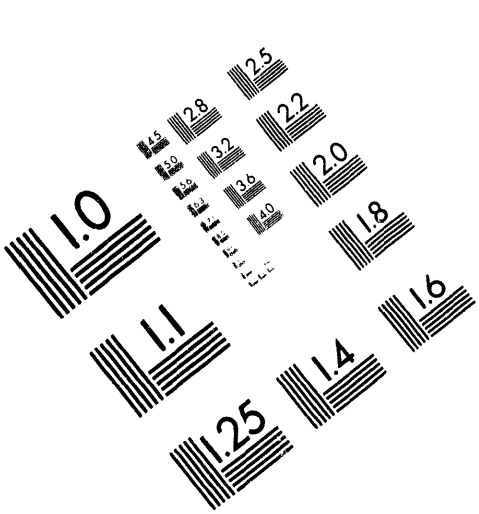

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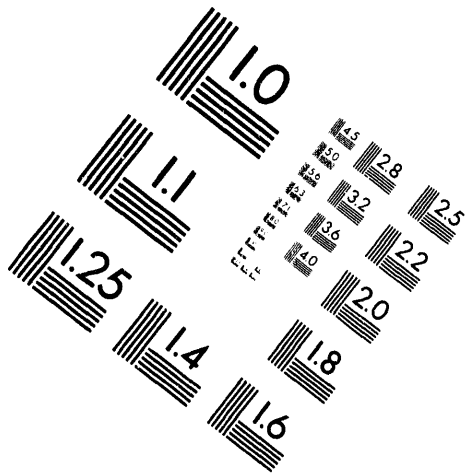

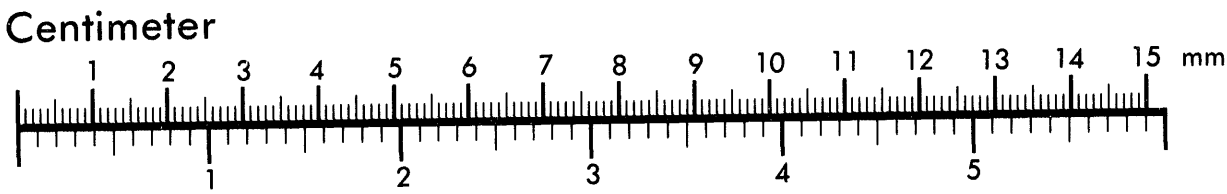

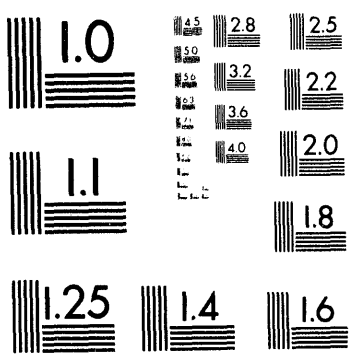

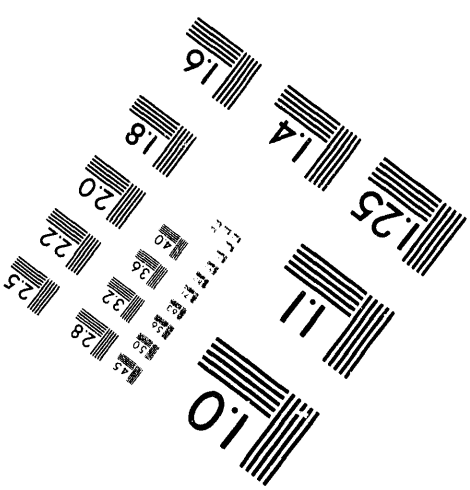

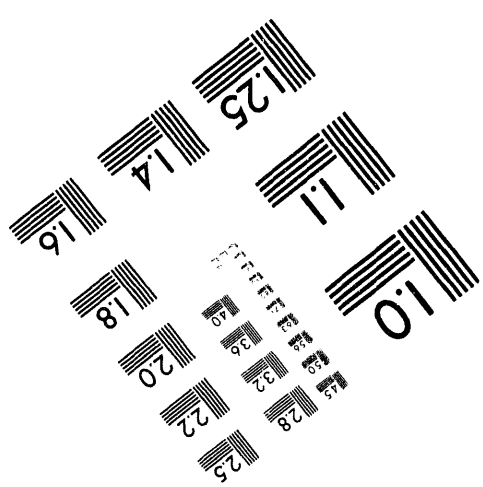

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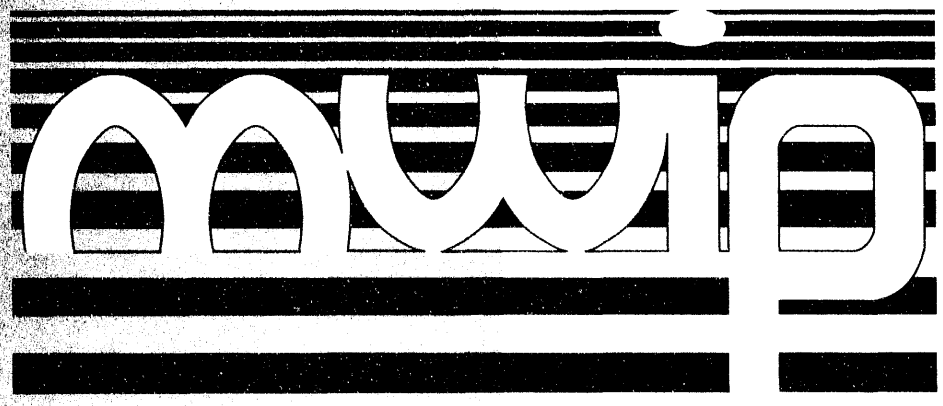

DOE\MWIP-25
LA-UR-94-928

LIFE CYCLE COST ANALYSIS for the PLASMA ARC FURNACE

Prepared for the Department of Energy-Office of Technology Development (EM-50), TTP Number AL-1212-19.

March 1994

DOE/MWIP--25
LA-UR--94-928

MIXED WASTE INTEGRATED PROGRAM

LIFE CYCLE COST ANALYSIS FOR THE PLASMA ARC FURNACE

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PRELIMINARY ISSUED FOR COMMENT

OCTOBER 20, 1993

DRAFT

MIXED WASTE INTEGRATED PROGRAM

LIFE CYCLE COST COMPARISON FOR THE PLASMA ARC FURNACE STUDY

EXECUTIVE SUMMARY

INTRODUCTION

The Mixed Waste Integrated Program requested that the Systems Analysis Group investigate the cost effectiveness of using the Plasma Arc Furnace (PAF) module in place of specified thermal and final forms treatment equipment in the baseline Mixed Waste Treatment Project (MWTP) study as performed by Bechtel Corporation, September 1992.

The attached estimates are based on the process equipment and facilities cost data contained in the Bechtel study. The PAF process equipment and facilities cost data were developed using independent cost estimates for the equipment list provided by SAIC, Waste Management and Technology Division, in cooperation with the Pollution Prevention and Systems Analysis Group of the Oak Ridge National Laboratory, Chemical Technology Division.

ESTIMATE METHODOLOGY

In order to develop the total life cycle cost estimate comparison for this study, it was necessary to use a common base for comparison. Although it was felt that the Bechtel MWTP study did not fully reflect the optimum size for the thermal and final forms treatment equipment, it was the best available data at the time.

Process Equipment

In both the baseline cost evaluation and the alternative treatment cost evaluation, the equipment costs for the major process equipment items were taken from areas 800 and 900 of the MWTP estimate, and factored from the direct cost level to total capital cost level by using the stated cost multipliers as defined in the study estimate. In the alternative treatment evaluation, the total capital cost was developed by replacing or removing certain process equipment items in areas 800 and 900, and applying the same multiplier factors to convert this direct cost to total capital cost.

Support Operations Equipment

The support operations equipment for areas 800 and 900 was factored from the MWTP cost estimate by the ratio of direct cost for the area process equipment against the direct cost for the

total process equipment. This factor was intended to apportion the support operations equipment to the user areas, in a direct ratio of process equipment cost.

Building Facilities

Using the MWTP cost summary for process buildings, the direct costs for building facilities for areas 800,900 and 1000 were factored according to their respective process floor areas versus the total process floor area. These direct costs were then treated to the same multipliers as the total building facilities cost to bring the direct cost to total capital cost.

The building facilities costs included the following:

Earthwork
Concrete
Steel
Architectural
HVAC
Mechanical Equipment
Piping
Electrical
Instrumentation
Mechanical Utility Pad
Electrical Utility Pad

Multiplier Factors

The following multipliers were used to expand the direct cost level to total cost:

Process Controls	20% of direct labor and materials
Indirect Field Costs	28% of direct labor for material 75% of direct labor for labor
Contractor's OH&P	5% of materials and subcontracts 15% of labor
Construction Management	10% of contractor's field cost
Architect/Engineer Costs	25% of total field cost
Project Management	6% of subtotal cost

Contingency	25% of total cost
Escalation	4.4% per year

Operations and Maintenance

Trial Burn

A 2 week trial burn period was estimated for the thermal process equipment in order to establish emission parameters, and to determine the optimum processing rate for the equipment.

