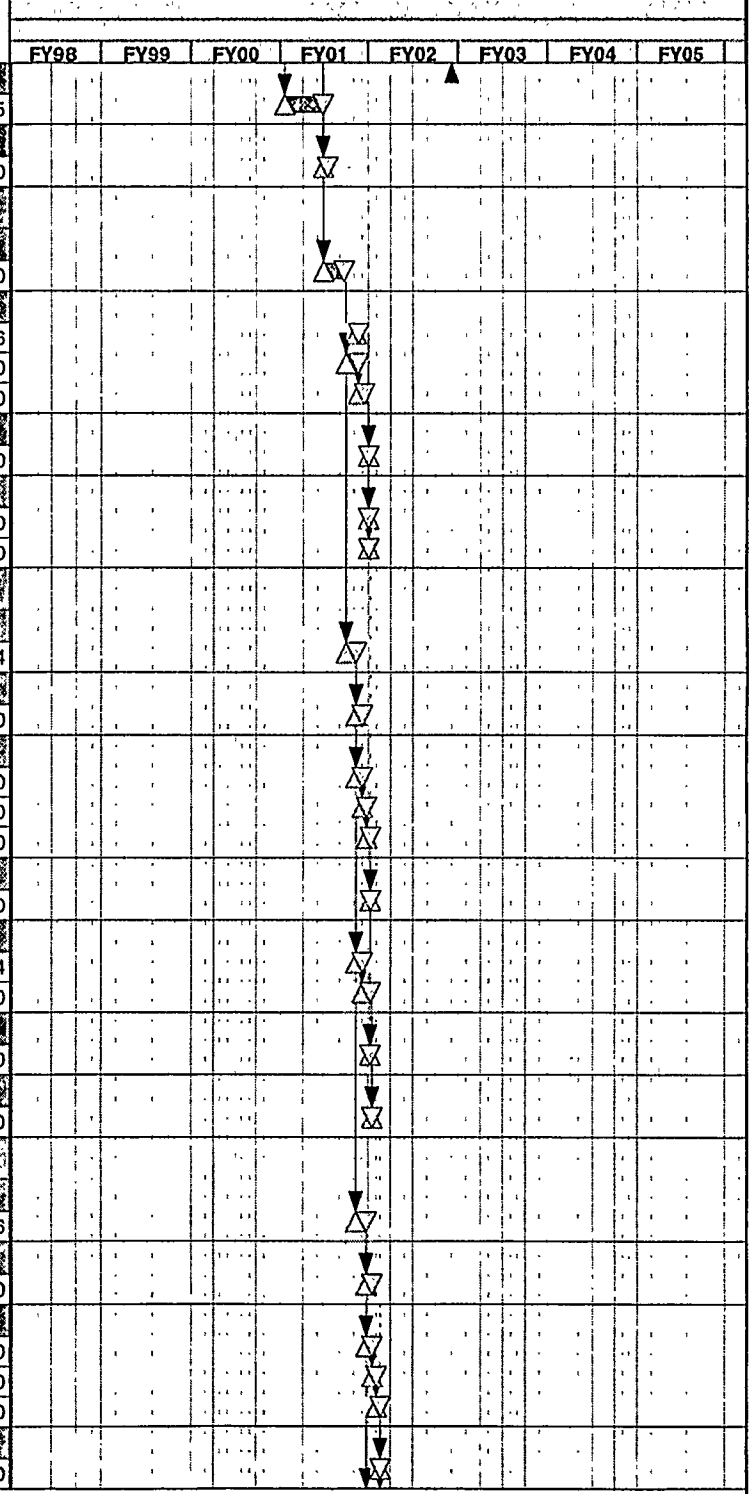
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Training						
CCA022	Practice Dry Run	1	17MAY99	17MAY99	70.00	3,801.40
S&S Plans for Repackaging						
CCA034	Request for Safe Secure Transport (SST)	1	06APR99	06APR99	4.00	200.56
CCA025	Material Control & Accountability Work	12	31MAR99	20APR99	24.00	1,194.24
CCA028	Complete Materials Management Plan Activities	8	21APR99	04MAY99	16.00	796.16
Material Repackaging						
CCA031	Place shipping pkg in certified container	1	18MAY99	18MAY99	110.00	5,791.80
Product Shipment						
CCA037	Load Truck and Ship to Receiver	1	19MAY99	19MAY99	108.00	5,653.68
Rocky Flats Material - Ship As Is						
Project Definition						
CCA0RF40	Evaluate & Develop Customer Receiving Criteria	16	22MAR99*	15APR99	80.00	4,200.60
Procurement						
CCA0RF10	Inspect & PM Shipping Container	16	19APR99	13MAY99	60.00	3,185.80
Procedures						
CCA0RF13	Develop Procedure	16	19APR99	13MAY99	160.00	7,754.80
CCA0RF16	Review & Resolve Comments	8	17MAY99	31MAY99	120.00	6,623.50
CCA0RF19	Approve New Procedure	8	01JUN99	14JUN99	30.00	1,620.20
Training						
CCA0RF22	Practice Dry Run	1	15JUN99	15JUN99	70.00	3,801.40
S&S Plans for Repackaging						
CCA0RF38	Request for Safe Secure Transport (SST)	1	13MAY99	13MAY99	4.00	200.56
CCA0RF25	Material Control & Accountability Work	16	21APR99	18MAY99	160.00	7,961.60
CCA0RF28	Complete Materials Management Plan Activities	15	19MAY99	15JUN99	80.00	3,980.80
Material Repackaging						
CCA0RF31	Place shipping pkg in certified container	4	16JUN99	29JUN99	360.00	19,487.90
Product Shipment						
CCA0RF37	Load Truck and Ship to Receiver	1	30JUN99	30JUN99	90.00	4,715.60
PWR Material						
Project Definition						
CCA0P40	Characterize Material to Meet Customer Req.	96	19APR99*	05OCT99	240.00	12,578.80
CCA0P40A	Evaluate & Develop Customer Receiving Criteria	24	06OCT99*	16NOV99	100.00	4,976.00
CCA0P41	Design/Fabricate 44 Aluminum Shipping Cans	60	17NOV99*	08MAR00	520.00	29,586.40
Procurement						
CCA0P10	Inspect & PM Shipping Containers	16	09MAR00	05APR00	116.00	5,955.56
Procedures						
CCA0P13	Develop Procedure	16	09MAR00	05APR00	160.00	7,754.80
CCA0P16	Review & Resolve Comments	8	06APR00	19APR00	110.00	6,110.70
CCA0P19	Approve New Procedure	8	20APR00	03MAY00	30.00	1,620.20
Training						
CCA0P22	Practice Dry Run	1	04MAY00	04MAY00	70.00	3,801.40
S&S Plans for Repackaging						
CCA0P25	Material Control & Accountability Work	32	18JAN00	13MAR00	74.00	3,682.24
CCA0P28	Complete Materials Management Plan Activities	24	14MAR00	24APR00	28.00	1,393.28
CCA0P34	Request for Safe Secure Transport (SST)	1	06JUN00	06JUN00	4.00	200.56



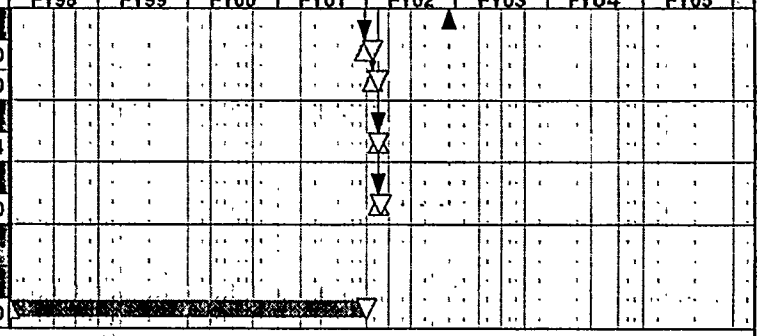
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Material Repackaging						
CCA0P31	Place shipping pkg in certified container	22	09MAY00	19JUL00	1,724.00	90,717.36
Product Shipment						
CCA0P37	Load Truck and Ship to Receiver	4	20JUL00	23JUL00	270.00	13,952.00
PWR (1 full assembly)						
Project Definition						
CCA0P140	Evaluate & Develop Customer Receiving Criteria	32	19APR99*	14JUN99	180.00	9,396.40
Procurement						
CCA0P107	Obtain Certification of Shipping Container	96	01JUN99*	16NOV99	60.00	8,440.40
CCA0P110	Inspect & PM Shipping Container	16	03NOV99	01DEC99	60.00	3,185.80
Procedures						
CCA0P113	Develop Procedure	16	15JUN99	12JUL99	160.00	7,754.80
CCA0P116	Review & Resolve Comments	8	13JUL99	26JUL99	110.00	6,110.70
CCA0P119	Approve New Procedure	8	27JUL99	09AUG99	30.00	1,620.20
Training						
CCA0P122	Practice Dry Run	1	01DEC99	01DEC99	70.00	3,801.40
S&S Plans for Repackaging						
CCA0P125	Material Control & Accountability Work	32	31AUG99	26OCT99	120.00	5,971.20
CCA0P134	Request for Safe Secure Transport (SST)	1	26OCT99	26OCT99	4.00	200.56
CCA0P128	Complete Materials Management Plan Activities	16	27OCT99	23NOV99	80.00	3,980.80
Material Repackaging						
CCA0P131	Place shipping pkg in certified container	2	07DEC99	08DEC99	190.00	10,087.00
Product Shipment						
CCA0P137	Load Truck and Ship to Receiver	1	09DEC99	09DEC99	110.00	5,753.20
Fluorinel Material						
Project Definition						
CCA0F41	Characterize Material to Meet Customer Req.	96	06OCT99	29MAR00	260.00	13,581.60
CCA0F41A	Evaluate & Develop Customer Receiving Criteria	24	30MAR00*	10MAY00	140.00	7,186.20
CCA0210	Design/Fabricate Aluminum Shipping Cans	60	11MAY00	28AUG00	520.00	29,586.40
Procurement						
CCA0F07	Purchase Twenty-one 110 gal, DOT-6M Drums - 72"	96	16MAR00*	05SEP00	180.00	40,139.40
CCA0F08	Purchase Five 110 gal, DOT-6M Drums 58"	96	16MAR00*	05SEP00	180.00	16,139.40
CCA0F09	Purchase Four 55 gal, DOT-6M Drums 23"	96	16MAR00*	05SEP00	180.00	13,339.40
CCA0F091	Purchase Sixty 85 gal, DOT-6M Drums 43"	96	16MAR00*	05SEP00	180.00	70,139.40
CCA0F10	Inspect & PM New Shipping Containers	16	06SEP00	03OCT00	160.00	8,277.20
Procedures						
CCA0F13	Develop Procedures - all Drums	32	19JUN00	14AUG00	320.00	15,509.60
CCA0F16	Review & Resolve Comments - all drums	16	15AUG00	12SEP00	200.00	11,208.60
CCA0F19	Approve New Procedures - all drums	16	13SEP00	10OCT00	60.00	3,240.40
Training						
CCA0F22	Practice Dry Run	4	11OCT00	17OCT00	280.00	15,205.60
S&S Plans for Repackaging						
CCA0F25	Material Control & Accountability Work	32	25MAY00	24JUL00	120.00	5,971.20
CCA0F28	Complete Materials Management Plan Activities	48	25JUL00	17OCT00	80.00	3,980.80
CCA0F34	Request for Safe Secure Transport (SST)	1	13FEB01	13FEB01	4.00	200.56



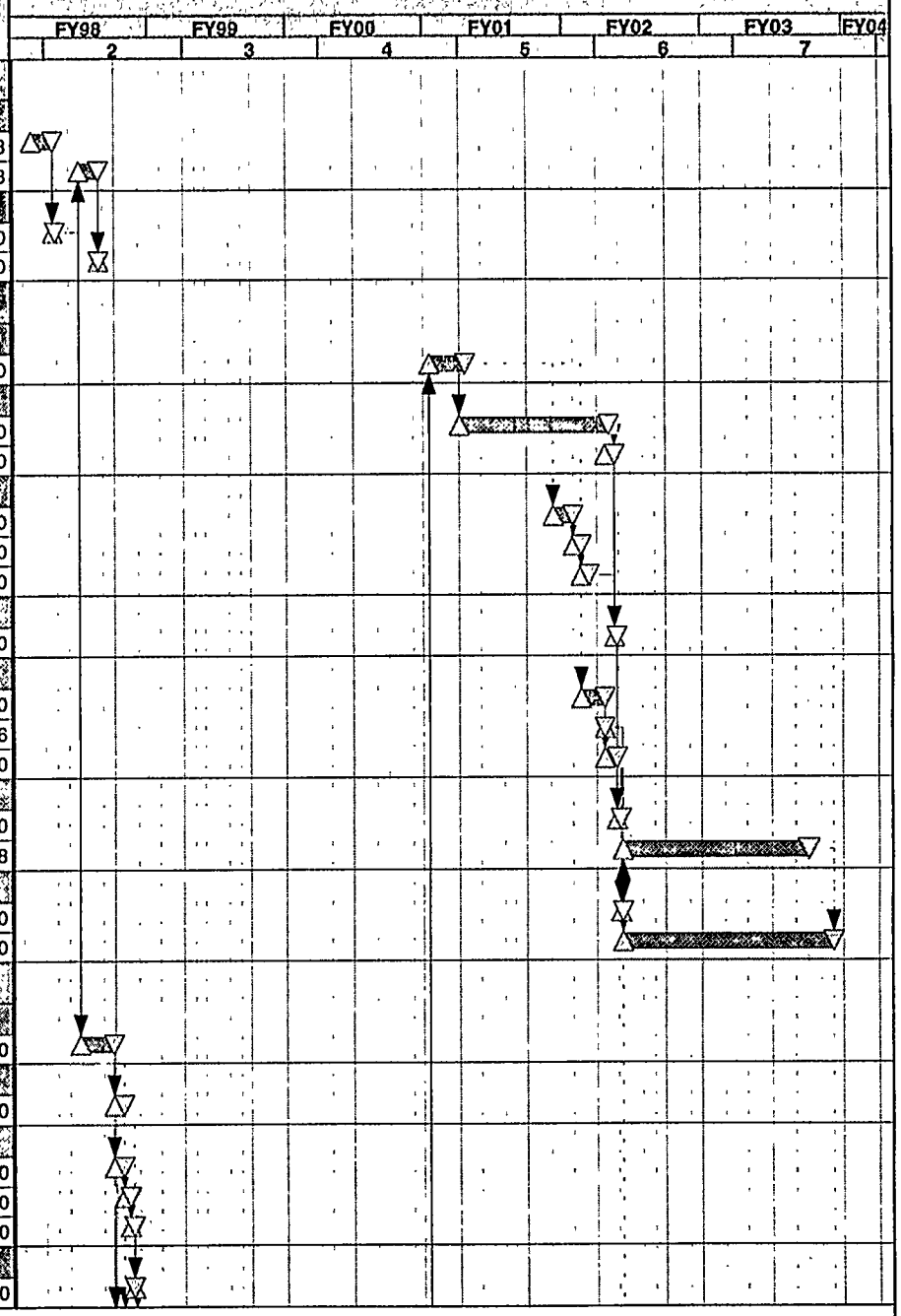
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Material Repackaging						
CCA0F31	Place shipping pkg in certified container	45	18OCT00	28MAR01	4,090.00	219,794.05
Product Shipment						
CCA0F37	Load Truck and Ship to Receiver	20	29MAR01	17APR01	1,400.00	72,248.00
YCOR Glass Material						
Project Definition						
CCA0V11	Evaluate & Develop Customer Receiving Criteria	48	29MAR01	21JUN01	130.00	6,897.00
S&S Plans for Repackaging						
CCA0V34	Request for Safe Secure Transport (SST)	1	13AUG01	13AUG01	4.00	200.56
CCA0V25	Material Control & Accountability Work	32	25JUN01	20AUG01	120.00	5,971.20
CCA0V28	Complete Materials Management Plan Activities	12	21AUG01	11SEP01	80.00	3,980.80
Material Repackaging						
CCA0V31	Safeguards Inventory of Material	2	25SEP01	26SEP01	220.00	12,150.20
Product Shipment						
CCA0V37	Load Truck and Ship to Receiver	1	26SEP01	26SEP01	80.00	4,196.80
CC01	Processing Costs at Argonne Lab.	1	27SEP01	27SEP01	0.00	545,405.00
anus Material						
Project Definition						
CCA0J10	Evaluate & Develop Customer Receiving Criteria	24	25JUN01*	06AUG01	134.00	7,092.24
Procurement						
CCA0J30	Inspect & PM Shipping Containers	16	07AUG01	04SEP01	60.00	3,185.80
Procedures						
CCA0J25	Develop Procedure 85 gal DOT-6M Drum	16	07AUG01	04SEP01	160.00	7,754.80
CCA0J35	Review & Resolve Comments 85 gal DOT-6M Drum	8	05SEP01	18SEP01	120.00	6,623.50
CCA0J45	Approve New Procedure 85 gal DOT-6M Drum	8	19SEP01	02OCT01	30.00	1,620.20
Training						
CCA0J50	Practice Dry Run	1	03OCT01	03OCT01	70.00	3,801.40
S&S Plans for Repackaging						
CCA0J55	Material Control & Accountability Work	16	07AUG01	04SEP01	44.00	2,189.44
CCA0J60	Complete Materials Management Plan Activities	16	05SEP01	02OCT01	40.00	1,990.40
Material Repackaging						
CCA0J65	Place shipping pkg in certified container	1	09OCT01	09OCT01	110.00	6,075.10
Product Shipment						
CCA0J70	Load Truck and Ship to Receiver	1	17OCT01	17OCT01	115.00	6,002.00
NL-E Material						
Project Definition						
CCA0E40	Evaluate & Develop Customer Receiving Criteria	24	07AUG01*	18SEP01	82.00	4,338.76
Procurement						
CCA0E10	Inspect & PM Shipping Containers	16	19SEP01	16OCT01	60.00	3,185.80
Procedures						
CCA0E13	Develop Procedure	16	19SEP01	16OCT01	160.00	7,754.80
CCA0E16	Review & Resolve Comments	8	17OCT01	30OCT01	120.00	6,623.50
CCA0E19	Approve New Procedure	8	31OCT01	13NOV01	30.00	1,620.20
Training						
CCA0E22	Practice Dry Run	1	14NOV01	14NOV01	70.00	3,801.40



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging						
CCA0E25	Material Control & Accountability Work	20	19SEP01	23OCT01	120.00	5,971.20
CCA0E28	Complete Materials Management Plan Activities	12	24OCT01	13NOV01	80.00	3,980.80
Material Repackaging						
CCA0E31	Place shipping pkg in certified container at CPP	1	20NOV01	20NOV01	114.00	6,274.14
Product Shipment						
CCA0E37	Load Truck and Ship to Argonne	1	21NOV01	21NOV01	100.00	5,212.00
Transfer Negotiations Team						
Transfer Negotiations Team						
CC001	Negotiating SNM Shipments/Receipts	802	01OCT97*	26SEP01	30,720.00	2,023,158.40



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
ANL Material					
Material Repackaging					
Place shipping pkg in certified container	16	25NOV97*	21JAN98	1,402.00	75,485.48
Place shipping pkg in certified container	16	31MAR98*	20MAY98	1,402.00	75,485.48
Product Shipment					
Load Truck and Ship to Receiver	1	22JAN98	22JAN98	80.00	4,207.40
Load Truck and Ship to Receiver	1	21MAY98	21MAY98	80.00	4,207.40
Denitrator Material - Ship As Is					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	18OCT00*	17JAN01	240.00	12,806.40
Procurement					
Purchase 96 DC-1 Shipping Containers	216	04JAN01*	31JAN02	200.00	971,346.80
Inspect & PM New Shipping Container	16	21JAN02	14FEB02	80.00	4,138.60
Procedures					
Develop Procedure	32	05SEP01	30OCT01	240.00	11,057.20
Review & Resolve Comments	12	31OCT01	20NOV01	120.00	6,623.50
Approve New Procedure	12	21NOV01	12DEC01	30.00	1,620.20
Training					
Practice Dry Run	2	18FEB02	19FEB02	140.00	7,602.80
S&S Plans for Repackaging					
Material Control & Accountability Work	32	19NOV01	22JAN02	200.00	9,952.00
Request for Safe Secure Transport (SST)	1	23JAN02	23JAN02	4.00	200.56
Complete Materials Management Plan Activities	16	23JAN02	19FEB02	120.00	5,971.20
Material Repackaging					
Place shipping pkg in DC1's - (1- 7)	4	20FEB02	05MAR02	505.00	27,387.50
Place remaining containers in DC-1's (8- 280)	136	12MAR02	01JUL03	9,232.00	490,968.88
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	06MAR02	07MAR02	145.00	7,455.00
Load Truck and Ship to Receiver - (2 thru 40)	540	12MAR02	02SEP03	2,160.00	110,953.80
ANL-W Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	31MAR98	23JUN98	200.00	10,376.40
Procurement					
Inspect & PM 6 Shipping Containers	16	24JUN98	21JUL98	60.00	3,185.80
Procedures					
Develop Procedure 55 gal DOT-6M Drum	16	24JUN98	21JUL98	160.00	7,754.80
Review & Resolve Comments 55 gal DOT-6M Drum	8	22JUL98	04AUG98	110.00	6,110.70
Approve New Procedure 55 gal DOT-6M Drum	8	05AUG98	18AUG98	30.00	1,620.20
Training					
Practice Dry Run	1	19AUG98	19AUG98	70.00	3,801.40