Startup Cost

Based on the Waste Management Facilities Cost Information Report produced by Idaho National Engineering Laboratory, October 1992, a factor of 100% of the annual operating cost was used for the cost of starting up the process equipment. This factor includes all temporary equipment and utilities, consumable supplies and labor to establish the operability of the process.

Annual Operating Cost

Based on the MWTP study, the annual operating cycle was stated to be 31 weeks per year at 24 hours per day. This varies from most processing facilities which operate at 24 hours per day for 50 weeks per year. We have therefore extended the working year to 50 weeks to conform to industry standards. Operating cost includes direct and indirect labor and material, consumable supplies, utilities, and miscellaneous supplies including personnel protection.

Annual Maintenance Cost

Based on the Waste Management facilities Cost Information report, the cost of annual maintenance was factored at 17% for labor, 7% for materials, and 1% for supervision & expenses against the fixed equipment cost.

Annual Waste Disposal Cost

Based on information received for disposal at Chemnuclear, Barnwell, South Carolina, and transportation from a generic central US facility, the cost of sampling, transport and disposal was calculated for the output from the MWTP flowsheet of 16,953 Kg/week, over the 50 week operating period.

Contingency

Based on the level of estimate development, a contingency of 25% of all costs excluding fixed capital was added to the total life cycle cost. This amount is intended to reflect the confidence of the scope, design and cost data used in this study.

Discounted Cash Outflow

The discounted cash outflow table is intended to normalize the study by bringing all cost back to a common point of reference. The 3.7% Real Discount Rate is extrapolated from the Office of Management and Budget (OMB) Circular A-94, Dated October 29, 1992 (Appendix "C") which indicates the discount rates for Cost-Effectiveness, Lease Purchase, and related analysis. We have used the real discount rate as directed by the OMB circular which basically removes the effect of expected or actual inflation for cost-effectiveness analysis. We have also used the mid-year discount factor rather than the end-of-year discount factor as the cash outflows tend to occur in a steady stream throughout the project life cycle.

ASSUMPTIONS AND EXCLUSIONS

The cost effectiveness analysis is based on the following assumptions:

The cost data presented in the Bechtel MWTP study had been checked for reasonableness and accuracy within the range of a conceptual study estimate.

It is assumed for life cycle comparison that although the construction cost will be averaged over a minimum 5 year construction period, all capital construction costs occur in year "0".

An allowance of 20% of the fixed equipment cost is required every 5 years for replacement of major process equipment items not covered by the annual maintenance account.

The building facilities size and cost data is within the historic range of accuracy for a mixed low level waste treatment facility for the DOE complex.

The capital cost multiplier factors are within the standard American Association of Cost Engineers range of multipliers for capital cost development for process and utility industries.

The cost estimate has centered on the Thermal Treatment (Area 800) and the Final Forms Treatment (Area 900 in order to reflect the major cost differential as determined by the size and cost of redundant equipment. No comparison has been made at the front end of the flowsheet between the baseline and alternative flowsheets to determine what, if any,

impact to the life cycle cost is created by the changes in retrieval, handling, segregation and characterization that may occur when the PAF is introduced into the system.

The estimates for waste disposal are considered to be identical in both cases. No allowance has been made for any potential cost saving that may be realized from the ability of the alternative flowsheet to establish a volume reduction or to dispose of a vitrified or cast metal waste product at a lower cost disposal facility than that needed for the baseline flowsheet.

It is assumed that the Nevada test Site will not be available for long term storage and disposal of the final waste form, and that the Barnwell facility (or some other higher priced facility) will need to be used.

The waste characterization cost for the alternative flowsheet could increase significantly if it is necessary to establish the contents of every drum prior to incineration. It is therefore assumed that there will be no significant difference between the baseline and alternative characterization costs.

It is assumed that the plasma melting operation will not cause any migration from the low level classification of the final waste form, and that the waste form will still meet all disposal criteria for low level waste.

The life cycle cost analysis is sensitive to the availability and receiving costs of a permitted disposal facility. Any significant increase in the cost of transportation and disposal may result in any apparent advantage being minimized or reversed.

The removal of the glass melting facility in the final forms treatment area for the alternative flowsheet changes the criteria from that proposed in the SAIC draft flowsheet of April 02, 1993. It is our understanding that this furnace is not now required due to the anticipated ability of the slag from the plasma furnace to pass any tests for long term disposal criteria. Should this not be the case, then the capital cost for the alternative flowsheet would be increased significantly due to the approximately 3 to 1 ratio for slag to metal from the plasma furnace.

This study assumes the availability of sufficient low cost electric power, water, natural gas and rail/road transportation adjacent to the waste processing facility.

The following costs are excluded from this study:

Salvage costs for process and building equipment at the end of the useful project life cycle.

Decontamination and Decommissioning of process facilities and buildings.

Down-time and consumable costs associated with electrode replacement for the PAF.

Land and land improvements.

Roads and utility lines to the plantsite.

Research and Development costs.

CONCLUSION

As indicated by the attached life cycle cost comparisons, the alternative flowsheet shows a distinct economic advantage over the baseline flowsheet.

The major differences are in process equipment and annual maintenance. Due to the fact that the annual maintenance is factored from the fixed capital equipment, the difference in the cost of the process equipment is the main driver for the large cost delta over the 20 year life cycle.

It should be noted however that this cost analysis is extremely sensitive to the cost of the fixed capital equipment, which is susceptible to large cost swings. Should it be necessary to add back the glass melting process into the final forms treatment, this would add approximately $11 million to the fixed capital cost, which, when added to the annual maintenance cost would reflect in a $70 million cost increase over the life cycle of the facility. It can be seen from this example that any major cost changes in the fixed capital cost will be multiplied by a factor of 6 at the total life cycle cost level.

In summary, we would comment that this study indicates that further engineering development work be carried out on the flowsheet definition for both cases. If we can improve the confidence of the flowsheet, capital cost estimates, and therefore the life cycle cost estimate, we would be better able to draw a more definitive conclusion from the data. At this point, there is sufficient uncertainty in both the baseline and alternative flowsheets to require that additional process development be carried out before we can prepare a more definitive cost analysis.

LIFE CYCLE COST COMPARISON

BETWEEN

BASELINE AND ALTERNATIVE FLOWSHEETS

TABLE I	MIXED WASTE INTEGRATED PROGRAM		
15-Oct-93	PLASMA ARC COST EFFECTIVENESS STUDY		
FILENAME: PLASCOMP.XLS			
LIFE CYCLE COST COMPARISON BETWEEN BASELINE AND ALTERNATIVE FLOWSHEETS			
Description	Baseline	Alternative	Difference
Total Building Facilities	$62,577	$49,100	$13,477
Total Process Equipment	$87,605	$17,874	$69,731
Total Trial Burn	$285	$285	$0
Total Startup Cost	$12,477	$9,362	$3,115
Total Annual Operating	$172,462	$129,732	$42,730
Total Annual Maintenance	$194,724	$39,728	$154,996
Total Annual Waste Disposal	$48,630	$48,630	$0
Subtotal	$578,730	$294,701	$284,029
Contingency	$107,137	$56,932	$50,205
Total Life Cycle Cost	$685,867	$351,633	$334,234

Notes

The cost comparison is based on the 20 year life cycle cost analysis attached.