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	20AUG97

Early Bar
Progress Bar
Critical Activity

COMP:DRY2

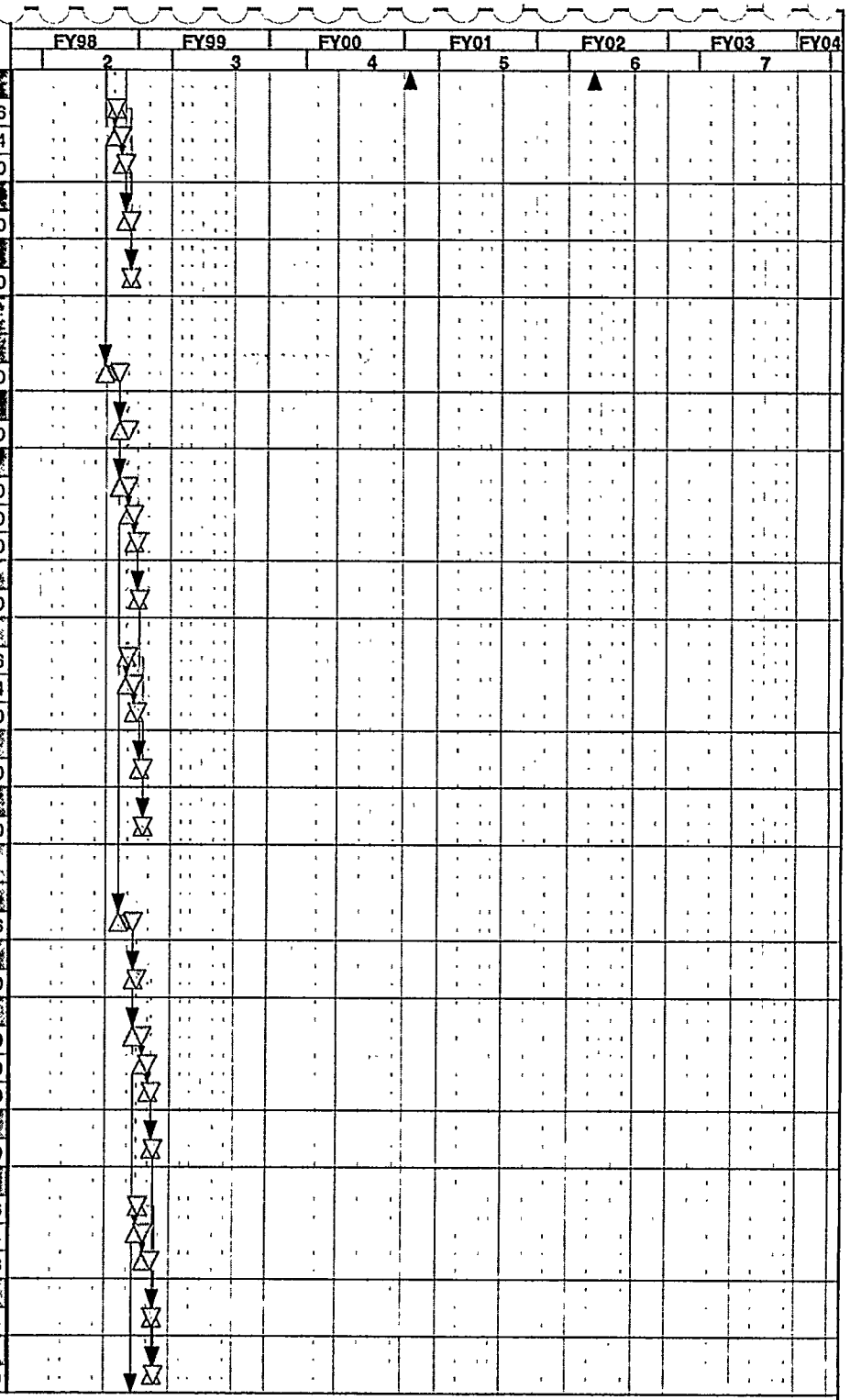
Sheet 1 of 6

LMITCO - CPP 651 MATERIALS SCHEDULE

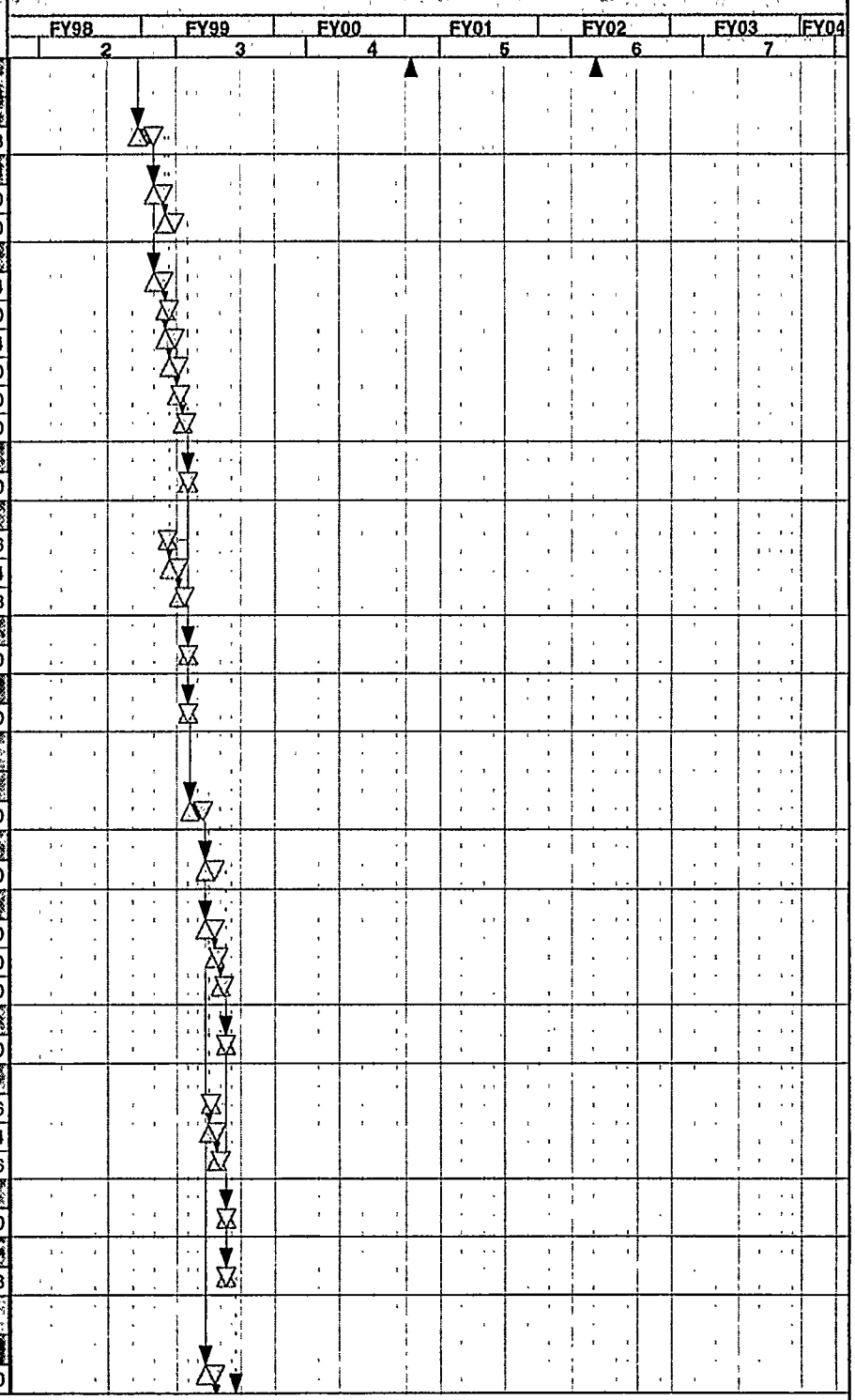
OPTION B - SHIP AS IS & TNT

Detailed Activity Schedule

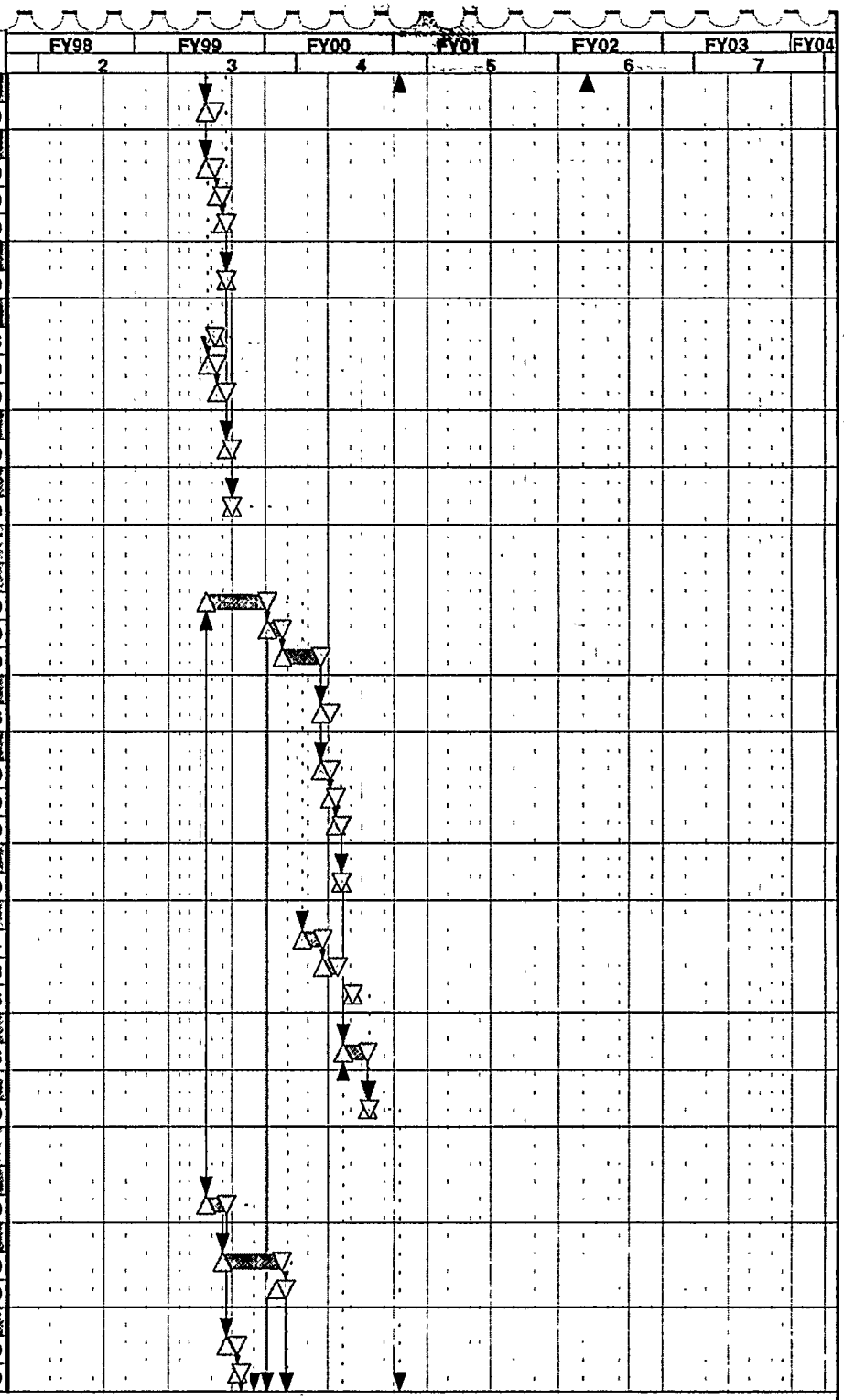
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging					
Request for Safe Transport (SST)	1	27JUL98	27JUL98	4.00	200.56
Material Control & Accountability Work	12	21JUL98	10AUG98	44.00	2,189.44
Complete Materials Management Plan Activities	8	11AUG98	24AUG98	20.00	995.20
Material Repackaging					
Place shipping pkg in certified container	5	25AUG98	08SEP98	525.00	35,675.40
Product Shipment					
Load Truck and Ship to Receiver	1	09SEP98	09SEP98	85.00	4,466.80
Custom Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	24JUN98*	04AUG98	250.00	13,076.60
Procurement					
Inspect & PM New Shipping Container	16	05AUG98	01SEP98	80.00	4,393.20
Procedures					
Develop Procedure 55 gal. DOT-6M Drum	16	05AUG98	01SEP98	160.00	7,754.80
Review & Resolve Comments 55 DOT-6M	8	02SEP98	16SEP98	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	17SEP98	30SEP98	30.00	1,620.20
Training					
Practice Dry Run	1	01OCT98	01OCT98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	31AUG98	31AUG98	4.00	200.56
Material Control & Accountability Work	12	26AUG98	16SEP98	44.00	2,189.44
Complete Materials Management Plan Activities	8	17SEP98	30SEP98	20.00	995.20
Material Repackaging					
Load Nine 55 gal. DOT-6M Shipping Containers	4	06OCT98	14OCT98	440.00	30,800.40
Product Shipment					
Load Truck and Ship to Receiver	1	15OCT98	15OCT98	105.00	5,504.40
U. of Wisconsin					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	05AUG98*	16SEP98	72.00	3,837.36
Procurement					
Inspect & PM (1) Shipping Container	8	17SEP98	30SEP98	50.00	2,673.00
Procedures					
Develop Procedure 85 gal DOT-6M	16	17SEP98	14OCT98	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M	8	15OCT98	28OCT98	110.00	6,110.70
Approve New Procedure 85 gal DOT-6M	8	29OCT98	11NOV98	30.00	1,620.20
Training					
Practice Dry Run	1	12NOV98	12NOV98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	06OCT98	06OCT98	4.00	200.56
Material Control & Accountability Work	12	01OCT98	21OCT98	24.00	1,194.24
Complete Materials Management Plan Activities	10	22OCT98	09NOV98	8.00	398.08
Material Repackaging					
Place shipping pkg in certified container	1	17NOV98	17NOV98	114.00	10,074.14
Product Shipment					
Load Truck and Ship to Receiver	1	18NOV98	18NOV98	105.00	5,504.40



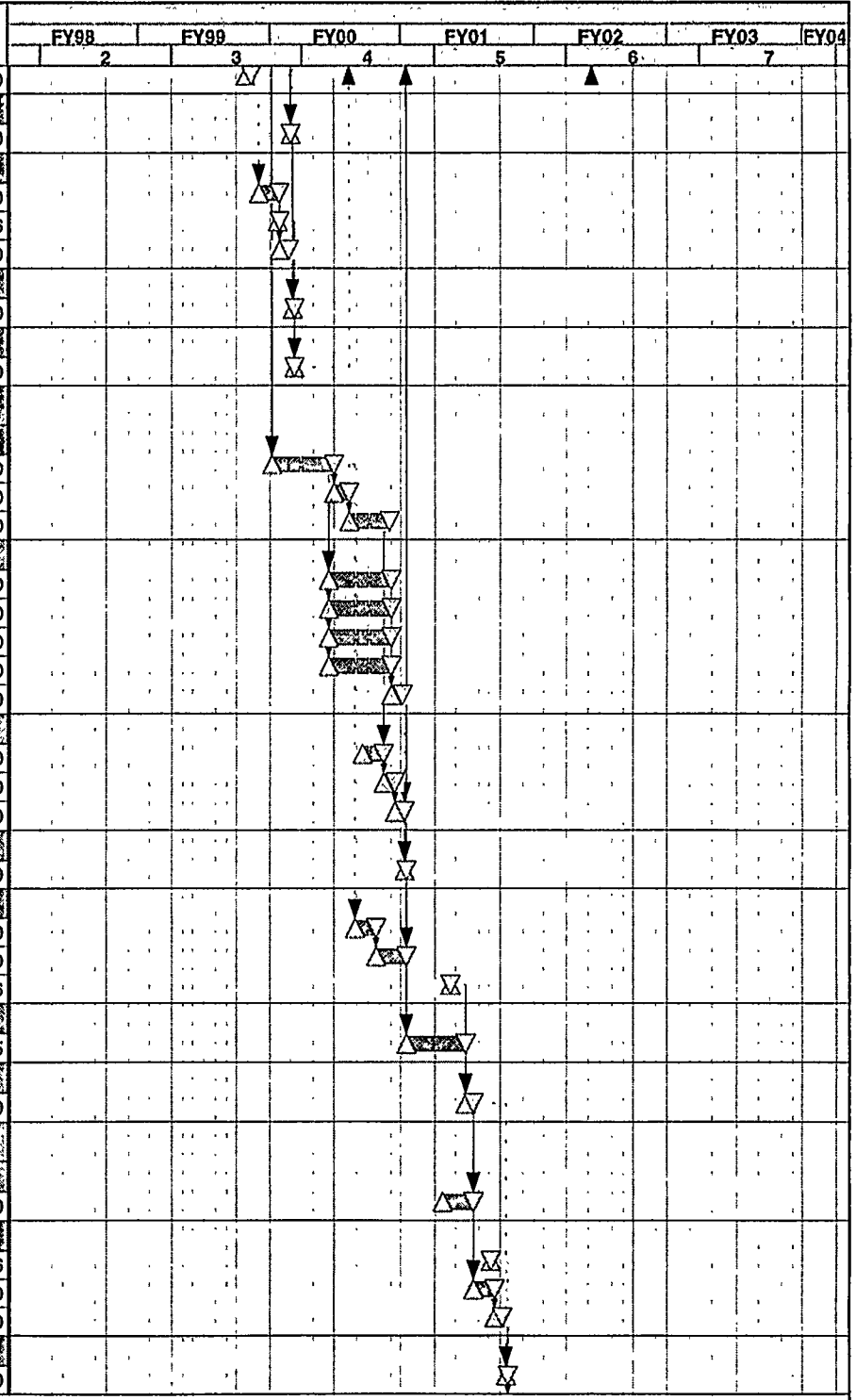
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
GEFAST Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	17SEP98*	28OCT98	68.00	3,595.88
Procurement					
Purchase One 35 gal. UN1A2 Shipping Container	16	29OCT98*	25NOV98	10.00	853.70
Inspect & PM Shipping Containers	16	30NOV98	24DEC98	60.00	3,185.80
Procedures					
Develop Procedure 35 gal DOT UN1A2 Shipping Pkg.	16	29OCT98	25NOV98	128.00	6,433.84
Review & Resolve Comments UN1A2 Pkg.	8	30NOV98	10DEC98	110.00	6,110.70
Develop Procedure 55 gal. DOT-6M Drum	16	30NOV98	24DEC98	128.00	6,433.84
Approve New Procedure UN1A2 Pkg.	11	14DEC98	06JAN99	30.00	1,620.20
Review & Resolve Comments 55 DOT-6M	8	04JAN99	14JAN99	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	18JAN99	28JAN99	30.00	1,620.20
Training					
Practice Dry Run	1	01FEB99	01FEB99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	08DEC98	08DEC98	4.00	200.56
Material Control & Accountability Work	12	10DEC98	06JAN99	14.00	696.64
Complete Materials Management Plan Activities	8	07JAN99	20JAN99	8.00	398.08
Material Repackaging					
Load 5 Containers in 5 DOT Shipping Containers	2	02FEB99	03FEB99	220.00	16,850.20
Product Shipment					
Load Truck and Ship to Receiver	1	04FEB99	04FEB99	105.00	5,504.40
U. of Washington					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	08FEB99*	18MAR99	100.00	5,188.20
Procurement					
Inspect & PM Shipping Container	16	22MAR99	15APR99	40.00	2,196.60
Procedures					
Develop Procedure	16	22MAR99	15APR99	160.00	7,754.80
Review & Resolve Comments	8	19APR99	29APR99	110.00	6,110.70
Approve New Procedure	8	03MAY99	13MAY99	30.00	1,620.20
Training					
Practice Dry Run	1	17MAY99	17MAY99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	06APR99	06APR99	4.00	200.56
Material Control & Accountability Work	12	31MAR99	20APR99	24.00	1,194.24
Complete Materials Management Plan Activities	8	21APR99	04MAY99	16.00	796.16
Material Repackaging					
Place shipping pkg in certified container	1	18MAY99	18MAY99	110.00	5,791.80
Product Shipment					
Load Truck and Ship to Receiver	1	19MAY99	19MAY99	108.00	5,653.68
Rocky Flats Material - Ship As Is					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	16	22MAR99*	15APR99	80.00	4,200.60



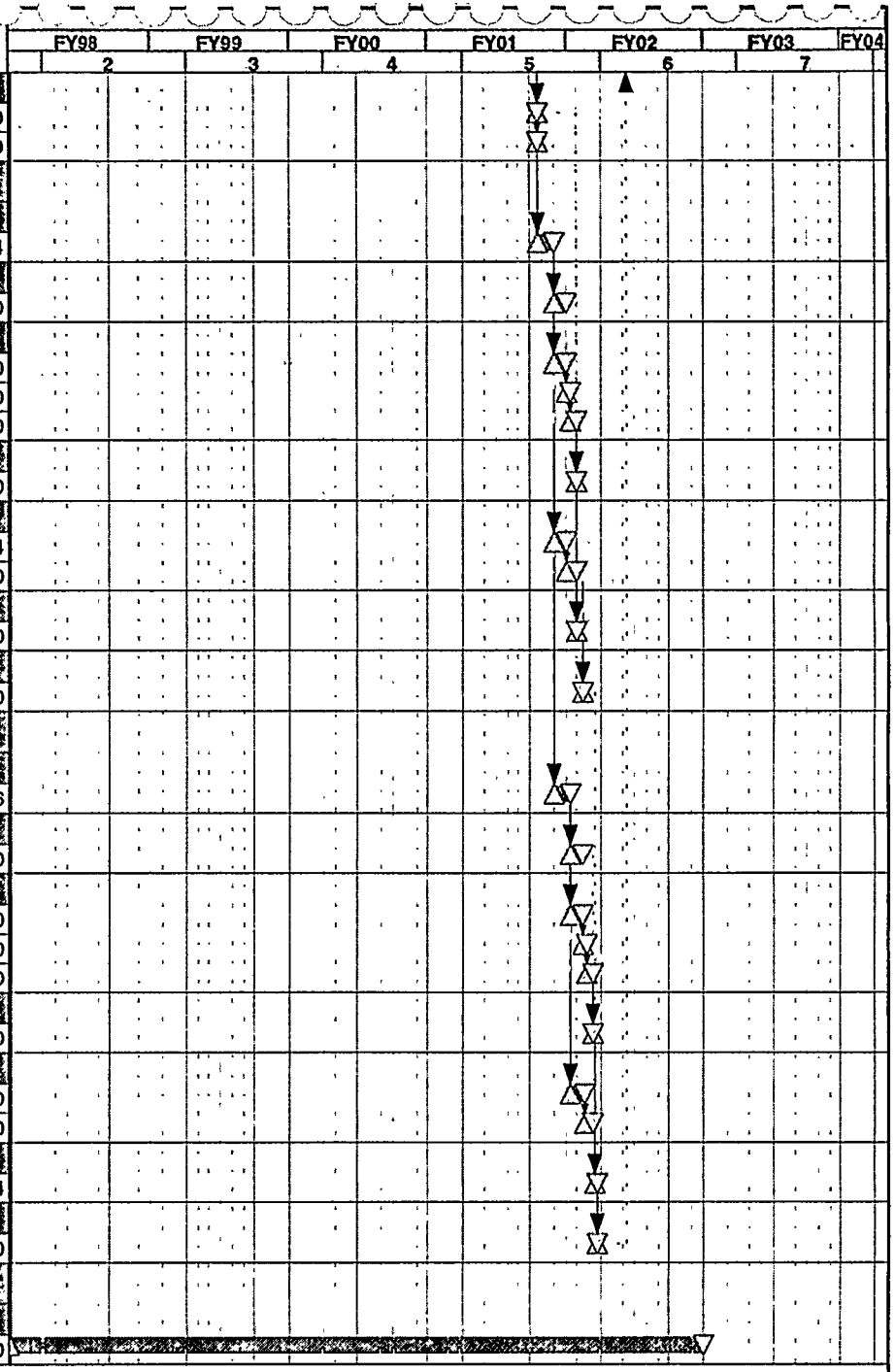
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Procurement					
Inspect & PM Shipping Container	16	19APR99	13MAY99	60.00	3,185.80
Procedures					
Develop Procedure	16	19APR99	13MAY99	160.00	7,754.80
Review & Resolve Comments	8	17MAY99	31MAY99	120.00	6,623.50
Approve New Procedure	8	01JUN99	14JUN99	30.00	1,620.20
Training					
Practice Dry Run	1	15JUN99	15JUN99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	13MAY99	13MAY99	4.00	200.56
Material Control & Accountability Work	16	21APR99	18MAY99	160.00	7,961.60
Complete Materials Management Plan Activities	15	19MAY99	15JUN99	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	4	16JUN99	29JUN99	360.00	19,487.90
Product Shipment					
Load Truck and Ship to Receiver	1	30JUN99	30JUN99	90.00	4,715.60
PWR Material					
Project Definition					
Characterize Material to Meet Customer Req.	96	19APR99*	05OCT99	240.00	12,578.80
Evaluate & Develop Customer Receiving Criteria	24	06OCT99*	16NOV99	100.00	4,976.00
Design/Fabricate 44 Aluminum Shipping Cans	60	17NOV99*	08MAR00	520.00	29,586.40
Procurement					
Inspect & PM Shipping Containers	16	09MAR00	05APR00	116.00	5,955.56
Procedures					
Develop Procedure	16	09MAR00	05APR00	160.00	7,754.80
Review & Resolve Comments	8	06APR00	19APR00	110.00	6,110.70
Approve New Procedure	8	20APR00	03MAY00	30.00	1,620.20
Training					
Practice Dry Run	1	04MAY00	04MAY00	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	18JAN00	13MAR00	74.00	3,682.24
Complete Materials Management Plan Activities	24	14MAR00	24APR00	28.00	1,393.28
Request for Safe Secure Transport (SST)	1	06JUN00	06JUN00	4.00	200.56
Material Repackaging					
Place shipping pkg in certified container	22	09MAY00	19JUL00	1,724.00	90,717.36
Product Shipment					
Load Truck and Ship to Receiver	4	20JUL00	23JUL00	270.00	13,952.00
PWR (1 full assembly)					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	32	19APR99*	14JUN99	180.00	9,396.40
Procurement					
Obtain Certification of Shipping Container	96	01JUN99*	16NOV99	60.00	8,440.40
Inspect & PM Shipping Container	16	03NOV99	01DEC99	60.00	3,185.80
Procedures					
Develop Procedure	16	15JUN99	12JUL99	160.00	7,754.80
Review & Resolve Comments	8	13JUL99	26JUL99	110.00	6,110.70



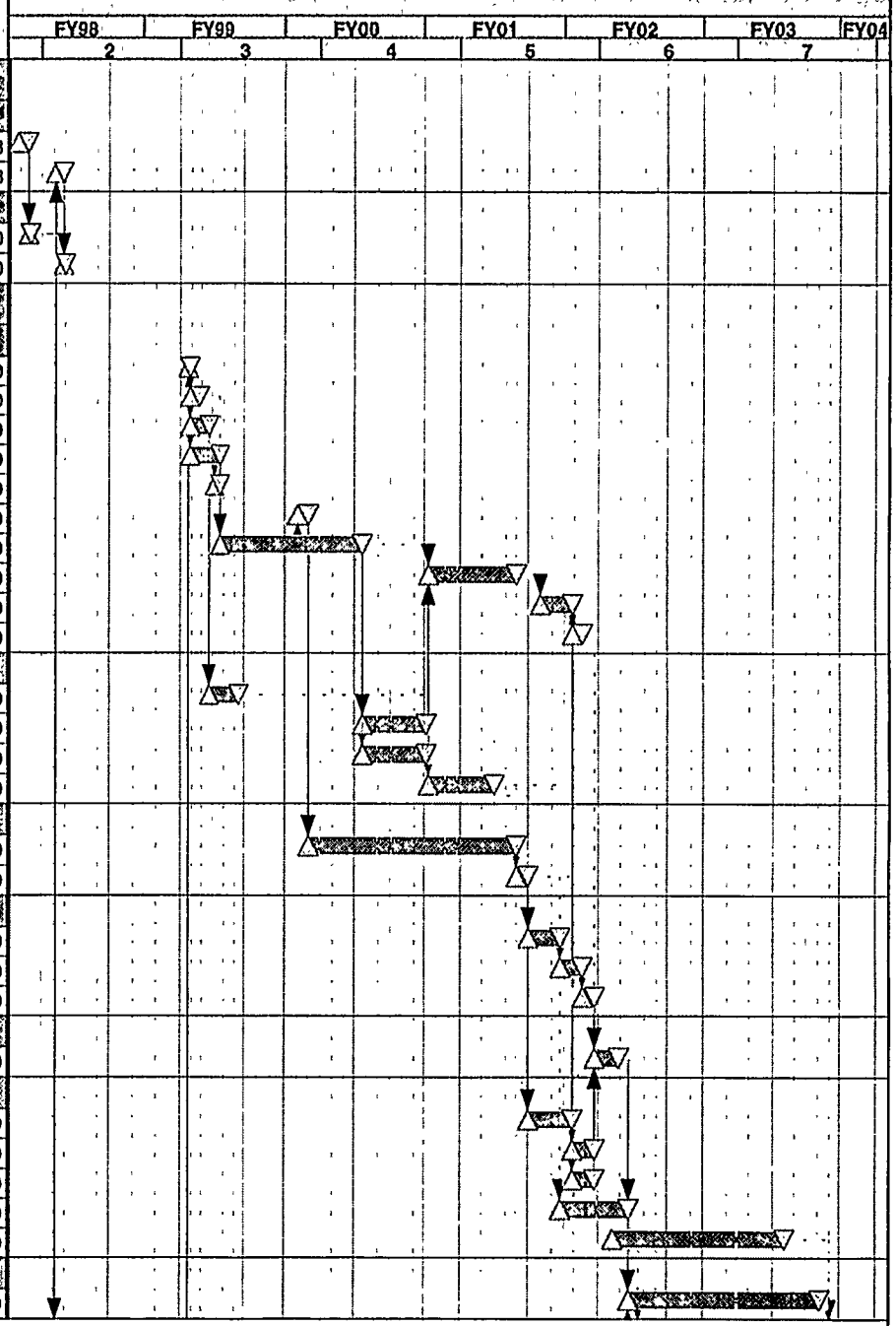
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Approve New Procedure	8	27JUL99	09AUG99	30.00	1,620.20
Training					
Practice Dry Run	1	01DEC99	01DEC99	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	31AUG99	26OCT99	120.00	5,971.20
Request for Safe Secure Transport (SST)	1	26OCT99	26OCT99	4.00	200.56
Complete Materials Management Plan Activities	16	27OCT99	23NOV99	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	2	07DEC99	08DEC99	190.00	10,087.00
Product Shipment					
Load Truck and Ship to Receiver	1	09DEC99	09DEC99	110.00	5,753.20
Fluorinel Material					
Project Definition					
Characterize Material to Meet Customer Req.	96	06OCT99*	29MAR00	260.00	13,581.60
Evaluate & Develop Customer Receiving Criteria	24	30MAR00*	10MAY00	140.00	7,186.20
Design/Fabricate Aluminum Shipping Cans	60	11MAY00	28AUG00	520.00	29,586.40
Procurement					
Purchase Twenty-one 110 gal, DOT-6M Drums - 72"	96	16MAR00*	05SEP00	180.00	40,139.40
Purchase Five 110 gal, DOT-6M Drums 58"	96	16MAR00*	05SEP00	180.00	16,139.40
Purchase Four 55 gal, DOT-6M Drums 23"	96	16MAR00*	05SEP00	180.00	13,339.40
Purchase Sixty 85 gal, DOT-6M Drums 43"	96	16MAR00*	05SEP00	180.00	70,139.40
Inspect & PM New Shipping Containers	16	06SEP00	03OCT00	160.00	8,277.20
Procedures					
Develop Procedures - all Drums	32	19JUN00	14AUG00	320.00	15,509.60
Review & Resolve Comments - all drums	16	15AUG00	12SEP00	200.00	11,208.60
Approve New Procedures - all drums	16	13SEP00	10OCT00	60.00	3,240.40
Training					
Practice Dry Run	4	11OCT00	17OCT00	280.00	15,205.60
S&S Plans for Repackaging					
Material Control & Accountability Work	32	25MAY00	24JUL00	120.00	5,971.20
Complete Materials Management Plan Activities	48	25JUL00	17OCT00	80.00	3,980.80
Request for Safe Secure Transport (SST)	1	13FEB01	13FEB01	4.00	200.56
Material Repackaging					
Place shipping pkg in certified container	45	18OCT00	28MAR01	4,090.00	219,794.05
Product Shipment					
Load Truck and Ship to Receiver	20	29MAR01	17APR01	1,400.00	72,248.00
VYCOR Glass Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	24JAN01	17APR01	130.00	6,897.00
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	05JUN01	05JUN01	4.00	200.56
Material Control & Accountability Work	32	18APR01	13JUN01	120.00	5,971.20
Complete Materials Management Plan Activities	12	14JUN01	05JUL01	80.00	3,980.80
Material Repackaging					
Safeguards Inventory of Material	2	18JUL01	19JUL01	220.00	12,150.20



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Product Shipment					
Load Truck and Ship to Receiver	1	20JUL01	20JUL01	80.00	4,196.80
Processing Costs at Argonne Lab.	1	21JUL01	21JUL01	0.00	545,405.00
Janus Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	23JUL01*	30AUG01	134.00	7,092.24
Procurement					
Inspect & PM Shipping Containers	16	04SEP01	01OCT01	60.00	3,185.80
Procedures					
Develop Procedure 85 gal DOT-6M Drum	16	04SEP01	01OCT01	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M Drum	8	02OCT01	15OCT01	120.00	6,623.50
Approve New Procedure 85 gal DOT-6M Drum	8	16OCT01	29OCT01	30.00	1,620.20
Training					
Practice Dry Run	1	30OCT01	30OCT01	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	16	04SEP01	01OCT01	44.00	2,189.44
Complete Materials Management Plan Activities	16	02OCT01	29OCT01	40.00	1,990.40
Material Repackaging					
Place shipping pkg in certified container	1	31OCT01	31OCT01	110.00	6,075.10
Product Shipment					
Load Truck and Ship to Receiver	1	13NOV01	13NOV01	115.00	6,002.00
ANL-E Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	04SEP01*	15OCT01	82.00	4,338.76
Procurement					
Inspect & PM Shipping Containers	16	16OCT01	12NOV01	60.00	3,185.80
Procedures					
Develop Procedure	16	16OCT01	12NOV01	160.00	7,754.80
Review & Resolve Comments	8	13NOV01	26NOV01	120.00	6,623.50
Approve New Procedure	8	27NOV01	11DEC01	30.00	1,620.20
Training					
Practice Dry Run	1	12DEC01	12DEC01	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	20	16OCT01	19NOV01	120.00	5,971.20
Complete Materials Management Plan Activities	12	20NOV01	11DEC01	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container at CPP	1	18DEC01	18DEC01	114.00	6,274.14
Product Shipment					
Load Truck and Ship to Argonne	1	19DEC01	19DEC01	100.00	5,212.00
Transfer Negotiations Team					
Transfer Negotiations Team					
Negotiating SNM Shipments/Receipts	1,003	01OCT97*	30SEP02	38,400.00	2,528,448.00



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
ANL Material					
Material Repackaging					
Place shipping pkg in certified container	16	28OCT97*	24NOV97	1,402.00	75,485.48
Place shipping pkg in certified container	16	02FEB98*	26FEB98	1,402.00	75,485.48
Product Shipment					
Load Truck and Ship to Receiver	1	25NOV97	25NOV97	80.00	4,207.40
Load Truck and Ship to Receiver	1	27FEB98	27FEB98	80.00	4,207.40
Denitrator Material - Dry Blending					
Project Definition					
Conduct Value Engineering Sessions	2	21JAN99*	25JAN99	280.00	14,200.00
Identify On-site Representative	16	26JAN99*	22FEB99	20.00	900.00
Obtain Characterization Data (product & depleted	32	26JAN99	22MAR99	120.00	5,800.00
Obtain Written Agreements as required (DOE, etc)	48	26JAN99*	19APR99	60.00	2,700.00
Obtain Peer Reviews & Approvals of Concepts	8	06APR99	19APR99	560.00	28,400.00
Provide Input to SAR NEPA, Operating Permits	16	02NOV99*	30NOV99	160.00	8,800.00
Develop Design Process Drawings (Title I & II)	201	20APR99	17APR00	80.00	254,000.00
Construction, Testing and Startup at U. of Utah	128	09OCT00	29MAY01	80.00	254,000.00
Install New Equipment in CPP-651	48	30JUL01	22OCT01	80.00	254,000.00
Inspection, Testing & Startup of New Equipment	16	23OCT01	19NOV01	80.00	54,000.00
Procurement					
Purchase Perma-Con Structure	48	23MAR99*	15JUN99	40.00	152,000.00
Purchase Process Equipment	96	18APR00*	05OCT00	40.00	752,000.00
Purchase Support Systems	96	18APR00*	05OCT00	40.00	202,000.00
Purchase 600 Drums - 110 gal DOT-6M Containers	96	09OCT00*	02APR01	40.00	702,000.00
ES&H Documentation (SAR NEPA Permits)					
Develop SAR/CSE	300	01DEC99	30MAY01	2,690.00	200,354.10
Final Review & Approval of SAR	16	31MAY01*	27JUN01	1,120.00	56,800.00
Procedures					
Develop Procedure	48	28JUN01	24SEP01	280.00	13,400.00
Review & Resolve Comments	32	25SEP01	19NOV01	170.00	8,300.00
Approve New Procedure	16	20NOV01	18DEC01	50.00	2,600.00
Training					
Practice Dry Run	32	19DEC01	20FEB02	960.00	46,400.00
S&S Plans for Repackaging					
Define Security Requirements & Modify Equipment	64	28JUN01	22OCT01	180.00	8,796.00
Identify MC&A Requirements - Sampling Plan	32	23OCT01	18DEC01	320.00	15,200.00
Develop Security Procedures & Implemt. Plans	32	23OCT01	18DEC01	240.00	11,200.00
Complete RA & Obtain Approval to Operate	96	25SEP01	20MAR02	1,920.00	97,909.20
Request for Safe Secure Transport (SST)	250	06FEB02	05MAY03	495.00	24,819.30
Material Repackaging					
Facility Operations - Dry Blending	278	21MAR02	06AUG03	24,558.00	1,249,203.00