ALTERNATIVE THERMAL TREATMENT

LIFE CYCLE COST ESTIMATE

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					($us x 1,000)		
				MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA1R.XLS	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	1.0000	0.9820	0.9470	0.9131	0.8704	0.8370	0.8048	0.7739	0.7441	0.7155	0.6880
BUILDING FACILITIES											
Building facilities - Area 800	$17,303										
Building facilities - Area 900	$6,793										
Building facilities - Area 1000	$25,004										
Total Building Facilities	$49,100	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PROCESS EQUIPMENT											
Thermal Treatment - Area 800	$7,610					$1,274					$1,047
Final Forms Treatment - Area 900	$909					$152					$125
Support Operations equipment - Area 80	$2,956					$495					$407
Support Operations equipment - Area 90	$353					$59					$49
Total Process Equipment	$11,828	$0	$0	$0	$0	$1,980	$0	$0	$0	$0	$1,628
TRIAL BURN											
Process Engineer - 2	$42										
Technician (Operator) - 3	$45										
Operating Engineer - 3	$45										
Rad. Technician - 2	$31										
Laborer - 4	$56										
Oversight Engineer - 1	$34										
Consumable Material	$30										
Supervision and Expenses	$3										
Total Trial Burn	$285	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STARTUP											
Startup Cost	$9,362										

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION		DISCOUNTED CASH OUTFLOW BY FISCAL YEAR								($us x 1,000)		
		MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST										
FILENAME: PLASMA1R.XLS	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	1.0000	0.9820	0.9470	0.9131	0.8704	0.8370	0.8048	0.7739	0.7441	0.7155	0.6880
Total Startup	$9,362	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ANNUAL OPERATING											
Process Engineers - 2		$518	$500	$482	$460	$442	$425	$409	$393	$378	$363
Technician (Operator) - 6		$1,827	$1,761	$1,698	$1,619	$1,557	$1,497	$1,439	$1,384	$1,331	$1,280
Operating Engineer - 4		$1,096	$1,057	$1,019	$971	$934	$898	$864	$830	$798	$768
Rad. Technician - 2		$377	$364	$351	$334	$321	$309	$297	$286	$275	$264
Laborer - 6		$1,367	$1,318	$1,271	$1,212	$1,165	$1,120	$1,077	$1,036	$996	$958
Oversight Engineer - 2		$837	$807	$778	$742	$713	$686	$659	$634	$610	$586
Electric Power		$825	$795	$767	$731	$703	$676	$650	$625	$601	$578
Natural Gas		$795	$767	$740	$705	$678	$652	$627	$603	$580	$557
Lubricants		$61	$59	$57	$54	$52	$50	$48	$47	$45	$43
Compressed Gas		$614	$592	$571	$544	$523	$503	$484	$465	$447	$430
Raw Materials& Chemical Additives		$491	$474	$457	$435	$419	$402	$387	$372	$358	$344
Miscellaneous Supplies (Rad. Protection)		$295	$284	$274	$261	$251	$241	$232	$223	$215	$206
Supervision & Expenses		$91	$88	$85	$81	$78	$75	$72	$69	$66	$64
Total Annual Operating	$0	$9,194	$8,866	$8,549	$8,149	$7,836	$7,535	$7,245	$6,966	$6,699	$6,441
ANNUAL MAINTENANCE											
Maintenance Labor		$1,975	$1,904	$1,836	$1,750	$1,683	$1,618	$1,556	$1,496	$1,439	$1,383
Maintenance Materials		$813	$784	$756	$721	$693	$666	$641	$616	$592	$570
Supervision & Expenses		$28	$27	$26	$25	$24	$23	$22	$21	$20	$20
Total Annual Maintenance	$0	$2,816	$2,715	$2,618	$2,496	$2,400	$2,308	$2,219	$2,133	$2,051	$1,973
ANNUAL WASTE DISPOSAL											
Containers (55 gallon drum)		$45	$43	$42	$40	$38	$37	$36	$34	$33	$32
Assay & Storage		$13	$12	$12	$11	$11	$10	$10	$10	$9	$9
Transportation		$26	$25	$24	$23	$22	$21	$20	$19	$19	$18

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR (Sus x 1,000)							
				MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA1R.XLS	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	1.0000	0.9820	0.9470	0.9131	0.8704	0.8370	0.8048	0.7739	0.7441	0.7155	0.6880
Long Term Disposal & Storage		$3,329	$3,210	$3,095	$2,951	$2,837	$2,728	$2,624	$2,522	$2,426	$2,332
Supervision & Expenses		$34	$33	$32	$30	$29	$28	$27	$26	$25	$24
Total Annual Waste Disposal	$0	$3,446	$3,324	$3,205	$3,055	$2,938	$2,825	$2,716	$2,612	$2,511	$2,415
Subtotal	$70,576	$15,456	$14,905	$14,371	$13,699	$15,154	$12,667	$12,180	$11,711	$11,261	$12,456
Contingency @ 25%	$2,412	$3,864	$3,726	$3,593	$3,425	$3,293	$3,167	$3,045	$2,928	$2,815	$2,707
Annual Life Cycle cost	$72,987	$19,320	$18,631	$17,964	$17,124	$18,447	$15,834	$15,226	$14,639	$14,077	$15,163

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION					DISCOUNTED CASH OUTFLOW BY FISCAL YEAR ($ us x 1,000)						
					MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST						
FILENAME: PLASMA1R.XLS	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	TOTAL
	0.6615	0.6361	0.6116	0.5881	0.5655	0.5437	0.5228	0.5027	0.4834	0.4648	
BUILDING FACILITIES											
Building facilities - Area 800											$17,303
Building facilities - Area 900											$6,793
Building facilities - Area 1000											$25,004
Total Building Facilities	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$49,100
PROCESS EQUIPMENT											
Thermal Treatment - Area 800					$861					$707	$11,499
Final Forms Treatment - Area 900					$103					$85	$1,374
Support Operations equipment - Area 800					$334					$275	$4,467
Support Operations equipment - Area 900					$40					$33	$533
Total Process Equipment	$0	$0	$0	$0	$1,338	$0	$0	$0	$0	$1,100	$17,874
TRIAL BURN											
Process Engineer - 2											$42
Technician (Operator) - 3											$45
Operating Engineer - 3											$45
Rad. Technician - 2											$31
Laborer - 4											$56
Oversight Engineer - 1											$34
Consumable Material											$30
Supervision and Expenses											$3
Total Trial Burn	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$285
STARTUP											
Startup Cost											$9,362

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION — DISCOUNTED CASH OUTFLOW BY FISCAL YEAR ($ us x 1,000)

MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST

FILENAME: PLASMA1R.XLS	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	TOTAL
	0.6615	0.6361	0.6116	0.5881	0.5655	0.5437	0.5228	0.5027	0.4834	0.4648	
Total Startup	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$9,362
ANNUAL OPERATING											
Process Engineers - 2	$349	$336	$323	$311	$299	$287	$276	$265	$255	$245	$7,316
Technician (Operator) - 6	$1,230	$1,183	$1,138	$1,094	$1,052	$1,011	$972	$935	$899	$865	$25,772
Operating Engineer - 4	$738	$710	$683	$656	$631	$607	$583	$561	$539	$519	$15,463
Rad. Technician - 2	$254	$244	$235	$226	$217	$209	$201	$193	$186	$178	$5,321
Laborer - 6	$921	$885	$851	$819	$787	$757	$728	$700	$673	$647	$19,288
Oversight Engineer - 2	$564	$542	$521	$501	$482	$463	$445	$428	$412	$396	$11,805
Electric Power	$556	$534	$514	$494	$475	$457	$439	$422	$406	$390	$11,639
Natural Gas	$536	$515	$495	$476	$458	$440	$423	$407	$392	$376	$11,223
Lubricants	$41	$40	$38	$37	$35	$34	$33	$31	$30	$29	$866
Compressed Gas	$413	$398	$382	$368	$353	$340	$327	$314	$302	$291	$8,660
Raw Materials& Chemical Additives	$331	$318	$306	$294	$283	$272	$261	$251	$242	$232	$6,928
Miscellaneous Supplies (Rad. Protection)	$198	$191	$183	$176	$170	$163	$157	$151	$145	$139	$4,157
Supervision & Expenses	$61	$59	$57	$55	$52	$50	$48	$47	$45	$43	$1,284
Total Annual Operating	$6,193	$5,955	$5,726	$5,506	$5,294	$5,090	$4,895	$4,706	$4,526	$4,352	$129,723
ANNUAL MAINTENANCE											
Maintenance Labor	$1,330	$1,279	$1,230	$1,183	$1,137	$1,093	$1,051	$1,011	$972	$935	$27,862
Maintenance Materials	$548	$527	$506	$487	$468	$450	$433	$416	$400	$385	$11,473
Supervision & Expenses	$19	$18	$17	$17	$16	$15	$15	$14	$14	$13	$393
Total Annual Maintenance	$1,897	$1,824	$1,754	$1,686	$1,621	$1,559	$1,499	$1,441	$1,386	$1,333	$39,728
ANNUAL WASTE DISPOSAL											
Containers (55 gallon drum)	$30	$29	$28	$27	$26	$25	$24	$23	$22	$21	$636

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR (S us x 1,000)							
				MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA1R.XLS	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	TOTAL
	0.6615	0.6361	0.6116	0.5881	0.5655	0.5437	0.5228	0.5027	0.4834	0.4648	
Assay & Storage	$9	$8	$8	$8	$7	$7	$7	$7	$6	$6	$180
Transportation	$17	$17	$16	$15	$15	$14	$14	$13	$13	$12	$360
Long Term Disposal & Storage	$2,242	$2,156	$2,073	$1,994	$1,917	$1,843	$1,772	$1,704	$1,639	$1,576	$46,972
Supervision & Expenses	$23	$22	$21	$20	$20	$19	$18	$17	$17	$16	$481
Total Annual Waste Disposal	$2,322	$2,232	$2,147	$2,064	$1,985	$1,908	$1,835	$1,764	$1,697	$1,631	$48,630
Subtotal	$10,411	$10,012	$9,626	$9,256	$10,238	$8,557	$8,228	$7,912	$7,608	$8,415	$294,701
Contingency @ 25%	$2,603	$2,503	$2,407	$2,314	$2,225	$2,139	$2,057	$1,978	$1,902	$1,829	$56,932
Annual Life Cycle cost	$13,014	$12,515	$12,033	$11,570	$12,463	$10,697	$10,285	$9,890	$9,510	$10,244	$351,633

BASELINE THERMAL TREATMENT

COST ESTIMATE SUMMARY

	MIXED WASTE INTEGRATED PROGRAM		
19-Oct-93	PLASMA ARC COST EFFECTIVENESS STUDY		
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE			
DESCRIPTION		CALCULATIONS	$ US x 1,000
FILENAME: PLASMA2R.XLS			
BUILDING FACILITIES			
Building facilities - Area 800		See attached estimate	$29,610
Building facilities - Area 900		See attached estimate	$11,599
Building facilities - Area 1000		See attached estimate	$21,367
Total Building Facilities			$62,577
PROCESS EQUIPMENT			
Thermal Treatment - Area 800		See attached estimate	$26,670
Final Forms Treatment - Area 900		See attached estimate	$23,618
Support Operations equipment - Area 800		See attached estimate	$4,103
Support Operations equipment - Area 900		See attached estimate	$3,585
Total Process Equipment			$57,976
TRIAL BURN			
Process Engineer - 2		2 x 10 Days @ 24 hrs/day @ $88/hr	$42
Technician (Operator) - 3		3 x 10 Days @ 24 hrs/day @ $62/hr	$45
Operating Engineer - 3		3 x 10 Days @ 24 hrs/day @ $62/hr	$45
Rad. Technician - 2		2 x 10 Days @ 24 hrs/day @ $64/hr	$31
Laborer - 4		4 x 10 Days @ 24 hrs/day @ $58/hr	$56
Oversight Engineer - 1		1 x 10 days @ 24 hrs/day @ $142/hr	$34
Consumable Material		10 days @ $3,000/day	$30
Supervision and Expenses		1% of Labor & Materials	$3
Total Trial Burn			$285
STARTUP			
Startup Cost		100% of 1 years operating cost	$12,447

	MIXED WASTE INTEGRATED PROGRAM		
19-Oct-93	PLASMA ARC COST EFFECTIVENESS STUDY		
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE			
	DESCRIPTION	CALCULATIONS	$ US x 1,000
FILENAME: PLASMA2R.XLS			
Total Startup			$12,447
ANNUAL OPERATING			
Process Engineers - 2		2 x 250 days @ 24 hrs/day @ $88/hr	$1,056
Technician (Operator) - 6		6 x 250 days @ 24 hrs/day @ $62/hr	$2,232
Operating Engineer - 4		4 x 250 days @ 24 hrs/day @ $62/hr	$1,488
Rad. Technician - 2		2 x 250 days @ 24 hrs/day @ $64/hr	$768
Laborer - 6		6 x 250 days @ 24 hrs/day @ $58/hr	$2,088
Oversight Engineer - 2		2 x 250 days @ 24 hrs/day @ $142/hr	$1,704
Electric Power		250 days @ 24 hrs/day @ 1500 kw/hr @ $0.035/kwhr.	$315
Natural Gas		250 days @ 24 hrs/day @ 37 therm/hr @ $5.00/therm.	$1,110
Lubricants		250 days @ $250/day	$63
Compressed Gas		250 days @ $1500/day	$375
Raw Materials& Chemical Additives		250 days @ $3000/day	$750
Miscellaneous Supplies (Rad. Protection)		250 days @ $1500/day	$375
Supervision & Expenses		1% of Labor & Material	$123
Total Annual Operating			$12,447
ANNUAL MAINTENANCE			
Maintenance Labor		17% of fixed equipment cost	$9,856
Maintenance Materials		7% of fixed equipment cost	$4,058
Supervision & Expenses		1% of Labor & Materials	$139
Total Annual Maintenance			$14,053
ANNUAL WASTE DISPOSAL			
Containers (55 gallon drum)		16,953 kg/week x 50 weeks @ 75 kg/cf @ 7.4 cf/bbl = 1530 bbl x $30/bb	$46
Assay & Storage		Sampling 1 bbl in 60 = 26 samples @ $500 each	$13

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE

DESCRIPTION	CALCULATIONS	$ US x 1,000
FILENAME: PLASMA2R.XLS		
Transportation	1530 bbls @ $17 each	$26
Long Term Disposal & Storage	11,300 cf @ $300/cf	$3,390
Supervision & Expenses	1% of waste disposal cost	$35
Total Annual Waste Disposal		$3,510

BASELINE THERMAL TREATMENT

LIFE CYCLE COST ESTIMATE

		MIXED WASTE INTEGRATED PROGRAM										
19-Oct-93		PLASMA ARC COST EFFECTIVENESS STUDY										
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE												
	DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					($us x 1,000)		
					MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA2R.XLS		YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		1.0000	0.9820	0.9470	0.9131	0.8704	0.8370	0.8048	0.7739	0.7441	0.7155	0.6880
BUILDING FACILITIES												
Building facilities - Area 800		$29,610										
Building facilities - Area 900		$11,599										
Building facilities - Area 1000		$21,367										
Total Building Facilities		$62,577	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PROCESS EQUIPMENT												
Thermal Treatment - Area 800		$26,670					$4,465					$3,670
Final Forms Treatment - Area 900		$23,618					$3,954					$3,250
Support Operations equipment - Area 80		$4,103					$687					$565
Support Operations equipment - Area 90		$3,585					$600					$493
Total Process Equipment		$57,976	$0	$0	$0	$0	$9,705	$0	$0	$0	$0	$7,978
TRIAL BURN												
Process Engineer - 2		$42										
Technician (Operator) - 3		$45										
Operating Engineer - 3		$45										
Rad. Technician - 2		$31										
Laborer - 4		$56										
Oversight Engineer - 1		$34										
Consumable Material		$30										
Supervision and Expenses		$3										
Total Trial Burn		$285	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STARTUP												
Startup Cost		$12,447										
Total Startup		$12,447	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE

DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					(Sus x 1,000)		
				MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA2R.XLS	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	1.0000	0.9820	0.9470	0.9131	0.8704	0.8370	0.8048	0.7739	0.7441	0.7155	0.6880
ANNUAL OPERATING											
Process Engineers - 2		$1,037	$1,000	$964	$919	$884	$850	$817	$786	$756	$727
Technician (Operator) - 6		$2,192	$2,114	$2,038	$1,943	$1,868	$1,796	$1,727	$1,661	$1,597	$1,536
Operating Engineer - 4		$1,461	$1,409	$1,359	$1,295	$1,245	$1,198	$1,152	$1,107	$1,065	$1,024
Rad. Technician - 2		$754	$727	$701	$668	$643	$618	$594	$571	$550	$528
Laborer - 6		$2,050	$1,977	$1,907	$1,817	$1,748	$1,680	$1,616	$1,554	$1,494	$1,437
Oversight Engineer - 2		$1,673	$1,614	$1,556	$1,483	$1,426	$1,371	$1,319	$1,268	$1,219	$1,172
Electric Power		$309	$298	$288	$274	$264	$254	$244	$234	$225	$217
Natural Gas		$1,090	$1,051	$1,014	$966	$929	$893	$859	$826	$794	$764
Lubricants		$61	$59	$57	$54	$52	$50	$48	$47	$45	$43
Compressed Gas		$368	$355	$342	$326	$314	$302	$290	$279	$268	$258
Raw Materials& Chemical Additives		$737	$710	$685	$653	$628	$604	$580	$558	$537	$516
Miscellaneous Supplies (Rad. Protection)		$368	$355	$342	$326	$314	$302	$290	$279	$268	$258
Supervision & Expenses		$121	$117	$113	$107	$103	$99	$95	$92	$88	$85
Total Annual Operating	$0	$12,223	$11,787	$11,365	$10,834	$10,418	$10,017	$9,633	$9,262	$8,906	$8,563
ANNUAL MAINTENANCE											
Maintenance Labor		$9,679	$9,334	$8,999	$8,579	$8,249	$7,932	$7,628	$7,334	$7,052	$6,781
Maintenance Materials		$3,985	$3,843	$3,706	$3,532	$3,397	$3,266	$3,141	$3,020	$2,904	$2,792
Supervision & Expenses		$137	$132	$127	$121	$116	$112	$108	$104	$100	$96
Total Annual Maintenance	$0	$13,800	$13,309	$12,832	$12,232	$11,763	$11,310	$10,876	$10,457	$10,055	$9,669
ANNUAL WASTE DISPOSAL											
Containers (55 gallon drum)		$45	$43	$42	$40	$38	$37	$36	$34	$33	$32
Assay & Storage		$13	$12	$12	$11	$11	$10	$10	$10	$9	$9
Transportation		$26	$25	$24	$23	$22	$21	$20	$19	$19	$18
Long Term Disposal & Storage		$3,329	$3,210	$3,095	$2,951	$2,837	$2,728	$2,624	$2,522	$2,426	$2,332
Supervision & Expenses		$34	$33	$32	$30	$29	$28	$27	$26	$25	$24
Total Annual Waste Disposal	$0	$3,446	$3,324	$3,205	$3,055	$2,938	$2,825	$2,716	$2,612	$2,511	$2,415