oject Start	01JUL97
oject Finish	05MAR10
ta Date	01OCT97
n Date	20AUG97

Early Bar
Progress Bar
Critical Activity

COMP:DRY3

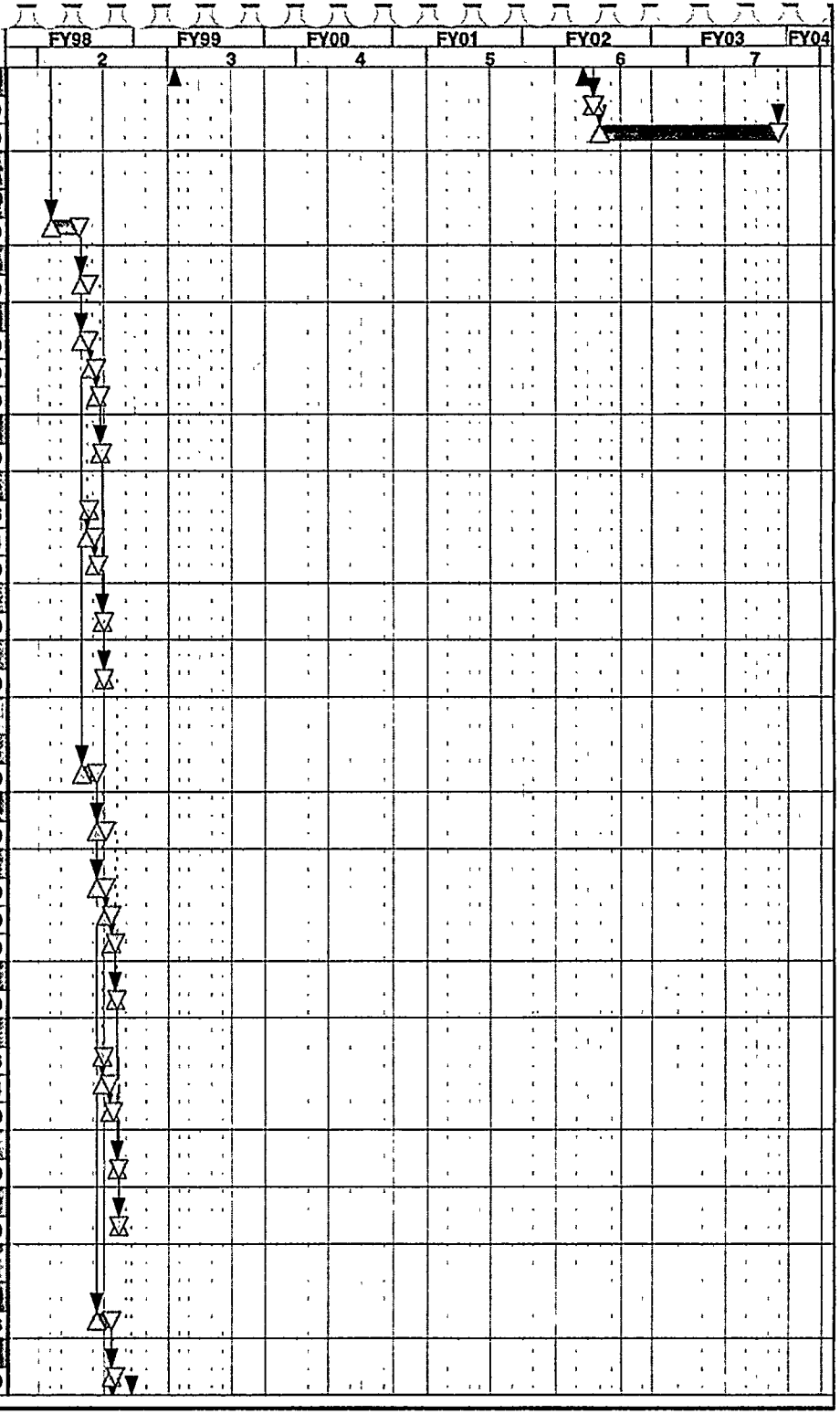
Sheet 1 of 7

LMITCO - CPP 651 MATERIALS SCHEDULE

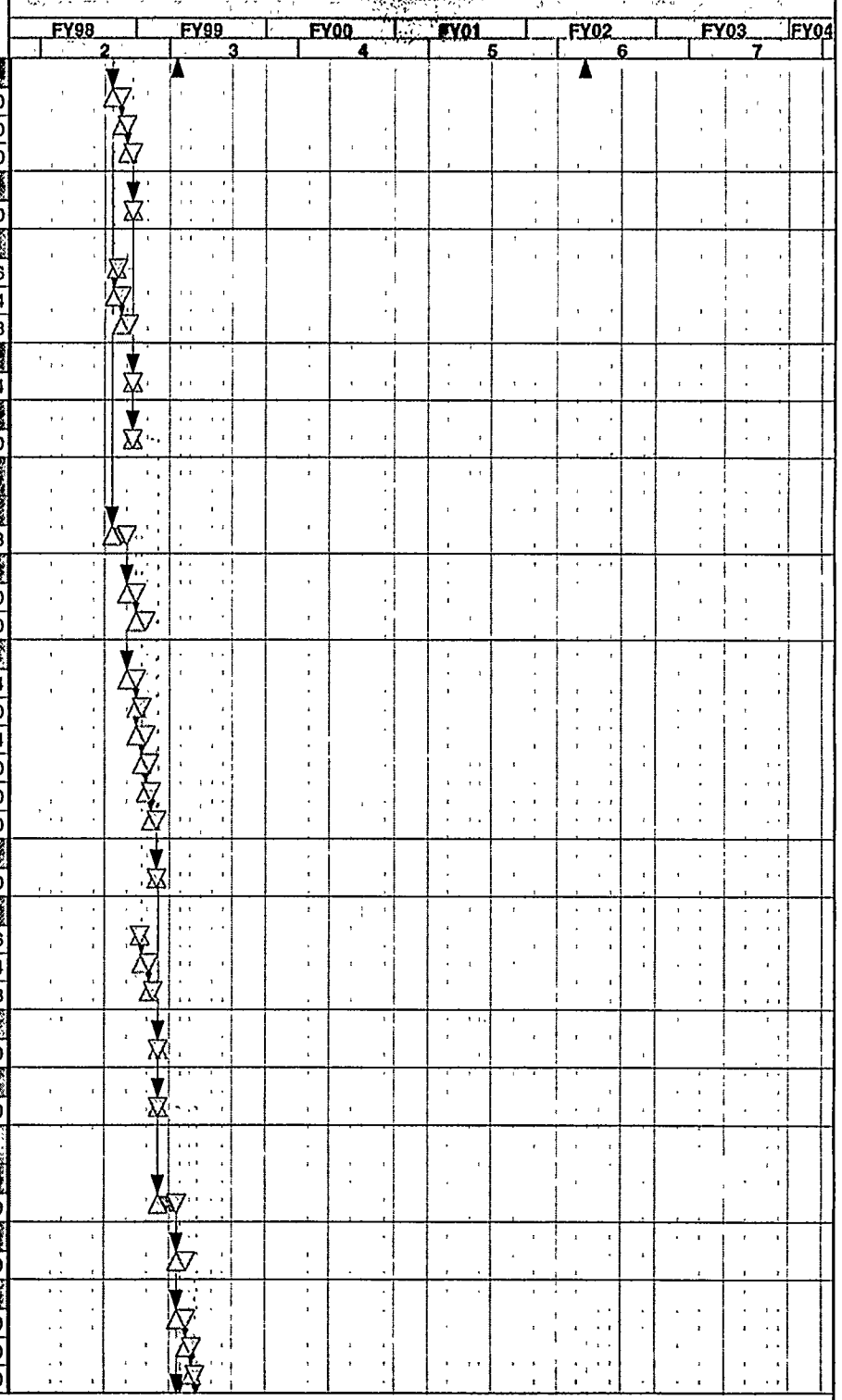
OPTION C -BASE CASE & TNT & OPS CREW

Detailed Activity Schedule

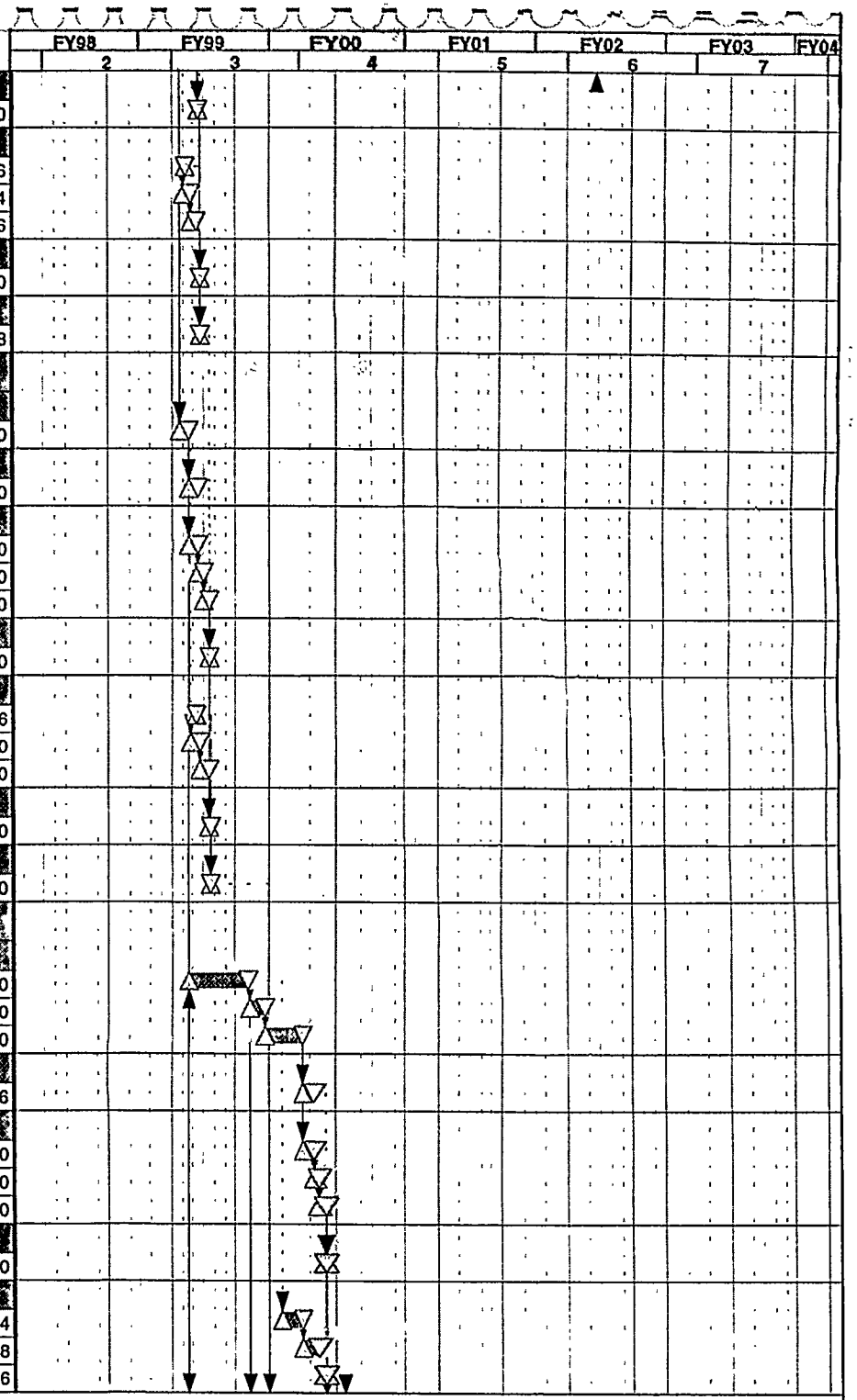
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	16APR02	17APR02	165.00	7,825.00
Load Truck and Ship to Receiver - (2 thru 23)	490	02MAY02	03SEP03	3,630.00	174,310.40
ANL-W Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	02FEB98	23APR98	200.00	10,376.40
Procurement					
Inspect & PM 6 Shipping Containers	16	27APR98	21MAY98	60.00	3,185.80
Procedures					
Develop Procedure 55 gal DOT-6M Drum	16	27APR98	21MAY98	160.00	7,754.80
Review & Resolve Comments 55 gal DOT-6M Drum	8	26MAY98	08JUN98	110.00	6,110.70
Approve New Procedure 55 gal DOT-6M Drum	8	09JUN98	22JUN98	30.00	1,620.20
Training					
Practice Dry Run	1	23JUN98	23JUN98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Transport (SST)	1	19MAY98	19MAY98	4.00	200.56
Material Control & Accountability Work	12	13MAY98	03JUN98	44.00	2,189.44
Complete Materials Management Plan Activities	8	04JUN98	17JUN98	20.00	995.20
Material Repackaging					
Place shipping pkg in certified container	5	24JUN98	01JUL98	525.00	35,675.40
Product Shipment					
Load Truck and Ship to Receiver	1	02JUL98	02JUL98	85.00	4,466.80
Custom Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	27APR98*	08JUN98	250.00	13,076.60
Procurement					
Inspect & PM New Shipping Container	16	09JUN98	06JUL98	80.00	4,393.20
Procedures					
Develop Procedure 55 gal. DOT-6M Drum	16	09JUN98	06JUL98	160.00	7,754.80
Review & Resolve Comments 55 DOT-6M	8	07JUL98	20JUL98	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	21JUL98	03AUG98	30.00	1,620.20
Training					
Practice Dry Run	1	04AUG98	04AUG98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	29JUN98	29JUN98	4.00	200.56
Material Control & Accountability Work	12	24JUN98	14JUL98	44.00	2,189.44
Complete Materials Management Plan Activities	8	15JUL98	28JUL98	20.00	995.20
Material Repackaging					
Load Nine 55 gal. DOT-6M Shipping Containers	4	05AUG98	11AUG98	440.00	30,800.40
Product Shipment					
Load Truck and Ship to Receiver	1	12AUG98	12AUG98	105.00	5,504.40
U. of Wisconsin					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	09JUN98*	20JUL98	72.00	3,837.36
Procurement					
Inspect & PM (1) Shipping Container	8	21JUL98	03AUG98	50.00	2,673.00



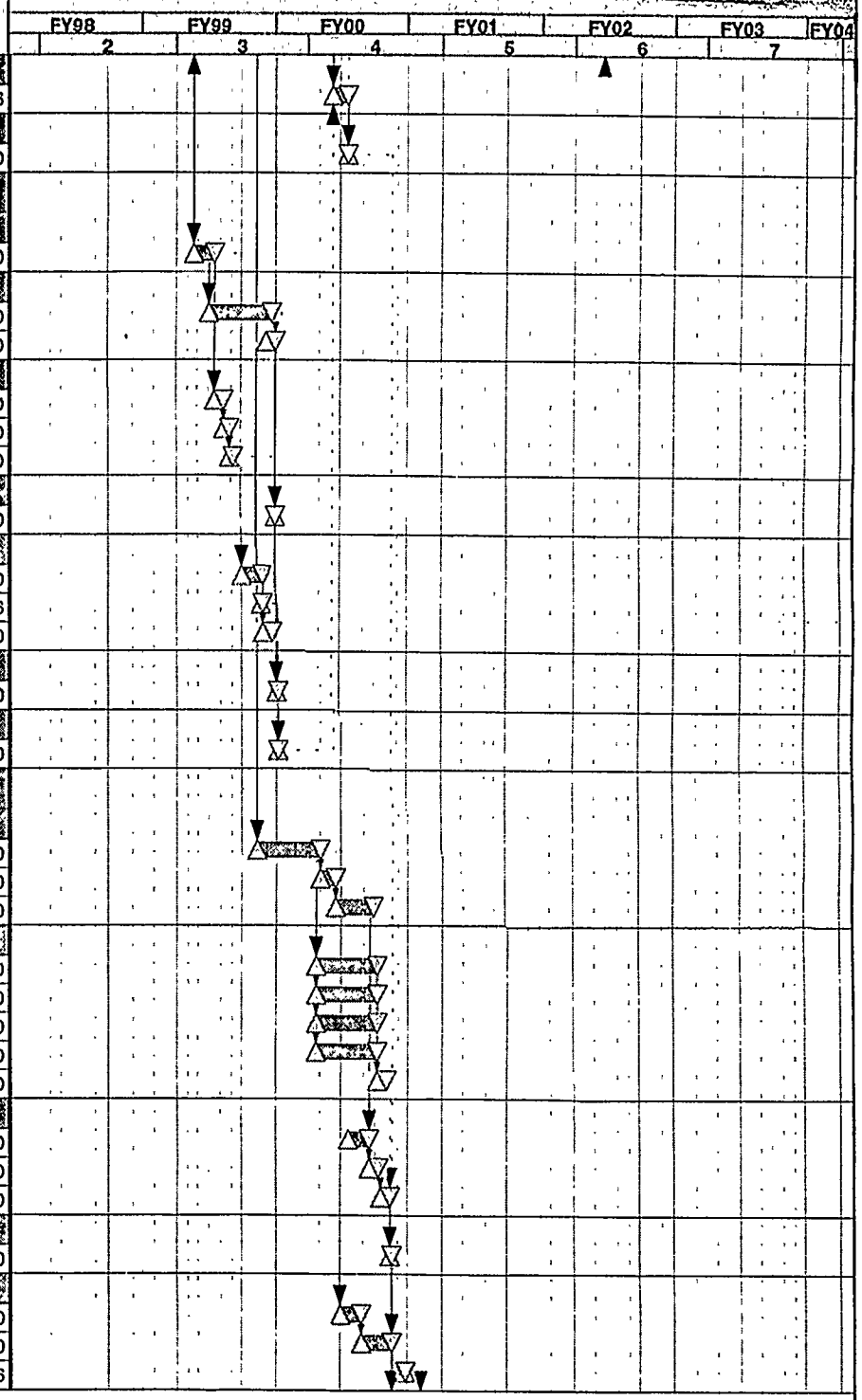
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Procedures					
Develop Procedure 85 gal DOT-6M	16	21JUL98	17AUG98	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M	8	18AUG98	31AUG98	110.00	6,110.70
Approve New Procedure 85 gal DOT-6M	8	01SEP98	15SEP98	30.00	1,620.20
Training					
Practice Dry Run	1	16SEP98	16SEP98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	04AUG98	04AUG98	4.00	200.56
Material Control & Accountability Work	12	30JUL98	19AUG98	24.00	1,194.24
Complete Materials Management Plan Activities	10	20AUG98	08SEP98	8.00	398.08
Material Repackaging					
Place shipping pkg in certified container	1	16SEP98	16SEP98	114.00	10,074.14
Product Shipment					
Load Truck and Ship to Receiver	1	17SEP98	17SEP98	105.00	5,504.40
GEFAST Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	21JUL98*	31AUG98	68.00	3,595.88
Procurement					
Purchase One 35 gal. UN1A2 Shipping Container	16	01SEP98*	29SEP98	10.00	853.70
Inspect & PM Shipping Containers	16	30SEP98	27OCT98	60.00	3,185.80
Procedures					
Develop Procedure 35 gal DOT UN1A2 Shipping Pkg.	16	01SEP98	29SEP98	128.00	6,433.84
Review & Resolve Comments UN1A2 Pkg.	8	30SEP98	13OCT98	110.00	6,110.70
Develop Procedure 55 gal. DOT-6M Drum	16	30SEP98	27OCT98	128.00	6,433.84
Approve New Procedure UN1A2 Pkg.	11	14OCT98	02NOV98	30.00	1,620.20
Review & Resolve Comments 55 DOT-6M	8	28OCT98	10NOV98	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	11NOV98	24NOV98	30.00	1,620.20
Training					
Practice Dry Run	1	25NOV98	25NOV98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	08OCT98	08OCT98	4.00	200.56
Material Control & Accountability Work	12	13OCT98	02NOV98	14.00	696.64
Complete Materials Management Plan Activities	8	03NOV98	16NOV98	8.00	398.08
Material Repackaging					
Load 5 Containers in 5 DOT Shipping Containers	2	30NOV98	01DEC98	220.00	16,850.20
Product Shipment					
Load Truck and Ship to Receiver	1	02DEC98	02DEC98	105.00	5,504.40
U. of Washington					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	03DEC98*	20JAN99	100.00	5,188.20
Procurement					
Inspect & PM Shipping Container	16	21JAN99	17FEB99	40.00	2,196.60
Procedures					
Develop Procedure	16	21JAN99	17FEB99	160.00	7,754.80
Review & Resolve Comments	8	18FEB99	03MAR99	110.00	6,110.70
Approve New Procedure	8	04MAR99	17MAR99	30.00	1,620.20



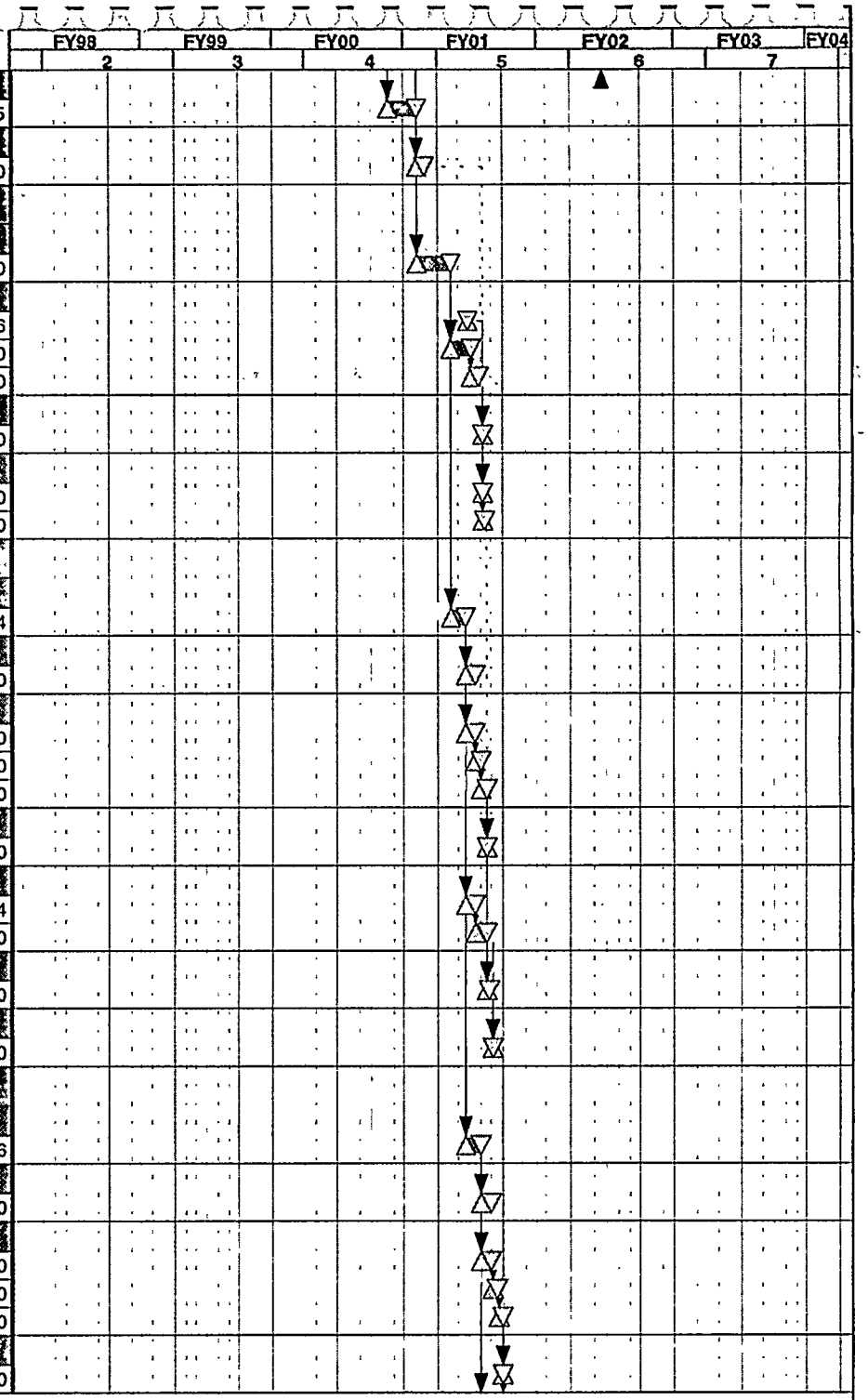
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Training					
Practice Dry Run	1	18MAR99	18MAR99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	08FEB99	08FEB99	4.00	200.56
Material Control & Accountability Work	12	02FEB99	22FEB99	24.00	1,194.24
Complete Materials Management Plan Activities	8	23FEB99	08MAR99	16.00	796.16
Material Repackaging					
Place shipping pkg in certified container	1	22MAR99	22MAR99	110.00	5,791.80
Product Shipment					
Load Truck and Ship to Receiver	1	23MAR99	23MAR99	108.00	5,653.68
Rocky Flats Material - Ship As Is					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	16	21JAN99*	17FEB99	80.00	4,200.60
Procurement					
Inspect & PM Shipping Container	16	18FEB99	17MAR99	60.00	3,185.80
Procedures					
Develop Procedure	16	18FEB99	17MAR99	160.00	7,754.80
Review & Resolve Comments	8	18MAR99	31MAR99	120.00	6,623.50
Approve New Procedure	8	01APR99	14APR99	30.00	1,620.20
Training					
Practice Dry Run	1	15APR99	15APR99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	10MAR99	10MAR99	4.00	200.56
Material Control & Accountability Work	16	23FEB99	22MAR99	160.00	7,961.60
Complete Materials Management Plan Activities	15	23MAR99	15APR99	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	4	19APR99	22APR99	360.00	19,487.90
Product Shipment					
Load Truck and Ship to Receiver	1	23APR99	23APR99	90.00	4,715.60
PWR Material					
Project Definition					
Characterize Material to Meet Customer Req.	96	18FEB99*	05AUG99	240.00	12,578.80
Evaluate & Develop Customer Receiving Criteria	24	09AUG99*	20SEP99	100.00	4,976.00
Design/Fabricate 44 Aluminum Shipping Cans	60	21SEP99*	11JAN00	520.00	29,586.40
Procurement					
Inspect & PM Shipping Containers	16	12JAN00	08FEB00	116.00	5,955.56
Procedures					
Develop Procedure	16	12JAN00	08FEB00	160.00	7,754.80
Review & Resolve Comments	8	09FEB00	22FEB00	110.00	6,110.70
Approve New Procedure	8	23FEB00	07MAR00	30.00	1,620.20
Training					
Practice Dry Run	1	08MAR00	08MAR00	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	10NOV99	12JAN00	74.00	3,682.24
Complete Materials Management Plan Activities	24	13JAN00	23FEB00	28.00	1,393.28
Request for Safe Secure Transport (SST)	1	08MAR00	08MAR00	4.00	200.56



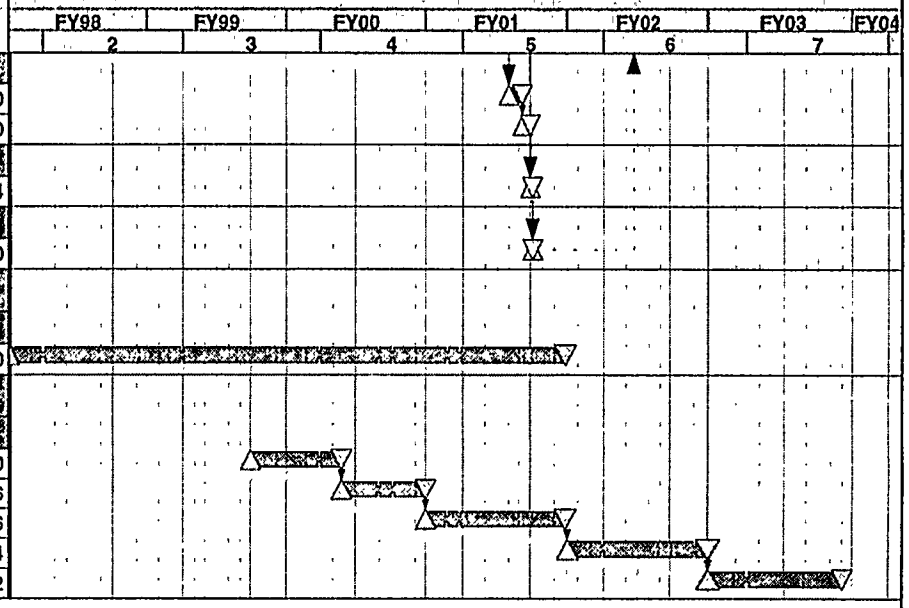
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Material Repackaging					
Place shipping pkg in certified container	22	09MAR00	17APR00	1,724.00	90,717.36
Product Shipment					
Load Truck and Ship to Receiver	4	18APR00	21APR00	270.00	13,952.00
PWR (1 full assembly)					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	32	18FEB99*	14APR99	180.00	9,396.40
Procurement					
Obtain Certification of Shipping Container	96	01APR99*	20SEP99	60.00	8,440.40
Inspect & PM Shipping Container	16	07SEP99	04OCT99	60.00	3,185.80
Procedures					
Develop Procedure	16	15APR99	12MAY99	160.00	7,754.80
Review & Resolve Comments	8	13MAY99	27MAY99	110.00	6,110.70
Approve New Procedure	8	31MAY99	10JUN99	30.00	1,620.20
Training					
Practice Dry Run	1	04OCT99	04OCT99	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	30JUN99	24AUG99	120.00	5,971.20
Request for Safe Secure Transport (SST)	1	24AUG99	24AUG99	4.00	200.56
Complete Materials Management Plan Activities	16	25AUG99	22SEP99	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	2	05OCT99	06OCT99	190.00	10,087.00
Product Shipment					
Load Truck and Ship to Receiver	1	07OCT99	07OCT99	110.00	5,753.20
Fluorinel Material					
Project Definition					
Characterize Material to Meet Customer Req.	96	09AUG99	01FEB00	260.00	13,581.60
Evaluate & Develop Customer Receiving Criteria	24	02FEB00*	14MAR00	140.00	7,186.20
Design/Fabricate Aluminum Shipping Cans	60	15MAR00	28JUN00	520.00	29,586.40
Procurement					
Purchase Twenty-one 110 gal, DOT-6M Drums - 72"	96	19JAN00*	06JUL00	180.00	40,139.40
Purchase Five 110 gal, DOT-6M Drums 58"	96	19JAN00*	06JUL00	180.00	16,139.40
Purchase Four 55 gal, DOT-6M Drums 23"	96	19JAN00*	06JUL00	180.00	13,339.40
Purchase Sixty 85 gal, DOT-6M Drums 43"	96	19JAN00*	06JUL00	180.00	70,139.40
Inspect & PM New Shipping Containers	16	10JUL00	03AUG00	160.00	8,277.20
Procedures					
Develop Procedures - all Drums	32	19APR00	14JUN00	320.00	15,509.60
Review & Resolve Comments - all drums	16	15JUN00	13JUL00	200.00	11,208.60
Approve New Procedures - all drums	16	17JUL00	10AUG00	60.00	3,240.40
Training					
Practice Dry Run	4	14AUG00	17AUG00	280.00	15,205.60
S&S Plans for Repackaging					
Material Control & Accountability Work	32	29MAR00	23MAY00	120.00	5,971.20
Complete Materials Management Plan Activities	48	24MAY00	17AUG00	80.00	3,980.80
Request for Safe Secure Transport (SST)	1	25SEP00	25SEP00	4.00	200.56



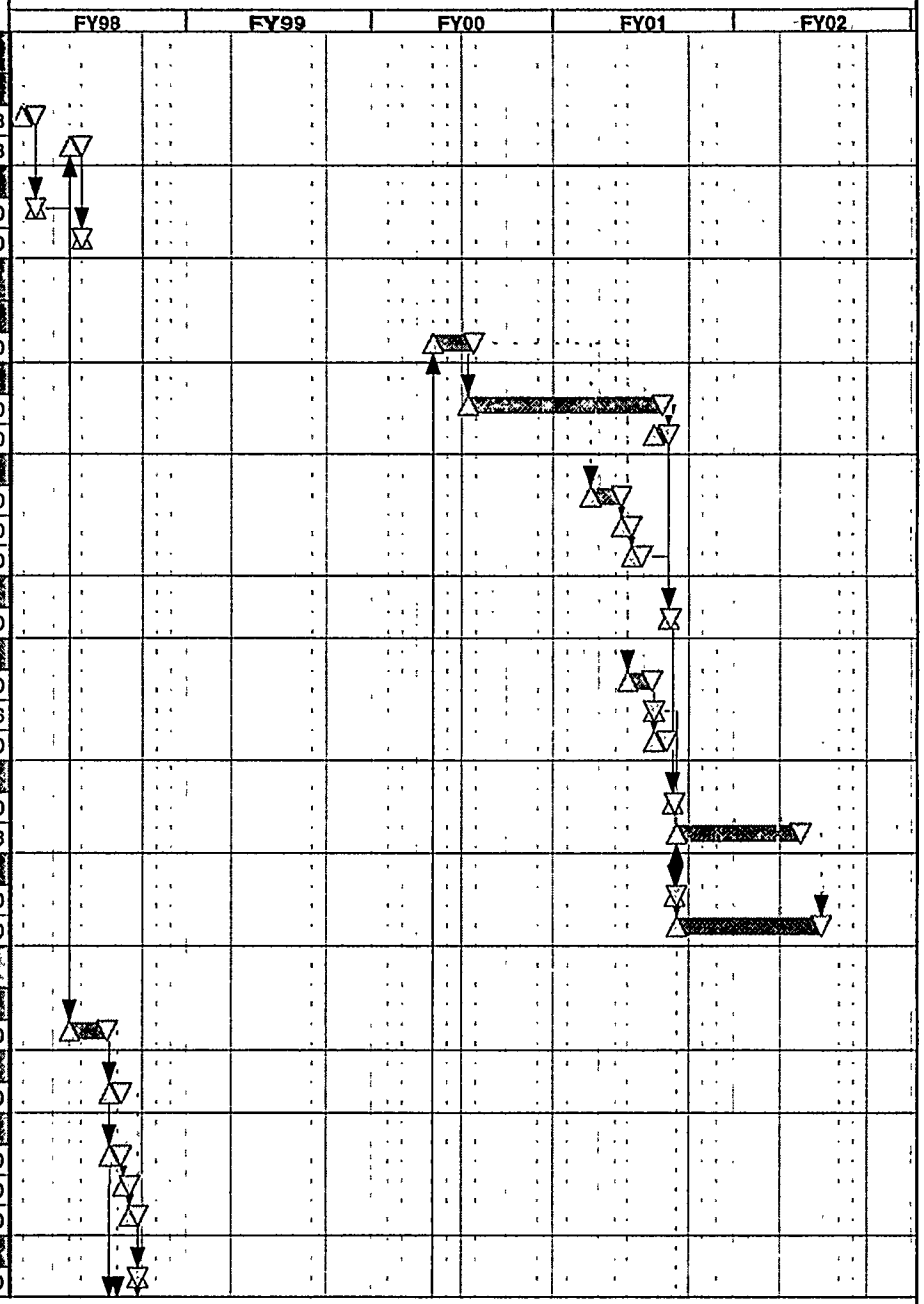
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Material Repackaging					
Place shipping pkg in certified container	45	21AUG00	07NOV00	4,090.00	219,794.05
Product Shipment					
Load Truck and Ship to Receiver	20	08NOV00	27NOV00	1,400.00	72,248.00
VYCOR Glass Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	08NOV00	07FEB01	130.00	6,897.00
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	28MAR01	28MAR01	4.00	200.56
Material Control & Accountability Work	32	08FEB01	04APR01	120.00	5,971.20
Complete Materials Management Plan Activities	12	05APR01	25APR01	80.00	3,980.80
Material Repackaging					
Safeguards Inventory of Material	2	09MAY01	10MAY01	220.00	12,150.20
Product Shipment					
Load Truck and Ship to Receiver	1	10MAY01	10MAY01	80.00	4,196.80
Processing Costs at Argonne Lab.	1	11MAY01	11MAY01	0.00	545,405.00
Janus Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	08FEB01*	21MAR01	134.00	7,092.24
Procurement					
Inspect & PM Shipping Containers	16	22MAR01	18APR01	60.00	3,185.80
Procedures					
Develop Procedure 85 gal DOT-6M Drum	16	22MAR01	18APR01	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M Drum	8	19APR01	02MAY01	120.00	6,623.50
Approve New Procedure 85 gal DOT-6M Drum	8	03MAY01	16MAY01	30.00	1,620.20
Training					
Practice Dry Run	1	17MAY01	17MAY01	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	16	22MAR01	18APR01	44.00	2,189.44
Complete Materials Management Plan Activities	16	19APR01	16MAY01	40.00	1,990.40
Material Repackaging					
Place shipping pkg in certified container	1	21MAY01	21MAY01	110.00	6,075.10
Product Shipment					
Load Truck and Ship to Receiver	1	04JUN01	04JUN01	115.00	6,002.00
ANL-E Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	22MAR01*	02MAY01	82.00	4,338.76
Procurement					
Inspect & PM Shipping Containers	16	03MAY01	31MAY01	60.00	3,185.80
Procedures					
Develop Procedure	16	03MAY01	31MAY01	160.00	7,754.80
Review & Resolve Comments	8	04JUN01	14JUN01	120.00	6,623.50
Approve New Procedure	8	18JUN01	28JUN01	30.00	1,620.20
Training					
Practice Dry Run	1	02JUL01	02JUL01	70.00	3,801.40



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging					
Material Control & Accountability Work	20	03MAY01	07JUN01	120.00	5,971.20
Complete Materials Management Plan Activities	12	11JUN01	28JUN01	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container at CPP	1	03JUL01	03JUL01	114.00	6,274.14
Product Shipment					
Load Truck and Ship to Argonne	1	05JUL01	05JUL01	100.00	5,212.00
Transfer Negotiations Team					
Transfer Negotiations Team					
Negotiating SNM Shipments/Receipts	802	01OCT97*	26SEP01	30,720.00	2,023,158.40
Added Cost - Dedicated Operations Crew					
Added Cost to Secure Dedicated Operations Crew					
Training	130	01JUL99*	23FEB00	5,760.00	298,828.80
SNM Fuel Handling Operations	121	24FEB00*	27SEP00	9,022.00	464,761.36
SNM Fuel Handling Operations	201	28SEP00*	27SEP01	9,922.00	510,928.36
SNM Fuel Handling Operations	201	01OCT01*	01OCT02	5,479.00	281,807.24
SNM Fuel Handling Operations	186	02OCT02*	04SEP03	1,508.00	77,971.12



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
LANL Material					
Material Repackaging					
Place shipping pkg in certified container	16	28OCT97*	24NOV97	1,402.00	75,485.48
Place shipping pkg in certified container	16	02FEB98*	26FEB98	1,402.00	75,485.48
Product Shipment					
Load Truck and Ship to Receiver	1	25NOV97	25NOV97	80.00	4,207.40
Load Truck and Ship to Receiver	1	27FEB98	27FEB98	80.00	4,207.40
Denitrator Material - Ship As Is					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	02FEB00*	25APR00	240.00	12,806.40
Procurement					
Purchase 96 DC-1 Shipping Containers	216	12APR00*	08MAY01	200.00	971,346.80
Inspect & PM New Shipping Container	16	25APR01	22MAY01	80.00	4,138.60
Procedures					
Develop Procedure	32	13DEC00	13FEB01	240.00	11,057.20
Review & Resolve Comments	12	14FEB01	06MAR01	120.00	6,623.50
Approve New Procedure	12	07MAR01	27MAR01	30.00	1,620.20
Training					
Practice Dry Run	2	23MAY01	24MAY01	140.00	7,602.80
S&S Plans for Repackaging					
Material Control & Accountability Work	32	26FEB01	19APR01	200.00	9,952.00
Request for Safe Secure Transport (SST)	1	23APR01	23APR01	4.00	200.56
Complete Materials Management Plan Activities	16	23APR01	17MAY01	120.00	5,971.20
Material Repackaging					
Place shipping pkg in DC1's - (1- 7)	4	29MAY01	04JUN01	505.00	27,387.50
Place remaining containers in DC-1's (8- 280)	136	07JUN01	13FEB02	9,232.00	490,968.88
Product Shipment					
Load Truck and Ship to Receiver - 1st Shipment	2	05JUN01	06JUN01	145.00	7,455.00
Load Truck and Ship to Receiver - (2 thru 40)	294	07JUN01	27MAR02	2,160.00	110,953.80
ANL-W Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	02FEB98	23APR98	200.00	10,376.40
Procurement					
Inspect & PM 6 Shipping Containers	16	27APR98	21MAY98	60.00	3,185.80
Procedures					
Develop Procedure 55 gal DOT-6M Drum	16	27APR98	21MAY98	160.00	7,754.80
Review & Resolve Comments 55 gal DOT-6M Drum	8	26MAY98	08JUN98	110.00	6,110.70
Approve New Procedure 55 gal DOT-6M Drum	8	09JUN98	22JUN98	30.00	1,620.20
Training					
Practice Dry Run	1	23JUN98	23JUN98	70.00	3,801.40