		MIXED WASTE INTEGRATED PROGRAM										
19-Oct-93		PLASMA ARC COST EFFECTIVENESS STUDY										
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE												
	DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					(Sus x 1,000)		
					MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA2R.XLS		YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		1.0000	0.9820	0.9470	0.9131	0.8704	0.8370	0.8048	0.7739	0.7441	0.7155	0.6880
Subtotal		$133,284	$29,470	$28,419	$27,402	$26,121	$34,823	$24,152	$23,225	$22,330	$21,472	$28,624
Contingency @ 25%		$3,183	$7,367	$7,105	$6,850	$6,530	$6,280	$6,038	$5,806	$5,583	$5,368	$5,162
Annual Life Cycle cost		$136,467	$36,837	$35,524	$34,252	$32,651	$41,103	$30,190	$29,031	$27,913	$26,840	$33,786

		MIXED WASTE INTEGRATED PROGRAM										
19-Oct-93		PLASMA ARC COST EFFECTIVENESS STUDY										
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE												
	DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					($ us x 1,000)		
					MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA2R.XLS		YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	TOTAL
		0.6615	0.6361	0.6116	0.5881	0.5655	0.5437	0.5228	0.5027	0.4834	0.4648	
BUILDING FACILITIES												
Building facilities - Area 800												$29,610
Building facilities - Area 900												$11,599
Building facilities - Area 1000												$21,367
Total Building Facilities		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$62,577
PROCESS EQUIPMENT												
Thermal Treatment - Area 800						$3,016					$2,479	$40,300
Final Forms Treatment - Area 900						$2,671					$2,196	$35,689
Support Operations equipment - Area 800						$464					$381	$6,200
Support Operations equipment - Area 900						$405					$333	$5,417
Total Process Equipment		$0	$0	$0	$0	$6,557	$0	$0	$0	$0	$5,389	$87,605
TRIAL BURN												
Process Engineer - 2												$42
Technician (Operator) - 3												$45
Operating Engineer - 3												$45
Rad. Technician - 2												$31
Laborer - 4												$56
Oversight Engineer - 1												$34
Consumable Material												$30
Supervision and Expenses												$3
Total Trial Burn		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$285
STARTUP												
Startup Cost												$12,447

		MIXED WASTE INTEGRATED PROGRAM										
19-Oct-93		PLASMA ARC COST EFFECTIVENESS STUDY										
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE												
	DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					(S us x 1,000)		
					MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA2R.XLS		YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	TOTAL
		0.6615	0.6361	0.6116	0.5881	0.5655	0.5437	0.5228	0.5027	0.4834	0.4648	
Total Startup		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$12,447
ANNUAL OPERATING												
Process Engineers - 2		$699	$672	$646	$621	$597	$574	$552	$531	$510	$491	$14,632
Technician (Operator) - 6		$1,476	$1,420	$1,365	$1,313	$1,262	$1,214	$1,167	$1,122	$1,079	$1,037	$30,927
Operating Engineer - 4		$984	$947	$910	$875	$841	$809	$778	$748	$719	$692	$20,618
Rad. Technician - 2		$508	$489	$470	$452	$434	$418	$402	$386	$371	$357	$10,641
Laborer - 6		$1,381	$1,328	$1,277	$1,228	$1,181	$1,135	$1,092	$1,050	$1,009	$971	$28,931
Oversight Engineer - 2		$1,127	$1,084	$1,042	$1,002	$964	$926	$891	$857	$824	$792	$23,611
Electric Power		$208	$200	$193	$185	$178	$171	$165	$158	$152	$146	$4,365
Natural Gas		$734	$706	$679	$653	$628	$604	$580	$558	$537	$516	$15,380
Lubricants		$41	$40	$38	$37	$35	$34	$33	$31	$30	$29	$866
Compressed Gas		$248	$239	$229	$221	$212	$204	$196	$189	$181	$174	$5,196
Raw Materials& Chemical Additives		$496	$477	$459	$441	$424	$408	$392	$377	$363	$349	$10,392
Miscellaneous Supplies (Rad. Protectior		$248	$239	$229	$221	$212	$204	$196	$189	$181	$174	$5,196
Supervision & Expenses		$82	$78	$75	$72	$70	$67	$64	$62	$60	$57	$1,708
Total Annual Operating		$8,234	$7,917	$7,612	$7,320	$7,039	$6,767	$6,507	$6,257	$6,017	$5,785	$172,462
ANNUAL MAINTENANCE												
Maintenance Labor		$6,520	$6,269	$6,028	$5,796	$5,574	$5,359	$5,153	$4,955	$4,764	$4,581	$136,564
Maintenance Materials		$2,685	$2,582	$2,482	$2,387	$2,295	$2,207	$2,122	$2,040	$1,962	$1,886	$56,232
Supervision & Expenses		$92	$89	$85	$82	$79	$76	$73	$70	$67	$65	$1,928
Total Annual Maintenance		$9,296	$8,939	$8,595	$8,265	$7,947	$7,641	$7,347	$7,065	$6,793	$6,532	$194,724
ANNUAL WASTE DISPOSAL												
Containers (55 gallon drum)		$30	$29	$28	$27	$26	$25	$24	$23	$22	$21	$636
Assay & Storage		$9	$8	$8	$8	$7	$7	$7	$7	$6	$6	$180

		MIXED WASTE INTEGRATED PROGRAM										
19-Oct-93		PLASMA ARC COST EFFECTIVENESS STUDY										
BASELINE THERMAL TREATMENT - BASED ON BECHTEL MWTP DESIGN STUDY & COST ESTIMATE												
	DESCRIPTION				DISCOUNTED CASH OUTFLOW BY FISCAL YEAR					(S us x 1,000)		
					MIDYEAR DISCOUNT FACTORS AT 3.7% REAL INTEREST							
FILENAME: PLASMA2R.XLS		YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20	TOTAL
		0.6615	0.6361	0.6116	0.5881	0.5655	0.5437	0.5228	0.5027	0.4834	0.4648	
Transportation		$17	$17	$16	$15	$15	$14	$14	$13	$13	$12	$360
Long Term Disposal & Storage		$2,242	$2,156	$2,073	$1,994	$1,917	$1,843	$1,772	$1,704	$1,639	$1,576	$46,972
Supervision & Expenses		$23	$22	$21	$20	$20	$19	$18	$17	$17	$16	$481
Total Annual Waste Disposal		$2,322	$2,232	$2,147	$2,064	$1,985	$1,908	$1,835	$1,764	$1,697	$1,631	$48,630
Subtotal		$19,851	$19,089	$18,354	$17,649	$23,528	$16,316	$15,689	$15,086	$14,507	$19,338	$578,730
Contingency @ 25%		$4,963	$4,772	$4,589	$4,412	$4,243	$4,079	$3,922	$3,771	$3,627	$3,487	$107,137
Annual Life Cycle cost		$24,814	$23,862	$22,943	$22,061	$27,770	$20,395	$19,611	$18,857	$18,133	$22,825	$685,867