Project Start	01JUL97
Project Finish	05MAR10
Data Date	01OCT97
Run Date	20AUG97

Early Bar
Progress Bar
Critical Activity

COMP:DRY4

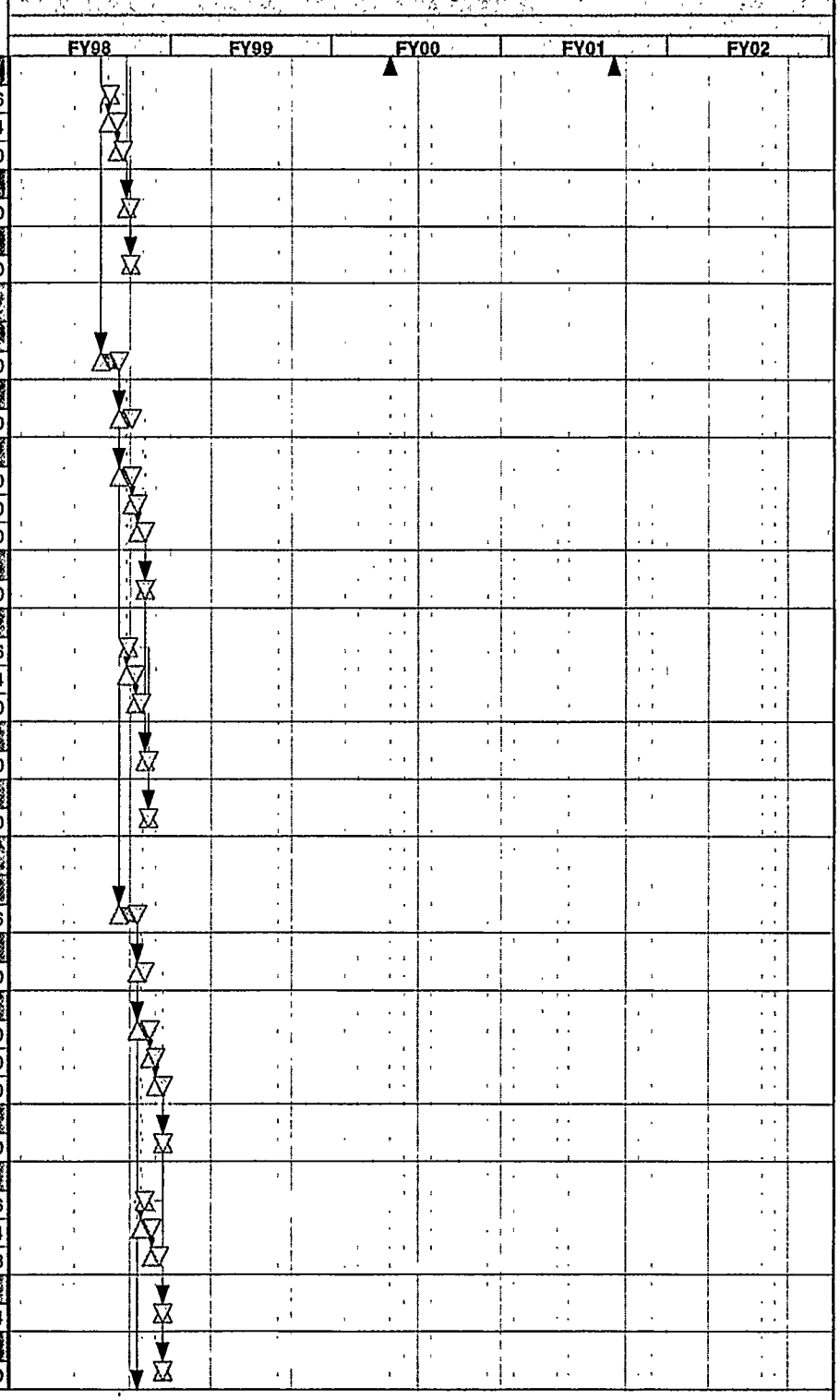
Sheet 1 of 7

LMITCO - CPP 651 MATERIALS SCHEDULE

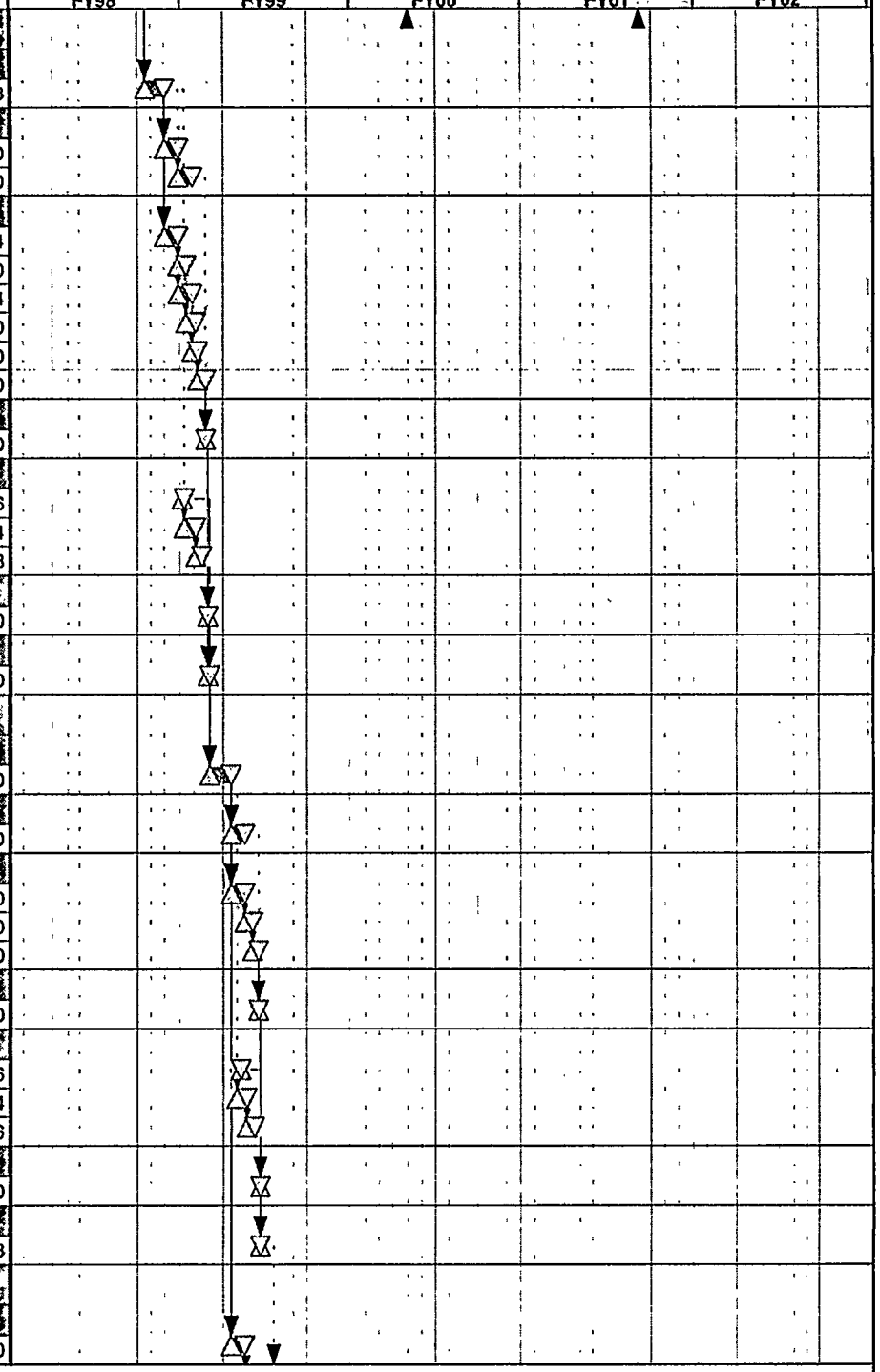
OPT D - SHIP AS IS & TNT & OPS CREW

Detailed Activity Schedule

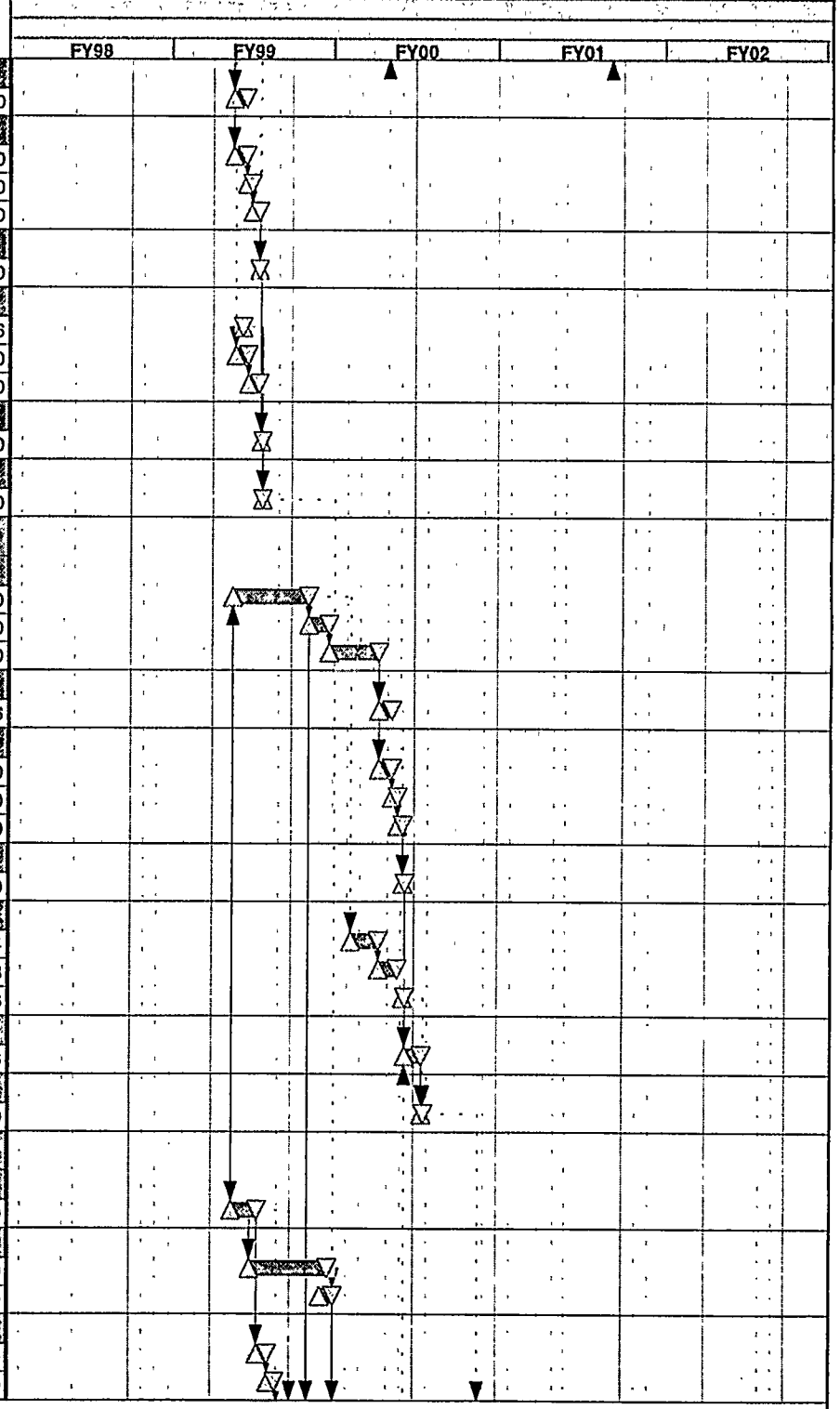
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
S&S Plans for Repackaging					
Request for Safe Transport (SST)	1	19MAY98	19MAY98	4.00	200.56
Material Control & Accountability Work	12	13MAY98	03JUN98	44.00	2,189.44
Complete Materials Management Plan Activities	8	04JUN98	17JUN98	20.00	995.20
Material Repackaging					
Place shipping pkg in certified container	5	24JUN98	01JUL98	525.00	35,675.40
Product Shipment					
Load Truck and Ship to Receiver	1	02JUL98	02JUL98	85.00	4,466.80
Custom Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	27APR98*	08JUN98	250.00	13,076.60
Procurement					
Inspect & PM New Shipping Container	16	09JUN98	06JUL98	80.00	4,393.20
Procedures					
Develop Procedure 55 gal. DOT-6M Drum	16	09JUN98	06JUL98	160.00	7,754.80
Review & Resolve Comments 55 DOT-6M	8	07JUL98	20JUL98	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	21JUL98	03AUG98	30.00	1,620.20
Training					
Practice Dry Run	1	04AUG98	04AUG98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	29JUN98	29JUN98	4.00	200.56
Material Control & Accountability Work	12	24JUN98	14JUL98	44.00	2,189.44
Complete Materials Management Plan Activities	8	15JUL98	28JUL98	20.00	995.20
Material Repackaging					
Load Nine 55 gal. DOT-6M Shipping Containers	4	05AUG98	11AUG98	440.00	30,800.40
Product Shipment					
Load Truck and Ship to Receiver	1	12AUG98	12AUG98	105.00	5,504.40
U. of Wisconsin					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	09JUN98*	20JUL98	72.00	3,837.36
Procurement					
Inspect & PM (1) Shipping Container	8	21JUL98	03AUG98	50.00	2,673.00
Procedures					
Develop Procedure 85 gal DOT-6M	16	21JUL98	17AUG98	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M	8	18AUG98	31AUG98	110.00	6,110.70
Approve New Procedure 85 gal DOT-6M	8	01SEP98	15SEP98	30.00	1,620.20
Training					
Practice Dry Run	1	16SEP98	16SEP98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	04AUG98	04AUG98	4.00	200.56
Material Control & Accountability Work	12	30JUL98	19AUG98	24.00	1,194.24
Complete Materials Management Plan Activities	10	20AUG98	08SEP98	8.00	398.08
Material Repackaging					
Place shipping pkg in certified container	1	16SEP98	16SEP98	114.00	10,074.14
Product Shipment					
Load Truck and Ship to Receiver	1	17SEP98	17SEP98	105.00	5,504.40



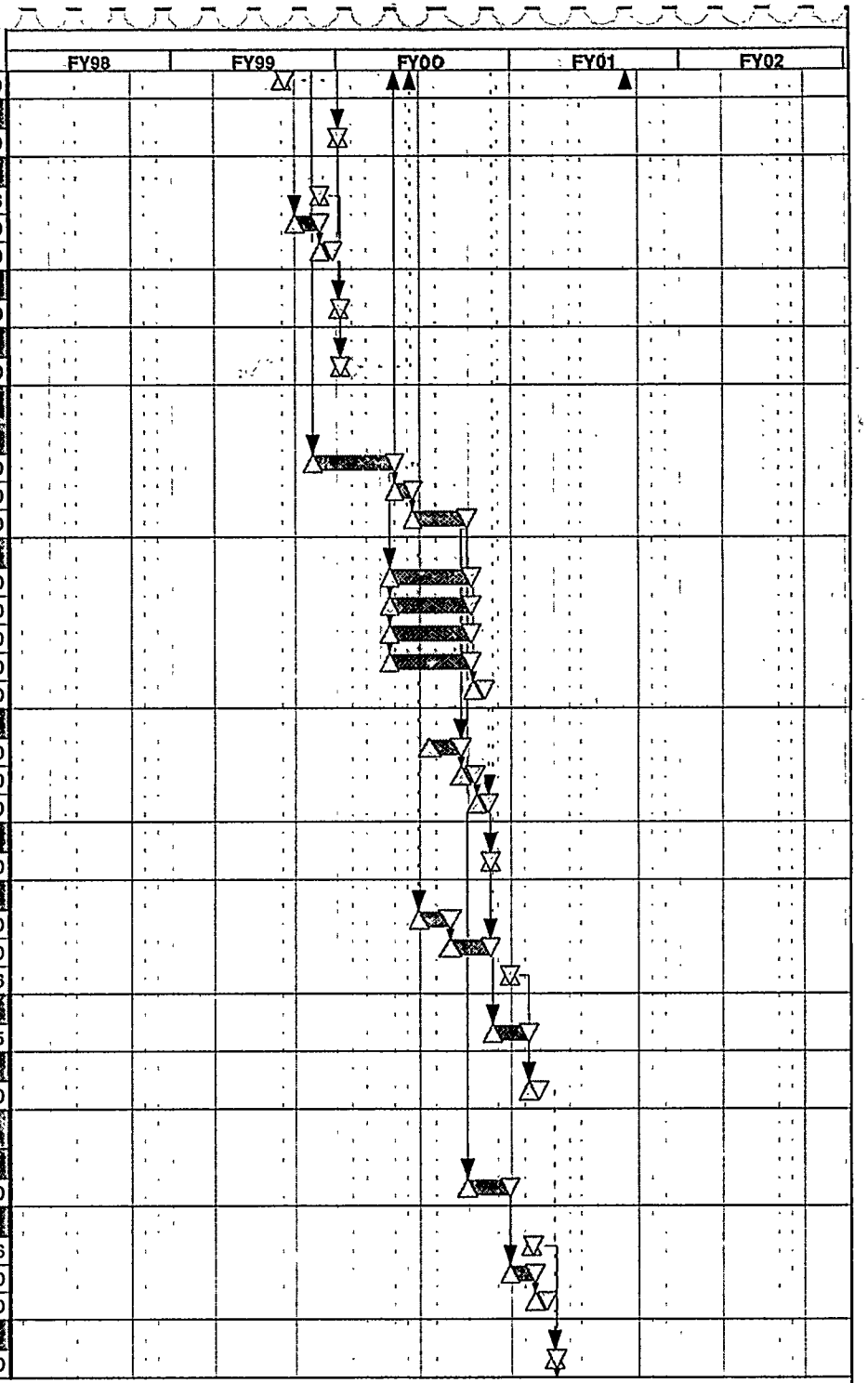
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
GEFAST Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	21JUL98*	31AUG98	68.00	3,595.88
Procurement					
Purchase One 35 gal. UN1A2 Shipping Container	16	01SEP98*	29SEP98	10.00	853.70
Inspect & PM Shipping Containers	16	30SEP98	27OCT98	60.00	3,185.80
Procedures					
Develop Procedure 35 gal DOT UN1A2 Shipping Pkg.	16	01SEP98	29SEP98	128.00	6,433.84
Review & Resolve Comments UN1A2 Pkg.	8	30SEP98	13OCT98	110.00	6,110.70
Develop Procedure 55 gal. DOT-6M Drum	16	30SEP98	27OCT98	128.00	6,433.84
Approve New Procedure UN1A2 Pkg.	11	14OCT98	02NOV98	30.00	1,620.20
Review & Resolve Comments 55 DOT-6M	8	28OCT98	10NOV98	110.00	6,110.70
Approve New Procedure 55 DOT-6M	8	11NOV98	24NOV98	30.00	1,620.20
Training					
Practice Dry Run	1	25NOV98	25NOV98	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	08OCT98	08OCT98	4.00	200.56
Material Control & Accountability Work	12	13OCT98	02NOV98	14.00	696.64
Complete Materials Management Plan Activities	8	03NOV98	16NOV98	8.00	398.08
Material Repackaging					
Load 5 Containers in 5 DOT Shipping Containers	2	30NOV98	01DEC98	220.00	16,850.20
Product Shipment					
Load Truck and Ship to Receiver	1	02DEC98	02DEC98	105.00	5,504.40
U. of Washington					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	03DEC98*	20JAN99	100.00	5,188.20
Procurement					
Inspect & PM Shipping Container	16	21JAN99	17FEB99	40.00	2,196.60
Procedures					
Develop Procedure	16	21JAN99	17FEB99	160.00	7,754.80
Review & Resolve Comments	8	18FEB99	03MAR99	110.00	6,110.70
Approve New Procedure	8	04MAR99	17MAR99	30.00	1,620.20
Training					
Practice Dry Run	1	18MAR99	18MAR99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	08FEB99	08FEB99	4.00	200.56
Material Control & Accountability Work	12	02FEB99	22FEB99	24.00	1,194.24
Complete Materials Management Plan Activities	8	23FEB99	08MAR99	16.00	796.16
Material Repackaging					
Place shipping pkg in certified container	1	22MAR99	22MAR99	110.00	5,791.80
Product Shipment					
Load Truck and Ship to Receiver	1	23MAR99	23MAR99	108.00	5,653.68
Rocky Flats Material - Ship As Is					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	16	21JAN99*	17FEB99	80.00	4,200.60