BASELINE THERMAL TREATMENT

CAPITAL COST ESTIMATE

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
ITEM	DESCRIPTION	UNIT	QTY	LABOR MHRS	LABOR RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	THERMAL TREATMENT EQUIPMENT - AREA 800												
370	LOW RESIDUE THERMAL TREATMENT	EA	1	950	27.4		$270,000		$26,030	$0	$270,000	$0	$296,030
	CONTROLLED AIR OXIDATION FURNACE												
380	CONC ORGANIC THERMAL TREATMENT	EA	1	500	$27.40		$50,000		$13,700	$0	$50,000	$0	$63,700
	OXIDATION FURNACE BURNER												
470	HIGH RESIDUE THERMAL TREATMENT	EA	1	1,210	$27.40		$168,000		$33,154	$0	$168,000	$0	$201,154
	ROTARY KILN INCINERATOR												
375	HEAVY ORGANIC THERMAL TREATMENT	EA	1	1,030	$27.40		$55,000		$28,222	$0	$55,000	$0	$83,222
	CAR BOTTOM FURNACE												
670	GLASS MELTER	EA	1	12,000	$27.40	$0	$5,304,000		$328,800	$0	$5,304,000	$0	$5,632,800
	CERAMIC JOULE MELTER W/SPOUT												
770	FERROUS MELT/SLAG	EA	1	1,290	$27.40		$1,531,000		$35,346	$0	$1,531,000	$0	$1,566,346
	CERAMIC ELECTRIC HEATED MELTER W/SPOUT												
775	NON-FERROUS MELT/SLAG	EA	1	1,290	$27.40		$1,531,000		$35,346	$0	$1,531,000	$0	$1,566,346
	CERAMIC ELECTRIC HEATED MELTER W/SPOUT												
480	SECONDARY COMBUSTION	EA	1	1,624	$27.40		$263,250		$44,498	$0	$263,250	$0	$307,748
	REFRACTORYLINED COMBUSTION CHAMBER												
490	OFF-GAS TREATMENT SYSTEM	EA	1	678	$27.40		$67,200		$18,577	$0	$67,200	$0	$85,777
	MISCELLANEOUS EQUIPMENT												
560	MERCURY BAKEOUT	EA	1	1,250	$27.40		$120,000		$34,250	$0	$120,000	$0	$154,250
	ELECTRIC REFRACTORY LINED FURNACE												
562	MERCURY SEPARATION	EA	1	300	$27.40		$20,000		$8,220	$0	$20,000	$0	$28,220
	MERCURY ABSORPTION PACKED BED												
565	MERCURY CONDENSATION	EA	1	844	$27.40		$119,500		$23,126	$0	$119,500	$0	$142,626
	CONDENSER, REACTOR, PUMP, TANK ETC.												
570	NON-METALLICS DRYING	EA	1	2,120	$27.40		$238,000		$58,088	$0	$238,000	$0	$296,088

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	ELECTRIC HEATED TUNNEL KILN												
	SUBTOTAL DIRECT EQUIPMENT COST			25,086	$27.40		9,736,950	0	687,356	0	9,736,950	0	10,424,306
	PROCESS CONTROLS @ 20%	LOT	1	5,017	$27.40		$1,947,390		$137,471	$0	$1,947,390	$0	$2,084,861
	TOTAL DIRECT EQUIPMENT COST	LOT		30,103			$11,684,340		$824,828	$0	$11,684,340	$0	$12,509,168
	INDIRECT FIELD COST @ 28/75%								$618,621		$230,952	$0	$849,573
	SUBTOTAL CONTRACTORS FIELD COST								$1,443,448	$0	$11,915,292	$0	$13,358,740
	CONTRACTORS O/H & P @ 5/15%								$216,517	$0	$595,765	$0	$812,282
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$1,659,966	$0	$12,511,056	$0	$14,171,022
	CONSTRUCTION MANAGEMENT @ 10%												$1,417,102
	SUBTOTAL FIELD COSTS - W/CM												$15,588,124
	ENGINEERING, DESIGN, INSPECT @ 25%												$3,897,031
	SUBTOTAL - W/ED&I												$19,485,155
	PROJECT MANAGEMENT @ 6%												$1,169,109
	SUBTOTAL - W/PM												$20,654,265
	CONTINGENCY @ 25%												$5,163,566
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$851,988
	TOTAL THERMAL TREATMENT EQUIPMENT - AREA 800												$26,669,819
	FINAL FORMS TREATMENT EQUIPMENT- AREA 900												
195	LEAD POLYMER ENCAPSULATION	EA	1	452	$27.4		$308,800		$12,385	$0	$308,800	$0	$321,185
295	GLASS MELTER	EA	1	6544	$27.4		$5,219,000		$179,306	$0	$5,219,000	$0	$5,398,306
395	MERCURY POLYMER SOLIDIFICATION	EA	1	36	$27.4		$15,700		$986	$0	$15,700	$0	$16,686
585	MERCUTY DISTILLATION	EA	1	92	$27.4		$24,000		$2,521	$0	$24,000	$0	$26,521
695	SUPER COMPACTION	EA	1	9004	$27.4		$3,170,600		$246,710	$0	$3,170,600	$0	$3,417,310
795	GROUTING	EA	1	1144	$27.4		$182,400		$31,346	$0	$182,400	$0	$213,746
	SUBTOTAL DIRECT EQUIPMENT COST			17,272	$27.40	$0	$8,920,500	$0	$473,253	$0	$8,920,500	$0	$9,393,753

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS					COSTS				
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	PROCESS CONTROLS @ 20%	LOT	1	3,454	$27.40		$1,784,100		$94,651	$0	$1,784,100	$0	$1,878,751
	TOTAL DIRECT EQUIPMENT COST	LOT		20,726			$10,704,600		$567,903	$0	$10,704,600	$0	$11,272,503
	INDIRECT FIELD COST @ 28/75%								$425,928		$159,013	$0	$584,940
	SUBTOTAL CONTRACTORS FIELD COST								$993,831	$0	$10,863,613	$0	$11,857,444
	CONTRACTORS O/H & P @ 5/15%								$149,075	$0	$543,181	$0	$692,255
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$1,142,906	$0	$11,406,794	$0	$12,549,699
	CONSTRUCTION MANAGEMENT @ 10%												$1,254,970
	SUBTOTAL FIELD COSTS - W/CM												$13,804,669
	ENGINEERING, DESIGN, INSPECT @ 25%												$3,451,167
	SUBTOTAL - W/ED&I												$17,255,836
	PROJECT MANAGEMENT @ 6%												$1,035,350
	SUBTOTAL - W/PM												$18,291,186
	CONTINGENCY @ 25%												$4,572,797
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$754,511
	TOTAL FINAL FORMS TREATMENT EQUIPMENT - AREA 900												$23,618,494
	SUPPORT OPERATIONS EQUIPMENT - AREA 800												
100	FEED AND SEGREGATION HANDLING								$0	$51,264			$51,264
280	SECOND STAGE GAS HANDLING								$7,804	$142,400			$150,204
290	OFF-GAS CLEAN-UP								$11,159	$127,733			$138,892
650	ATMOSPHERIC PROTECTION								$35,584	$226,416			$262,000
900	CONTAINER DECONTAMINATION								$35,428	$210,166			$245,594
1100	LOW LEVEL WASTE HANDLING								$18,323	$112,286			$130,609
1200	PACKAGE ASSAY								$11,549	$365,968			$377,517
1300	ANALYTICAL LABORATORY								$19,509	$142,400			$161,909
1400	RECORD KEEPING								$7,804	$28,480			$36,284

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
ITEM	DESCRIPTION	UNIT	QTY	LABOR MHRS	LABOR RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	SUBTOTAL DIRECT SUPPORT OPERRATIONS COST								$147,159	$1,407,114			$1,554,272
	PROCESS CONTROLS @ 20%								$29,432	$281,423			$310,855
	TOTAL DIRECT SUPPORT OPERATIONS COST								$176,590	$1,688,536	$0	$0	$1,865,126
	INDIRECT FIELD COST @ 28/75%								$132,443	$49,445	$0	$0	$181,888
	SUBTOTAL CONTRACTORS FIELD COST								$309,033	$1,737,982	$0	$0	$2,047,015
	CONTRACTORS O/H & P @ 15/5/5%								$46,355	$86,899	$0	$0	$133,254
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$355,388	$1,824,881	$0	$0	$2,180,269
	CONSTRUCTION MANAGEMENT @ 10%												$218,027
	SUBTOTAL FIELD COSTS - W/CM												$2,398,296
	ENGINEERING, DESIGN, INSPECT @ 25%												$599,574
	SUBTOTAL - W/ED&I												$2,997,870
	PROJECT MANAGEMENT @ 6%												$179,872
	SUBTOTAL - W/PM												$3,177,742
	CONTINGENCY @ 25%												$794,436
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$131,082
	TOTAL SUPPORT OPERATIONS EQUIPMENT - AREA 800												$4,103,260
	SUPPORT OPERATIONS EQUIPMENT - AREA 900												
100	FEED AND SEGREGATION HANDLING								$0	$44,784			$44,784
280	SECOND STAGE GAS HANDLING								$6,817	$124,400			$131,217
290	OFF-GAS CLEAN-UP								$9,748	$111,587			$121,335
650	ATMOSPHERIC PROTECTION								$31,086	$197,796			$228,882
900	CONTAINER DECONTAMINATION								$30,950	$183,600			$214,550
1100	LOW LEVEL WASTE HANDLING								$16,007	$98,093			$114,100
1200	PACKAGE ASSAY								$10,089	$319,708			$329,797
1300	ANALYTICAL LABORATORY								$17,043	$124,400			$141,443