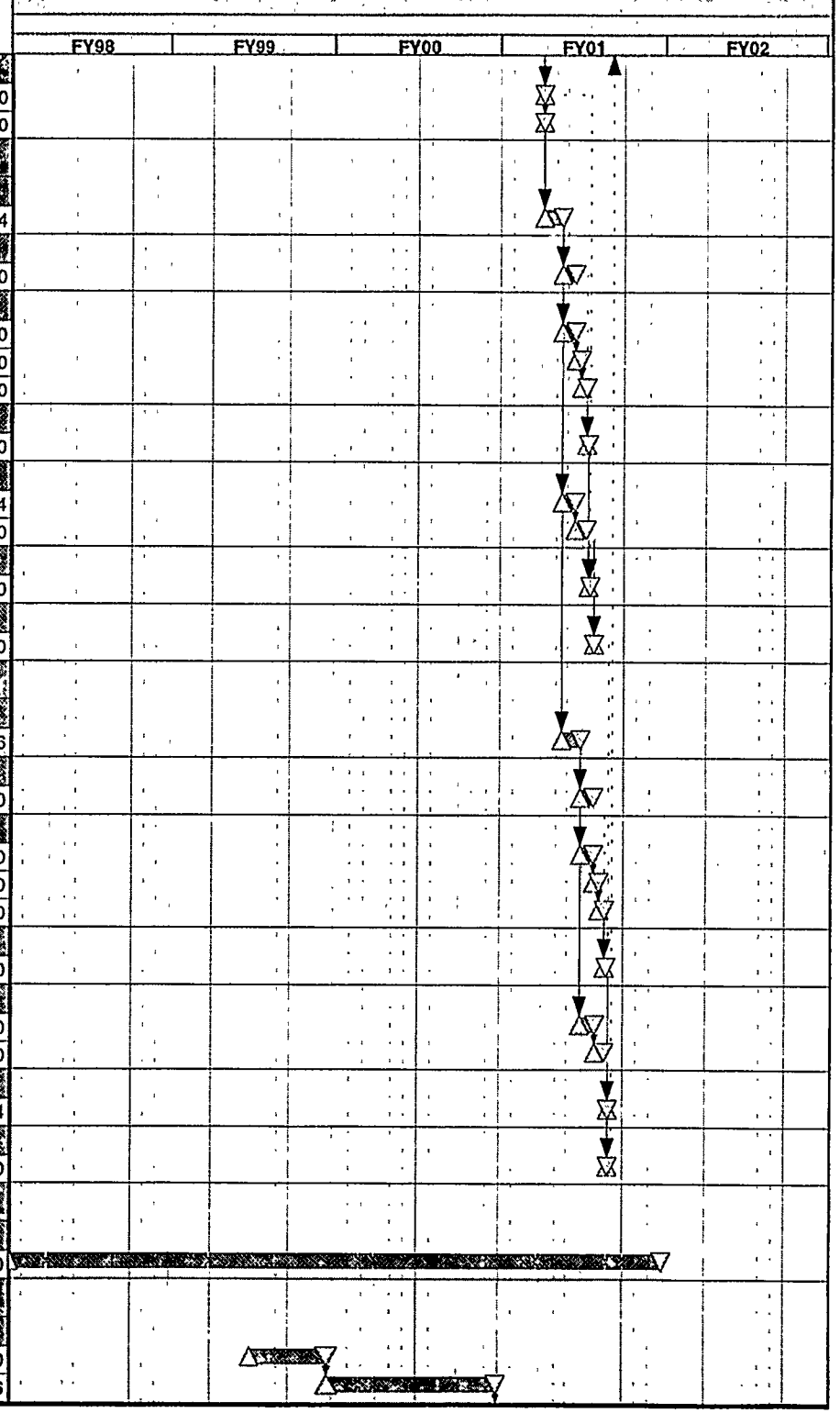
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Procurement					
Inspect & PM Shipping Container	16	18FEB99	17MAR99	60.00	3,185.80
Procedures					
Develop Procedure	16	18FEB99	17MAR99	160.00	7,754.80
Review & Resolve Comments	8	18MAR99	31MAR99	120.00	6,623.50
Approve New Procedure	8	01APR99	14APR99	30.00	1,620.20
Training					
Practice Dry Run	1	15APR99	15APR99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	10MAR99	10MAR99	4.00	200.56
Material Control & Accountability Work	16	23FEB99	22MAR99	160.00	7,961.60
Complete Materials Management Plan Activities	15	23MAR99	15APR99	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	4	19APR99	22APR99	360.00	19,487.90
Product Shipment					
Load Truck and Ship to Receiver	1	23APR99	23APR99	90.00	4,715.60
PWR Material					
Project Definition					
Characterize Material to Meet Customer Req.	96	18FEB99*	05AUG99	240.00	12,578.80
Evaluate & Develop Customer Receiving Criteria	24	09AUG99*	20SEP99	100.00	4,976.00
Design/Fabricate 44 Aluminum Shipping Cans	60	21SEP99*	11JAN00	520.00	29,586.40
Procurement					
Inspect & PM Shipping Containers	16	12JAN00	08FEB00	116.00	5,955.56
Procedures					
Develop Procedure	16	12JAN00	08FEB00	160.00	7,754.80
Review & Resolve Comments	8	09FEB00	22FEB00	110.00	6,110.70
Approve New Procedure	8	23FEB00	07MAR00	30.00	1,620.20
Training					
Practice Dry Run	1	08MAR00	08MAR00	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	32	10NOV99	12JAN00	74.00	3,682.24
Complete Materials Management Plan Activities	24	13JAN00	23FEB00	28.00	1,393.28
Request for Safe Secure Transport (SST)	1	08MAR00	08MAR00	4.00	200.56
Material Repackaging					
Place shipping pkg in certified container	22	09MAR00	17APR00	1,724.00	90,717.36
Product Shipment					
Load Truck and Ship to Receiver	4	18APR00	21APR00	270.00	13,952.00
PWR (1 full assembly)					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	32	18FEB99*	14APR99	180.00	9,396.40
Procurement					
Obtain Certification of Shipping Container	96	01APR99*	20SEP99	60.00	8,440.40
Inspect & PM Shipping Container	16	07SEP99	04OCT99	60.00	3,185.80
Procedures					
Develop Procedure	16	15APR99	12MAY99	160.00	7,754.80
Review & Resolve Comments	8	13MAY99	27MAY99	110.00	6,110.70



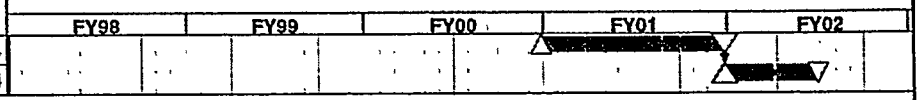
Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Approve New Procedure	8	31MAY99	10JUN99	30.00	1,620.20
Training					
Practice Dry Run	1	04OCT99	04OCT99	70.00	3,801.40
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	24AUG99	24AUG99	4.00	200.56
Material Control & Accountability Work	32	30JUN99	24AUG99	120.00	5,971.20
Complete Materials Management Plan Activities	16	25AUG99	22SEP99	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container	2	05OCT99	06OCT99	190.00	10,087.00
Product Shipment					
Load Truck and Ship to Receiver	1	07OCT99	07OCT99	110.00	5,753.20
Fluorinel Material					
Project Definition					
Characterize Material to Meet Customer Req.	96	09AUG99*	01FEB00	260.00	13,581.60
Evaluate & Develop Customer Receiving Criteria	24	02FEB00*	14MAR00	140.00	7,186.20
Design/Fabricate Aluminum Shipping Cans	60	15MAR00	28JUN00	520.00	29,586.40
Procurement					
Purchase Twenty-one 110 gal, DOT-6M Drums - 72"	96	19JAN00*	06JUL00	180.00	40,139.40
Purchase Five 110 gal, DOT-6M Drums 58"	96	19JAN00*	06JUL00	180.00	16,139.40
Purchase Four 55 gal, DOT-6M Drums 23"	96	19JAN00*	06JUL00	180.00	13,339.40
Purchase Sixty 85 gal, DOT-6M Drums 43"	96	19JAN00*	06JUL00	180.00	70,139.40
Inspect & PM New Shipping Containers	16	10JUL00	03AUG00	160.00	8,277.20
Procedures					
Develop Procedures - all Drums	32	19APR00	14JUN00	320.00	15,509.60
Review & Resolve Comments - all drums	16	15JUN00	13JUL00	200.00	11,208.60
Approve New Procedures - all drums	16	17JUL00	10AUG00	60.00	3,240.40
Training					
Practice Dry Run	4	14AUG00	17AUG00	280.00	15,205.60
S&S Plans for Repackaging					
Material Control & Accountability Work	32	29MAR00	23MAY00	120.00	5,971.20
Complete Materials Management Plan Activities	48	24MAY00	17AUG00	80.00	3,980.80
Request for Safe Secure Transport (SST)	1	25SEP00	25SEP00	4.00	200.56
Material Repackaging					
Place shipping pkg in certified container	45	21AUG00	07NOV00	4,090.00	219,794.05
Product Shipment					
Load Truck and Ship to Receiver	20	08NOV00	27NOV00	1,400.00	72,248.00
VYCOR Glass Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	48	29JUN00	25SEP00	130.00	6,897.00
S&S Plans for Repackaging					
Request for Safe Secure Transport (SST)	1	13NOV00	13NOV00	4.00	200.56
Material Control & Accountability Work	32	26SEP00	20NOV00	120.00	5,971.20
Complete Materials Management Plan Activities	12	21NOV00	12DEC00	80.00	3,980.80
Material Repackaging					
Safeguards Inventory of Material	2	02JAN01	03JAN01	220.00	12,150.20



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
Product Shipment					
Load Truck and Ship to Receiver	1	03JAN01	03JAN01	80.00	4,196.80
Processing Costs at Argonne Lab.	1	04JAN01	04JAN01	0.00	545,000.00
Janus Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	04JAN01*	14FEB01	134.00	7,092.24
Procurement					
Inspect & PM Shipping Containers	16	15FEB01	14MAR01	60.00	3,185.80
Procedures					
Develop Procedure 85 gal DOT-6M Drum	16	15FEB01	14MAR01	160.00	7,754.80
Review & Resolve Comments 85 gal DOT-6M Drum	8	15MAR01	28MAR01	120.00	6,623.50
Approve New Procedure 85 gal DOT-6M Drum	8	29MAR01	11APR01	30.00	1,620.20
Training					
Practice Dry Run	1	12APR01	12APR01	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	16	15FEB01	14MAR01	44.00	2,189.44
Complete Materials Management Plan Activities	16	15MAR01	11APR01	40.00	1,990.40
Material Repackaging					
Place shipping pkg in certified container	1	16APR01	16APR01	110.00	6,075.10
Product Shipment					
Load Truck and Ship to Receiver	1	26APR01	26APR01	115.00	6,002.00
ANL-E Material					
Project Definition					
Evaluate & Develop Customer Receiving Criteria	24	15FEB01*	28MAR01	82.00	4,338.76
Procurement					
Inspect & PM Shipping Containers	16	29MAR01	25APR01	60.00	3,185.80
Procedures					
Develop Procedure	16	29MAR01	25APR01	160.00	7,754.80
Review & Resolve Comments	8	26APR01	09MAY01	120.00	6,623.50
Approve New Procedure	8	10MAY01	23MAY01	30.00	1,620.20
Training					
Practice Dry Run	1	24MAY01	24MAY01	70.00	3,801.40
S&S Plans for Repackaging					
Material Control & Accountability Work	20	29MAR01	02MAY01	120.00	5,971.20
Complete Materials Management Plan Activities	12	03MAY01	23MAY01	80.00	3,980.80
Material Repackaging					
Place shipping pkg in certified container at CPP	1	29MAY01	29MAY01	114.00	6,274.14
Product Shipment					
Load Truck and Ship to Argonne	1	30MAY01	30MAY01	100.00	5,212.00
Transfer Negotiations Team					
Transfer Negotiations Team					
Negotiating SNM Shipments/Receipts	802	01OCT97*	26SEP01	30,720.00	2,023,158.40
Added Cost - Dedicated Operations Crew					
Added Cost to Secure Dedicated Operations Crew					
Training	96	01APR99*	20SEP99	5,760.00	298,828.80
SNM Fuel Handling Operations	205	21SEP99*	26SEP00	9,022.00	464,761.36



Activity Description	Orig Dur	Early Start	Early Finish	Budgeted Quantity	Budgeted Cost
SNM Fuel Handling Operations	201	27SEP00*	26SEP01	6,573.00	338,512.24
SNM Fuel Handling Operations	96	27SEP01*	25MAR02	10,085.00	517,865.64



Appendix D

Detailed resource and cost reports

for

current budget, base case, and options A, B, C, and D

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 20AUG97 RUN NO. 497
08:08

Cost Loading - Summary by Cost Account

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

CURRENT FUNDING -SHIP AS IS SCENARIO

START DATE 01JUL97 FIN DATE 05MAR10

DATA DATE 01OCT97 PAGE NO. 1

ACCOUNT	ACCOUNT TITLE	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	TOTAL
12100	LANL Material	159386												159386
12101	Fluorinel Material				227995	176923	140829							545748
121010	VYCOR Glass Material											4454	574347	578802
121011	ANL-W Material	76377												76377
121012	ANL-E Material						48763							48763
121013	Rocky Flats Option 1 (As Is)			63533										63533
121017	Denitrator Option 1 (As Is)					38215	279179	352366	314538	316434	267235	111465		1679431
12103	PWR (6 SPERT Boxes)			11137	171192									182329
12104	PWR (1 full assembly)				9718	56584								66302
12105	U of Washington			40308										40308
12106	U of Wisconsin		43169											43169
12107	Custom Product Material	6538	69909											76447
12108	GFAST - AWF-1		31307	32110										63416
12109	JANUS Material						46335							46335
	REPORT TOTAL	242301	144384	147088	408905	271723	515105	352366	314538	316434	267235	115919	574347	3670345

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 20AUG97 RUN NO. 494
08:02

All Resource Estimates

PRIMAVERA PROJECT PLANNER

RESOURCE LOADING REPORT

TOTAL USAGE FOR YEAR

CURRENT FUNDING -SHIP AS IS SCENARIO

START DATE 01JUL97 FIN DATE 05MAR10

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	TOTAL
1341E140	Radiological Engineer	35	34	36	60	38	42	26	17	17	17	15		335
1342T050	Radiological Technician	370	50	70	220	330	160	252	215	215	219	189	20	2310
1420E110	Quality Engineer	10	34	26	341	36	103	21	21	21	16			630
1420T060	Quality Inspector	20	50	40	61	48	88	3						308
3280P170	Transporation Coordinator	118	82	108	147	220	228	172	135	135	137	128	38	1647
4110E130	Other/Technical Engineer	210	50	30	80	155	90	81	64	64	66	57	20	967
5100M6	Direct Purchases													
5100M8	Subcontracts													
5112M010	CPP 651 Operations Foreman	400	90	108	292	390	400	333	270	270	274	243	20	3090
5112R040	CPP 651 Fuel Operators	1630	541	690	1239	1610	1330	1128	859	859	876	758	100	11620
5113E080	Facility Fuel Engineer	650	552	528	1069	718	873	445	302	302	298	269	74	6078
5122E130	Design Engineer				320									320
5130P130	Trainer	30	114	66	80	30	90							410
5152P160	Procedure Writer	100	320	216	281	119	380							1416
5213R040	CPP 602 Fuel Operators							102	110	110	110	107		540
5221E010	Technical Safety Engineer (TSE)	10	34	26	30	10	30							140
5432E130	Plant Systems Engineer	20	80	40	33	48	58	3						280
6100E130	Security Operations	10	34	26	30	10	30							140
6120P170	Safeguards & Accountability	704	363	602	799	695	1005	338	270	270	274	295	258	5872
6520C040	Machinist				320									320
6520C110	Welder				160									160
6520M010	Craft Foreman				80		10	36	28	28	28	27		235
6520R080	Equipment Operator	80	100	90	153	95	515	147	110	110	110	107	20	1638
	REPORT TOTAL	**4397**	**2526**	**2703**	**5794**	**4550**	**5432**	**3086**	**2400**	**2400**	**2423**	**2195**	**550**	**38456**

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 05AUG97 RUN NO. 483
13:02

Cost load by resource type

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

BASE CASE SCHEDULE - DRY BLENDING

START DATE 01JUL97 FIN DATE 11SEP06

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	TOTAL
1341E140	Radiological Engineer	6737	2433	5798	14748	6099	6280	2319	2965	3649	51027
1342T050	Radiological Technician	18271	3457	2469	27799	50137	51626	10414	11851	22221	198244
1420E110	Quality Engineer	5026	3989	5867	4708			1357	6677	11965	39589
1420T060	Quality Inspector	2051	2051	1538				3077	3487	2051	14256
1710P170	Environmental Engineer	4000	11257	11440	3833						30530
3280E130	Transportation Engineer			167	3833						4000
3280P170	Transporation Coordinator	9117	5616	9710	12700	22451	20985	9994	6493	16621	113688
4110E010	Safety Analyst	3000	78277	65504							146781
4110E120	Criticality Safety Engineer	3000	13119	14308							30427
4110E130	Other/Technical Engineer	21230	7635	11948	8833			5675	573	20694	76587
41E1R010	RAL Technician	1000			16679	30082	30976	5063			83800
41E1S010	RAL Engineer				13560	10027	10325	1688			35600
5100M4	Construction Purchases			437500	112500						550000
5100M6	Direct Purchases							1302	3698		5000
5100M8	Subcontracts	270928	1071135	729688				545405	29967	69233	2716355
5110M020	Fuel Manager	4200	14345	14904	6067						39516
5112G050	Administration Support			2019	8056						10075
5112M010	CPP 651 Operations Foreman	20752	6744	2761	34724	56204	57749	15033	17120	35797	246885
5112R040	CPP 651 Fuel Operators	90158	37354	27383	143750	229785	235966	67844	68287	127625	1028152
5113E070	Fuel Supervisor			200	4600						4800
5113E080	Facility Fuel Engineer	50127	44023	26284	77726	58501	59990	47416	41821	73148	479037
5122E130	Design Engineer	3000	2000	5625	375			8680	1949	10629	32258
5130P130	Trainer	6000	6000	5625	16875			4063	1938	2500	43000
5152P160	Procedure Writer	7998	14076	7892	1688			11610	4902	8256	56422
5213R040	CPP 602 Fuel Operators	900		113	15188						16200
5221E010	Technical Safety Engineer (TSE)	1419	2838	1001	4708			1507	1330	1419	14222
5432E130	Plant Systems Engineer	3622	3622	1374	3833			2415	2415	2415	19696
6100E130	Security Operations	3907	2415	5929	8175			1283	1132	1207	24048
6120P170	Safeguards & Accountability	49645	18361	23546	47016	51778	53260	62878	31822	37942	376248
6520C020	Electrician			422	97						519
6520C040	Machinist							6225	1397	7622	15245
6520C110	Welder							3112	699	3811	7622
6520M010	Craft Foreman			403	2140	4182	4182	3207	364	1986	16464
6520R080	Equipment Operator	4764	5240	2858	6550	13383	13383	8247	8004	22867	85298
6520T070	Instrument Technician			387	89						476
	REPORT TOTAL	590852	1355987	1424661	600851	532630	544723	829813	248890	483660	6612067

MITCO - CPP 651 MATERIAL SCHEDULE

EPORT DATE 05AUG97 RUN NO. 484
13:04

ll Resource Estimates

PRIMAVERA PROJECT PLANNER

RESOURCE LOADING REPORT

TOTAL USAGE FOR YEAR

BASE CASE SCHEDULE - DRY BLENDING

START DATE 01JUL97 FIN DATE 11SEP06

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	TOTAL
341E140	Radiological Engineer	125	40	110	246	100	103	38	49	60	871
342T050	Radiological Technician	370	70	50	556	1003	1033	209	240	450	3980
420E110	Quality Engineer	100	79	117	94			26	130	233	780
420T060	Quality Inspector	40	40	30				60	68	40	278
710P170	Environmental Engineer	80	208	215	77						580
280E130	Transportation Engineer			3	77						80
280P170	Transporation Coordinator	182	112	194	253	448	419	199	130	332	2268
110E010	Safety Analyst	60	1002	868							1930
110E120	Criticality Safety Engineer	60	168	212							440
110E130	Other/Technical Engineer	307	113	233	177			73	7	265	1175
1E1R010	RAL Technician	20			334	602	620	101			1676
1E1S010	RAL Engineer				271	201	207	34			712
100M4	Construction Purchases										
100M6	Direct Purchases										
100M8	Subcontracts										
110M020	Fuel Manager	60	208	215	87						570
112G050	Administration Support			41	199						240
112M010	CPP 651 Operations Foreman	400	130	53	674	1086	1116	291	330	690	4770
112R040	CPP 651 Fuel Operators	1740	720	533	2825	4429	4548	1308	1316	2460	19880
113E070	Fuel Supervisor			3	77						80
113E080	Facility Fuel Engineer	848	743	467	1555	1170	1200	822	693	1212	8708
122E130	Design Engineer	60	40	113	8			131	29	160	540
130P130	Trainer	120	120	113	338			81	39	50	860
152P160	Procedure Writer	194	341	184	38			281	119	200	1356
213R040	CPP 602 Fuel Operators	20		3	338						360
221E010	Technical Safety Engineer (TSE)	20	40	16	94			21	19	20	230
432E130	Plant Systems Engineer	60	60	23	77			40	40	40	340
100E130	Security Operations	80	40	128	182			21	19	20	490
120P170	Safeguards & Accountability	1013	369	485	970	1045	1074	1265	640	763	7622
520C020	Electrician			8	2						10
520C040	Machinist							131	29	160	320
520C110	Welder							65	15	80	160
520M010	Craft Foreman			8	43	84	84	64	7	40	330
520R080	Equipment Operator	100	110	60	164	335	335	187	168	480	1938
520T070	Instrument Technician			8	2						10
	REPORT TOTAL	**6058**	**4753**	**4494**	**9752**	**10501**	**10737**	**5448**	**4086**	**7754**	**63584**