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS					COSTS				
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
1400	*RECORD KEEPING*								$6,817	$24,880			$31,697
	SUBTOTAL DIRECT SUPPORT OPERRATIONS COST								$128,557	$1,229,248			$1,357,805
	PROCESS CONTROLS @ 20%								$25,711	$245,850			$271,561
	TOTAL DIRECT SUPPORT OPERATIONS COST								$154,268	$1,475,098	$0	$0	$1,629,366
	INDIRECT FIELD COST @ 28/75%								$115,701	$43,195	$0	$0	$158,896
	SUBTOTAL CONTRACTORS FIELD COST								$269,970	$1,518,293	$0	$0	$1,788,262
	CONTRACTORS OVH & P @ 15/5/5%								$40,495	$75,915	$0	$0	$116,410
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$310,465	$1,594,207	$0	$0	$1,904,673
	CONSTRUCTION MANAGEMENT @ 10%												$190,467
	SUBTOTAL FIELD COSTS - W/CM												$2,095,141
	ENGINEERING, DESIGN, INSPECT @ 25%												$523,785
	SUBTOTAL - W/ED&I												$2,618,926
	PROJECT MANAGEMENT @ 6%												$157,136
	SUBTOTAL - W/PM												$2,776,061
	CONTINGENCY @ 25%												$694,015
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$114,513
	TOTAL SUPPORT OPERATIONS EQUIPMENT - AREA 900												$3,584,589
	BUILDING FACILITIES - AREA 800												
	EARTHWORK								$43,776	$3,819			$47,595
	CONCRETE								$1,171,255	$699,521			$1,870,776
	STEEL								$90,486	$200,978			$291,464
	ARCHITECTURAL								$8,903	$12,731		$660,681	$682,315
	HVAC								$415,636	$1,901,236		$173,880	$2,490,752
	MECHANICAL EQUIPMENT								$14,153	$344,355			$358,508
	PIPING								$906,081	$994,664		$124,740	$2,025,485

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS					COSTS				
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	ELECTRICAL								$870,943	$626,250			$1,497,193
	INSTRUMENTATION								$148,683	$1,329,988			$1,478,671
	MECHANICAL UTILITY PAD								$74,365	$154,910			$229,275
	ELECTRICAL UTILITY PAD								$42,304	$62,145		$874	$105,323
	TOTAL DIRECT BUILDING FACILITIES COST								$3,786,586	$6,330,596	$0	$960,175	$11,077,357
	INDIRECT FIELD COST @ 28/75%								$2,839,940	$1,060,244	$0	$0	$3,900,184
	SUBTOTAL CONTRACTORS FIELD COST								$6,626,526	$7,390,840	$0	$960,175	$14,977,540
	CONTRACTORS O/H & P @ 15/5/5%								$993,979	$369,542	$0	$48,009	$1,411,530
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$7,620,504	$7,760,382	$0	$1,008,183	$16,389,070
	CONSTRUCTION MANAGEMENT @ 10%												$1,638,907
	SUBTOTAL FIELD COSTS - W/CM												$18,027,977
	ENGINEERING, DESIGN, INSPECT @ 20%												$3,605,595
	SUBTOTAL - W/ED&I												$21,633,572
	PROJECT MANAGEMENT @ 6%												$1,298,014
	SUBTOTAL - W/PM												$22,931,586
	CONTINGENCY @ 25%												$5,732,897
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$945,928
	TOTAL BUILDING FACILITIES - AREA 800												$29,610,411
	BUILDING FACILITIES - AREA 900												
	EARTHWORK								$17,179	$1,499			$18,678
	CONCRETE								$459,635	$274,512			$734,147
	STEEL								$35,509	$78,870			$114,379
	ARCHITECTURAL								$3,494	$4,996		$251,688	$260,178
	HVAC								$163,108	$746,101		$66,240	$975,449
	MECHANICAL EQUIPMENT								$5,554	$135,135			$140,689

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	PIPING								$355,573	$390,335		$47,520	$793,428
	ELECTRICAL								$341,784	$245,759			$587,543
	INSTRUMENTATION								$58,347	$521,926			$580,273
	MECHANICAL UTILITY PAD								$29,183	$60,791			$89,974
	ELECTRICAL UTILITY PAD								$16,601	$24,387		$333	$41,321
	TOTAL DIRECT BUILDING FACILITIES COST								$1,485,967	$2,484,312	$0	$365,781	$4,336,060
	INDIRECT FIELD COST @ 28/75%								$1,114,475	$416,071	$0	$0	$1,530,546
	SUBTOTAL CONTRACTORS FIELD COST								$2,600,442	$2,900,383	$0	$365,781	$5,866,606
	CONTRACTORS O/H & P @ 15/5/5%								$390,066	$145,019	$0	$18,289	$553,375
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$2,990,509	$3,045,402	$0	$384,070	$6,419,980
	CONSTRUCTION MANAGEMENT @ 10%												$641,998
	SUBTOTAL FIELD COSTS - W/CM												$7,061,978
	ENGINEERING, DESIGN, INSPECT @ 20%												$1,412,396
	SUBTOTAL - W/ED&I												$8,474,374
	PROJECT MANAGEMENT @ 6%												$508,462
	SUBTOTAL - W/PM												$8,982,836
	CONTINGENCY @ 25%												$2,245,709
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$370,542
	TOTAL BUILDING FACILITIES - AREA 900												$11,599,088
	BUILDING FACILITIES - AREA 1000												
	EARTHWORK								$31,611	$2,758			$34,369
	CONCRETE								$845,750	$505,116			$1,350,866
	STEEL								$65,339	$145,124			$210,463
	ARCHITECTURAL								$6,429	$9,193		$471,915	$487,537
	HVAC								$300,127	$1,372,862		$124,200	$1,797,189

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

ITEM	DESCRIPTION	UNIT	QTY	UNIT FACTORS LABOR MHRS	UNIT FACTORS LABOR RATE	UNIT FACTORS MAT	UNIT FACTORS EQUIP	UNIT FACTORS S/C	COSTS LAB	COSTS MAT.	COSTS EQUIPT.	COSTS SUBCONT.	TOTAL
	MECHANICAL EQUIPMENT								$10,220	$248,655			$258,875
	PIPING								$654,272	$718,236		$89,100	$1,461,608
	ELECTRICAL								$628,899	$452,209			$1,081,108
	INSTRUMENTATION								$107,362	$960,370			$1,067,732
	MECHANICAL UTILITY PAD								$53,698	$111,859			$165,557
	ELECTRICAL UTILITY PAD								$30,547	$44,874		$624	$76,045
	TOTAL DIRECT BUILDING FACILITIES COST								$2,734,252	$4,571,255	$0	$685,839	$7,991,346
	INDIRECT FIELD COST @ 28/75%								$2,050,689	$765,591	$0	$0	$2,816,280
	SUBTOTAL CONTRACTORS FIELD COST								$4,784,941	$5,336,846	$0	$685,839	$10,807,626
	CONTRACTORS O/H & P @ 15/5/5%								$717,741	$266,842	$0	$34,292	$1,018,875
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$5,502,682	$5,603,688	$0	$720,131	$11,826,501
	CONSTRUCTION MANAGEMENT @ 10%												$1,182,650
	SUBTOTAL FIELD COSTS - W/CM												$13,009,151
	ENGINEERING, DESIGN, INSPECT @ 20%												$2,601,830
	SUBTOTAL - W/ED&I												$15,610,981
	PROJECT MANAGEMENT @ 6%												$936,659
	SUBTOTAL - W/PM												$16,547,641
	CONTINGENCY @ 25%												$4,136,910
	ESCALATION FROM 1ST QTR FY92 TO 4TH QTR FY93												$682,590
	TOTAL BUILDING FACILITIES - AREA 1000												$21,367,141

NOTES

THERMAL TREATMENT EQUIPMENT COSTS - AREA 800

THE PURCHASED EQUIPMENT COSTS ARE TAKEN FROM THE BECHTEL MWTP BASELINE PROCESS EQUIPMENT LIST, PAGES 9/14 & 10/14, DATED 9/3/92.