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 05AUG97 RUN NO. 512
12:38

Cost load by resource type

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

OPT A - BASE CASE & TRANSFER TEAM

START DATE 01JUL97 FIN DATE 18JUN05

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TOTAL
1341E140	Radiological Engineer	2737	8257	3649	3041	17028	6143	6084	3721	50662
1342T050	Radiological Technician	18271	5926	11851	23209	4910	50986	50495	30886	196532
1420E110	Quality Engineer	1026	7200	18359	3492	9513				39589
1420T060	Quality Inspector	2564	3077	5282	2179	1154				14256
1710P170	Environmental Engineer		4000	6188	11020	9322				30530
3280E130	Transportation Engineer	96509	96989	96029	95549	4000				389075
3280P170	Transporation Coordinator	6117	14332	6618	19204	10303	24240	23878	8997	113688
4110E010	Safety Analyst		3000	35411	93187	15182				146781
4110E120	Criticality Safety Engineer		3000	5935	15618	5874				30427
4110E130	Other/Technical Engineer	16399	9287	10207	22413	18281				76587
41E1R010	RAL Technician		1000			2383	30976	30678	18764	83800
41E1S010	RAL Engineer					8794	10325	10226	6255	35600
5100M4	Construction Purchases				205078	344922				550000
5100M6	Direct Purchases	86716	90793	87638	85853					351000
5100M8	Subcontracts	6500	73988	450358	2185509					2716355
5110M020	Fuel Manager	132271	137130	139636	144699	13549				567286
5112G050	Administration Support					10075				10075
5112M010	CPP 651 Operations Foreman	20752	10354	17142	36835	11084	55942	55323	34264	241696
5112R040	CPP 651 Fuel Operators	87677	66726	72200	130608	57001	236564	233965	145312	1030052
5113E070	Fuel Supervisor					4800				4800
5113E080	Facility Fuel Engineer	48940	69072	71266	63289	69442	60257	59517	37255	479037
5122E130	Design Engineer		3000	23258		6000				32258
5130P130	Trainer	3500	11500	4000	1875	22125				43000
5152P160	Procedure Writer	9907	20475	12074	5573	8393				56422
5213R040	CPP 602 Fuel Operators		900							900
5221E010	Technical Safety Engineer (TSE)	1419	4256	2128	709	5709				14222
5432E130	Plant Systems Engineer	4830	3622	4528	1962	4755				19696
6100E130	Security Operations	1207	6322	1811	604	14104				24048
6120P170	Safeguards & Accountability	237682	245408	233889	246060	38961	53320	52771	32469	1140562
6520C020	Electrician					519				519
6520C040	Machinist			15245						15245
6520C110	Welder			7622						7622
6520M010	Craft Foreman			3971		993	4316	4194	2991	16464
6520R080	Equipment Operator	5717	7146	11338	21795	2501	13810	13420	9570	85298
6520T070	Instrument Technician					1906				1906
	REPORT TOTAL	790741	906759	1357635	3419361	723582	546878	540551	330483	8615989

MITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | OPT A - BASE CASE & TRANSFER TEAM

REPORT DATE 05AUG97 12:25 RUN NO. 510 | RESOURCE LOADING REPORT | START DATE 01JUL97 FIN DATE 18JUN05

DATA DATE 01OCT97 PAGE NO. 1

All Resource Estimates | TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TOTAL
1341E140	Radiological Engineer	45	150	60	50	298	101	100	61	865
1342T050	Radiological Technician	370	120	240	470	99	1033	1023	625	3980
1420E110	Quality Engineer	20	142	358	70	190				780
1420T060	Quality Inspector	50	60	103	43	23				278
1710P170	Environmental Engineer		80	116	200	184				580
3280E130	Transportation Engineer	1925	1934	1915	1906	80				7760
3280P170	Transporation Coordinator	122	286	132	383	206	484	476	179	2268
4110E010	Safety Analyst		60	453	1193	223				1930
4110E120	Criticality Safety Engineer		60	76	200	104				440
4110E130	Other/Technical Engineer	210	141	159	311	354				1175
41E1R010	RAL Technician		20			48	620	614	375	1676
41E1S010	RAL Engineer					176	207	205	125	712
5100M4	Construction Purchases									
5100M6	Direct Purchases									
5100M8	Subcontracts									
5110M020	Fuel Manager	1925	1994	2031	2106	194				8250
5112G050	Administration Support					240				240
5112M010	CPP 651 Operations Foreman	400	200	330	710	219	1119	1106	685	4770
5112R040	CPP 651 Fuel Operators	1690	1288	1392	2518	1150	4562	4510	2801	19910
5113E070	Fuel Supervisor					80				80
5113E080	Facility Fuel Engineer	811	1159	1190	1059	1349	1205	1190	745	8708
5122E130	Design Engineer		60	360		120				540
5130P130	Trainer	70	230	80	38	443				860
5152P160	Procedure Writer	240	496	293	135	193				1356
5213R040	CPP 602 Fuel Operators		20							20
5221E010	Technical Safety Engineer (TSE)	20	60	30	10	110				230
5432E130	Plant Systems Engineer	80	60	75	33	93				340
6100E130	Security Operations	20	120	30	10	310				490
6120P170	Safeguards & Accountability	4777	4947	4700	4945	817	1076	1065	655	22982
6520C020	Electrician					10				10
6520C040	Machinist			320						320
6520C110	Welder			160						160
6520M010	Craft Foreman			80		20	86	84	60	330
6520R080	Equipment Operator	120	150	238	458	53	345	336	239	1938
6520T070	Instrument Technician					40				40
	REPORT TOTAL	**12894**	**13838**	**14922**	**16844**	**7425**	**10836**	**10707**	**6552**	**94018**

LMITCO - CPP 651 MATERIAL SCHEDULE

REPORT DATE 05AUG97 RUN NO. 463
12:32

Cost load by resource type

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

OPT B - SHIP AS IS & TRANSFER TEAM

START DATE 01JUL97 FIN DATE 02SEP03

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
1341E140	Radiological Engineer	2737	4257	3649	2433	4508	2791	20375
1342T050	Radiological Technician	18271	5926	11851	23209	25358	29454	114068
1420E110	Quality Engineer	1026	3825	17713	2849	2792		28204
1420T060	Quality Inspector	2564	3077	5282	1218	3654		15794
3280E130	Transportation Engineer	96461	96941	95981	95981	95981		481344
3280P170	Transporation Coordinator	6117	11332	6618	21021	18314	19178	82581
4110E130	Other/Technical Engineer	16399	6247	6247	19132	13514	13974	75513
5100M6	Direct Purchases	86572	90649	87496	86142	86142		437000
5100M8	Subcontracts	6500	15250	99200	1212072	293333		1626355
5110M020	Fuel Manager	132206	132863	131548	131548	131548		659712
5112M010	CPP 651 Operations Foreman	20752	10354	17142	36835	35539	39687	160309
5112R040	CPP 651 Fuel Operators	87677	63726	72200	129052	126412	123780	602846
5113E080	Facility Fuel Engineer	48940	64697	68621	67514	63732	46181	359684
5122E130	Design Engineer			21258				21258
5130P130	Trainer	3500	8500	4000	1375	3125		20500
5152P160	Procedure Writer	9907	20475	12074	6295	9701		58452
5213R040	CPP 602 Fuel Operators					10532	17484	28015
5221E010	Technical Safety Engineer (TSE)	1419	4256	2128		2128		9932
5432E130	Plant Systems Engineer	4830	3622	4528	1434	2490		16904
6100E130	Security Operations	1207	3622	1811		1811		8452
6120P170	Safeguards & Accountability	237587	238112	233794	248324	251701	38065	1247583
6520C040	Machinist			15245				15245
6520C110	Welder			7622				7622
6520M010	Craft Foreman			3971		3512	4182	11665
6520R080	Equipment Operator	5717	7146	11338	21378	16400	16055	78034
	REPORT TOTAL	790388	794877	941317	2107810	1202227	350828	6187447

MITCO - CPP 651 MATERIAL SCHEDULE | PRIMAVERA PROJECT PLANNER | OPT B - SHIP AS IS & TRANSFER TEAM

EPORT DATE 05AUG97 12:34 RUN NO. 464 | RESOURCE LOADING REPORT | START DATE 01JUL97 FIN DATE 02SEP03

DATA DATE 01OCT97 PAGE NO. 1

.ll Resource Estimates | TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
1341E140	Radiological Engineer	45	70	60	40	74	46	335
1342T050	Radiological Technician	370	120	240	470	514	596	2310
1420E110	Quality Engineer	20	75	345	56	54		550
1420T060	Quality Inspector	50	60	103	24	71		308
3280E130	Transportation Engineer	1924	1933	1914	1914	1914		9600
3280P170	Transporation Coordinator	122	226	132	419	365	382	1647
4110E130	Other/Technical Engineer	210	80	80	245	173	179	967
5100M6	Direct Purchases							
5100M8	Subcontracts							
5110M020	Fuel Manager	1924	1933	1914	1914	1914		9600
5112M010	CPP 651 Operations Foreman	400	200	330	710	685	765	3090
5112R040	CPP 651 Fuel Operators	1690	1228	1392	2488	2437	2386	11620
5113E080	Facility Fuel Engineer	811	1072	1137	1118	1056	765	5958
5122E130	Design Engineer			320				320
5130P130	Trainer	70	170	80	28	63		410
5152P160	Procedure Writer	240	496	293	153	235		1416
5213R040	CPP 602 Fuel Operators					203	337	540
5221E010	Technical Safety Engineer (TSE)	20	60	30		30		140
5432E130	Plant Systems Engineer	80	60	75	24	41		280
6100E130	Security Operations	20	60	30		30		140
6120P170	Safeguards & Accountability	4775	4785	4698	4990	5058	765	25072
6520C040	Machinist			320				320
6520C110	Welder			160				160
6520M010	Craft Foreman			80		71	84	235
6520R080	Equipment Operator	120	150	238	449	344	337	1638
	REPORT TOTAL	**12890**	**12778**	**13972**	**15041**	**15333**	**6643**	**76656**

MITCO - CPP 651 MATERIAL SCHEDULE

EPORT DATE 05AUG97 RUN NO. 506
13:12

Cost load by resource type

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

OPT C - BASE CASE & TNT & DED. CREW

START DATE 01JUL97 FIN DATE 04SEP03

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
1341E140	Radiological Engineer	3421	7573	4893	6842	17832	10101	50662
1342T050	Radiological Technician	20740	3457	88766	88014	88226	88554	377757
1420E110	Quality Engineer	1603	7526	19352	6328	4781		39589
1420T060	Quality Inspector	2628	3974	4577	3077			14256
1710P170	Environmental Engineer		4000	11202	11453	3875		30530
3280E130	Transportation Engineer	96509	96989	96029	95674	3875		389075
3280P170	Transporation Coordinator	9827	11146	12061	21243	24870	34542	113688
4110E010	Safety Analyst		3000	77811	65970			146781
4110E120	Criticality Safety Engineer		3000	13041	14386			30427
4110E130	Other/Technical Engineer	20303	7558	17012	22755	8958		76587
41E1R010	RAL Technician		1000			31869	50931	83800
41E1S010	RAL Engineer					18623	16977	35600
5100M4	Construction Purchases				432292	117708		550000
5100M6	Direct Purchases	86716	92147	86284	85853			351000
5100M8	Subcontracts	17050	270372	1143945	1284988			2716355
5110M020	Fuel Manager	132271	137130	145890	145870	6125		567286
5112G050	Administration Support				1904	8172		10075
5112M010	CPP 651 Operations Foreman	25421	25964	123056	92502	90430	92620	449994
5112R040	CPP 651 Fuel Operators	109726	145713	276218	95462	260286	391672	1279076
5113E070	Fuel Supervisor				150	4650		4800
5113E080	Facility Fuel Engineer	67554	52848	90392	61118	107065	100060	479037
5122E130	Design Engineer		4240	22018	5594	406		32258
5130P130	Trainer	5625	9375	4000	7094	16906		43000
5152P160	Procedure Writer	14541	15841	12384	11940	1716		56422
5213R040	CPP 602 Fuel Operators		900	339365	366774	200551	73635	981225
5221E010	Technical Safety Engineer (TSE)	2217	3458	2128	1638	4781		14222
5432E130	Plant Systems Engineer	4905	4679	3698	2540	3875		19696
6100E130	Security Operations	1887	5643	1811	6439	8269		24048
6120P170	Safeguards & Accountability	244052	252319	232883	250282	87690	88761	1155987
6520C020	Electrician				413	105		519
6520C040	Machinist		889	14356				15245
6520C110	Welder		445	7178				7622
6520M010	Craft Foreman		232	3740	892	4013	7588	16464
6520R080	Equipment Operator	7682	6074	10921	23820	12519	24281	85298
6520T070	Instrument Technician				1519	387		1906
	REPORT TOTAL	874678	1177490	2865010	3214823	1138565	979721	10250286

MITCO - CPP 651 MATERIAL SCHEDULE

EPORT DATE 05AUG97 RUN NO. 504
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ll Resource Estimates

PRIMAVERA PROJECT PLANNER

RESOURCE LOADING REPORT

TOTAL USAGE FOR YEAR

OPT C - BASE CASE & TNT & DED. CREW

START DATE 01JUL97 FIN DATE 04SEP03

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	TOTAL
1341E140	Radiological Engineer	56	139	80	127	296	166	865
1342T050	Radiological Technician	420	70	1798	1782	1787	1793	7650
1420E110	Quality Engineer	31	149	378	126	96		780
1420T060	Quality Inspector	51	78	89	60			278
1710P170	Environmental Engineer		80	207	216	78		580
3280E130	Transportation Engineer	1925	1934	1915	1908	78		7760
3280P170	Transporation Coordinator	196	222	241	424	496	689	2268
4110E010	Safety Analyst		60	996	874			1930
4110E120	Criticality Safety Engineer		60	167	213			440
4110E130	Other/Technical Engineer	260	132	233	371	179		1175
41E1R010	RAL Technician		20			637	1019	1676
41E1S010	RAL Engineer					372	340	712
5100M4	Construction Purchases							
5100M6	Direct Purchases							
5100M8	Subcontracts							
5110M020	Fuel Manager	1925	1994	2122	2121	88		8250
5112G050	Administration Support				38	202		240
5112M010	CPP 651 Operations Foreman	490	500	2372	1783	1787	1852	8785
5112R040	CPP 651 Fuel Operators	2115	2811	5324	1845	5065	7550	24710
5113E070	Fuel Supervisor				3	78		80
5113E080	Facility Fuel Engineer	1119	893	1511	1043	2141	2001	8708
5122E130	Design Engineer		79	341	112	8		540
5130P130	Trainer	113	188	80	142	338		860
5152P160	Procedure Writer	352	384	300	282	38		1356
5213R040	CPP 602 Fuel Operators		20	6541	7070	3866	1419	18916
5221E010	Technical Safety Engineer (TSE)	31	49	30	24	96		230
5432E130	Plant Systems Engineer	81	78	61	43	78		340
6100E130	Security Operations	31	109	30	136	184		490
6120P170	Safeguards & Accountability	4905	5086	4680	5041	1789	1791	23292
6520C020	Electrician				8	2		10
6520C040	Machinist		19	301				320
6520C110	Welder		9	151				160
6520M010	Craft Foreman		5	75	18	80	152	330
6520R080	Equipment Operator	161	128	229	500	313	607	1938
6520T070	Instrument Technician				32	8		40
	REPORT TOTAL	14263	15293	30255	26341	20179	19379	125709

MITCO - CPP 651 MATERIAL SCHEDULE

EPORT DATE 05AUG97 RUN NO. 466
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ost load by resource type

PRIMAVERA PROJECT PLANNER

COST LOADING REPORT

TOTAL USAGE FOR YEAR

OPT D - SHIP AS IS & TNT & DED. CREW

START DATE 01JUL97 FIN DATE 27MAR02

DATA DATE 01OCT97 PAGE NO. 1

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	TOTAL
1341E140	Radiological Engineer	3421	3573	4893	5876	2612	20375
1342T050	Radiological Technician	20740	5682	86655	88522	87768	289367
1420E110	Quality Engineer	1603	3526	19239	3837		28204
1420T060	Quality Inspector	2628	3974	4577	4615		15794
3280E130	Transportation Engineer	96509	96989	96029	95549		385075
3280P170	Transporation Coordinator	9827	8146	14568	31947	18093	82581
4110E130	Other/Technical Engineer	20303	2707	14863	24562	13078	75513
5100M6	Direct Purchases	86716	92147	86284	85853		351000
5100M8	Subcontracts	17050	4700	521422	1082778		1625950
5110M020	Fuel Manager	132271	132930	131613	130955		527770
5112M010	CPP 651 Operations Foreman	25421	57965	91044	93137	92273	359840
5112R040	CPP 651 Fuel Operators	109726	292128	126803	207367	115845	851870
5113E080	Facility Fuel Engineer	67554	47848	96906	103807	43569	359684
5122E130	Design Engineer		1240	20018			21258
5130P130	Trainer	5625	6375	4000	4500		20500
5152P160	Procedure Writer	14541	15841	12384	15686		58452
5213R040	CPP 602 Fuel Operators		11525	328563	269088	361810	970986
5221E010	Technical Safety Engineer (TSE)	2217	3458	2128	2128		9932
5432E130	Plant Systems Engineer	4905	4679	3698	3622		16904
6100E130	Security Operations	1887	2943	1811	1811		8452
6120P170	Safeguards & Accountability	244052	245119	243395	288580	88502	1109648
6520C040	Machinist		889	14356			15245
6520C110	Welder		445	7178			7622
6520M010	Craft Foreman		232	3740	3637	4057	11665
6520R080	Equipment Operator	7682	6074	10921	37781	15575	78034
	REPORT TOTAL	874678	1051135	1947087	2585639	843182	7301720

MITCO - CPP 651 MATERIAL SCHEDULE

PRIMAVERA PROJECT PLANNER

OPT D - SHIP AS IS & TNT & DED. CREW

EPORT DATE 05AUG97 12:54 RUN NO. 464

RESOURCE LOADING REPORT

START DATE 01JUL97 FIN DATE 27MAR02

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ll Resource Estimates

TOTAL USAGE FOR YEAR

RESOURCE	RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	TOTAL
341E140	Radiological Engineer	56	59	80	97	43	335
342T050	Radiological Technician	420	115	1755	1793	1777	5860
420E110	Quality Engineer	31	69	375	75		550
420T060	Quality Inspector	51	78	89	90		308
280E130	Transportation Engineer	1925	1934	1915	1906		7680
280P170	Transporation Coordinator	196	162	291	637	361	1647
110E130	Other/Technical Engineer	260	35	190	315	167	967
100M6	Direct Purchases						
100M8	Subcontracts						
110M020	Fuel Manager	1925	1934	1915	1906		7680
112M010	CPP 651 Operations Foreman	490	1117	1755	1795	1779	6936
112R040	CPP 651 Fuel Operators	2115	5631	2444	3997	2233	16420
113E080	Facility Fuel Engineer	1119	793	1605	1720	722	5958
122E130	Design Engineer		19	301			320
130P130	Trainer	113	128	80	90		410
152P160	Procedure Writer	352	384	300	380		1416
213R040	CPP 602 Fuel Operators		222	6333	5187	6974	18716
221E010	Technical Safety Engineer (TSE)	31	49	30	30		140
432E130	Plant Systems Engineer	81	78	61	60		280
100E130	Security Operations	31	49	30	30		140
120P170	Safeguards & Accountability	4905	4926	4891	5799	1779	22300
520C040	Machinist		19	301			320
520C110	Welder		9	151			160
520M010	Craft Foreman		5	75	73	82	235
520R080	Equipment Operator	161	128	229	793	327	1638
	REPORT TOTAL	**14263**	**17940**	**25199**	**26771**	**16243**	**100416**