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS								COSTS		
				LABOR	LABOR									
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
LABOR COSTS FOR INSTALLING THE EQUIPMENT ARE TAKEN FROM THE BECHTEL MWTP BASELINE COST SUMMARY FOR THE THERMAL TREATMENT AREA 800.													
FIELD INDIRECTS, CONTRACTORS OH&P, CONSTRUCTION MANAGEMENT, A/E COSTS AND CONTINGENCY ARE CALCULATED													
USING THE SAME FACTORS AS THE BECHTEL COST ESTIMATE.													
ESCALATION IS ADDED TO BRING THE COSTS FORWARD FROM THE 1ST QUARTER OF FY92, TO THE 4TH QUARTER OF FY93.													
THE ESCALATION FACTORS WERE TAKEN FROM THE DRI - ANTICIPATED ECONOMIC ESCALATION RATES FOR DOE CONSTRUCTION PROJECTS,													
UPDATED FEBRUARY 1993, AS SUPPLIED BY THE ENGINEERING FACILTIES DIVISION OF LOS ALAMOS NATIONAL LABORATORY.													
FINAL FORMS TREATMENT EQUIPMENT COSTS - AREA 900													
THE PURCHASED EQUIPMENT COSTS ARE TAKEN FROM THE BECHTEL MWTP BASELINE PROCESS EQUIPMENT LIST, PAGES 9/14 & 10/14, DATED 9/3/92.													
LABOR COSTS FOR INSTALLING THE EQUIPMENT ARE TAKEN FROM THE BECHTEL MWTP BASELINE COST SUMMARY FOR THE FINAL FORMS TREATMENT AREA 900.													
FIELD INDIRECTS, CONTRACTORS OH&P, CONSTRUCTION MANAGEMENT, A/E COSTS AND CONTINGENCY ARE CALCULATED													
USING THE SAME FACTORS AS THE BECHTEL COST ESTIMATE.													
ESCALATION IS ADDED TO BRING THE COSTS FORWARD FROM THE 1ST QUARTER OF FY92, TO THE 4TH QUARTER OF FY93.													
THE ESCALATION FACTORS WERE TAKEN FROM THE DRI - ANTICIPATED ECONOMIC ESCALATION RATES FOR DOE CONSTRUCTION PROJECTS,													
UPDATED FEBRUARY 1993, AS SUPPLIED BY THE ENGINEERING FACILTIES DIVISION OF LOS ALAMOS NATIONAL LABORATORY.													
SUPPORT OPERATIONS COSTS - AREA 800													
THE DIRECT COSTS FOR SUPPORT OPERATIONS WERE CALCULATED FROM THE DIRECT RATIO OF EQUIPMENT COSTS FOR THE THERMAL TREATMENT, AREA 800													
AGAINST THE TOTAL DIRECT COST FOR ALL PROCESS EQUIPMENT. THIS PERCENTAGE APPROXIMATED 28.5%.													
ALL INDIRECT COSTS WERE ALLOCATED USING THE BECHTEL RATIOS, AND ESCALATION WAS ADDED AS INDICATED IN THE THE PROCESS EQUIPMENT SECTION.													
SUPPORT OPERATIONS COSTS - AREA 900													
THE DIRECT COSTS FOR SUPPORT OPERATIONS WERE CALCULATED FROM THE DIRECT RATIO OF EQUIPMENT COSTS FOR THE FINAL FORMS TREATMENT AREA 900													
AGAINST THE TOTAL DIRECT COST FOR ALL PROCESS EQUIPMENT. THIS PERCENTAGE APPROXIMATED 24.9%.													
ALL INDIRECT COSTS WERE ALLOCATED USING THE BECHTEL RATIOS, AND ESCALATION WAS ADDED AS INDICATED IN THE THE PROCESS EQUIPMENT SECTION.													

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

BASELINE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA5.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
BUILDING FACILITIES COSTS - AREA 800													
USING THE DATA SHOWN IN THE DIRECT COSTS SECTION OF THE BECHTEL MWTP BASELINE ESTIMATE FOR THE PROCESS BUILDINGS, THE COSTS WERE FACTORED USING													
THE RATIO OF BUILDING SPACE ALLOCATION FROM TABLE II OF THE BECHTEL STUDY. THIS FACTOR APPROXIMATED 20.9%. OF THE BUILDING FLOOR AREA (13,500 SF/64,700SF).													
ALL INDIRECT COSTS WERE FACTORED USING THE BECHTEL STUDY FACTORS.													
ESCALATION WAS ADDED IN THE SAME RATIO AS SHOWN IN THE EQUIPMENT COSTS.													
BUILDING FACILITIES COSTS - AREA 900													
USING THE DATA SHOWN IN THE DIRECT COSTS SECTION OF THE BECHTEL MWTP BASELINE ESTIMATE FOR THE PROCESS BUILDINGS. THE COSTS WERE FACTORED USING													
THE RATIO OF BUILDING SPACE ALLOCATION FROM TABLE II OF THE BECHTEL STUDY. THIS FACTOR APPROXIMATED 8.2%. OF THE BUILDING FLOOR AREA (5,300SF/64,700SF).													
ALL INDIRECT COSTS WERE FACTORED USING THE BECHTEL STUDY FACTORS.													
ESCALATION WAS ADDED IN THE SAME RATIO AS SHOWN IN THE EQUIPMENT COSTS.													
BUILDING FACILITIES COSTS - AREA 1000													
USING THE DATA SHOWN IN THE DIRECT COSTS SECTION OF THE BECHTEL MWTP BASELINE ESTIMATE FOR THE PROCESS BUILDINGS. THE COSTS WERE FACTORED USING													
THE RATIO OF BUILDING SPACE ALLOCATION FROM TABLE II OF THE BECHTEL STUDY. THIS FACTOR APPROXIMATED 15.1%. OF THE BUILDING FLOOR AREA (9,750SF/64,700SF).													
ALL INDIRECT COSTS WERE FACTORED USING THE BECHTEL STUDY FACTORS.													
ESCALATION WAS ADDED IN THE SAME RATIO AS SHOWN IN THE EQUIPMENT COSTS.													

ALTERNATIVE THERMAL TREATMENT

COST ESTIMATE SUMMARY

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION	CALCULATIONS	$ US x 1,000
FILENAME: PLASMA1R.XLS		
BUILDING FACILITIES		
Building facilities - Area 800	See attached estimate	$17,303
Building facilities - Area 900	See attached estimate	$6,793
Building facilities - Area 1000	See attached estimate	$25,004
Total Building Facilities		$49,100
PROCESS EQUIPMENT		
Thermal Treatment - Area 800	See attached estimate	$7,610
Final Forms Treatment - Area 900	See attached estimate	$909
Support Operations equipment - Area 800	See attached estimate	$2,956
Support Operations equipment - Area 900	See attached estimate	$353
Total Process Equipment		$11,828
TRIAL BURN		
Process Engineer - 2	2 x 10 Days @ 24 hrs/day @ $88/hr	$42
Technician (Operator) - 3	3 x 10 Days @ 24 hrs/day @ $62/hr	$45
Operating Engineer - 3	3 x 10 Days @ 24 hrs/day @ $62/hr	$45
Rad. Technician - 2	2 x 10 Days @ 24 hrs/day @ $64/hr	$31
Laborer - 4	4 x 10 Days @ 24 hrs/day @ $58/hr	$56
Oversight Engineer - 1	1 x 10 days @ 24 hrs/day @ $142/hr	$34
Consumable Material	10 days @ $3,000/day	$30
Supervision and Expenses	1% of Labor & Materials	$3
Total Trial Burn		$285
STARTUP		
Startup Cost	100% of 1 years operating cost	$9,362

	MIXED WASTE INTEGRATED PROGRAM	
19-Oct-93	PLASMA ARC COST EFFECTIVENESS STUDY	
ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE		
DESCRIPTION	CALCULATIONS	$ US x 1,000
FILENAME: PLASMA1R.XLS		
Total Startup		$9,362
ANNUAL OPERATING		
Process Engineers - 2	1 x 250 days @ 24 hrs/day @ $88/hr	$528
Technician (Operator) - 6	5 x 250 days @ 24 hrs/day @ $62/hr	$1,860
Operating Engineer - 4	3 x 250 days @ 24 hrs/day @ $62/hr	$1,116
Rad. Technician - 2	1 x 250 days @ 24 hrs/day @ $64/hr	$384
Laborer - 6	4 x 250 days @ 24 hrs/day @ $58/hr	$1,392
Oversight Engineer - 2	1 x 250 days @ 24 hrs/day @ $142/hr	$852
Electric Power	250 days @ 24 hrs/day @ 4000 kw/hr @ $0.035/kwhr.	$840
Natural Gas	250 days @ 24 hrs/day @ 27 therm/hr @ $5.00/therm.	$810
Lubricants	250 days @ $250/day	$63
Compressed Gas	250 days @ $2500/day	$625
Raw Materials& Chemical Additives	250 days @ $2000/day	$500
Miscellaneous Supplies (Rad. Protection)	250 days @ $1200/day	$300
Supervision & Expenses	1% of Labor & Material	$93
Total Annual Operating		$9,362
ANNUAL MAINTENANCE		
Maintenance Labor	17% of fixed equipment cost	$2,011
Maintenance Materials	7% of fixed equipment cost	$828
Supervision & Expenses	1% of Labor & Materials	$28
Total Annual Maintenance		$2,867
ANNUAL WASTE DISPOSAL		
Containers (55 gallon drum)	16,953 kg/week x 50 weeks @ 75 kg/cf @ 7.4 cf/bbl = 1530 bbl x $30/bb	$46

MIXED WASTE INTEGRATED PROGRAM

19-Oct-93 PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL TREATMENT - BASED ON CHEMICAL TECHNOLOGY DIVISION PLASMA FURNACE

DESCRIPTION	CALCULATIONS	$ US x 1,000
FILENAME: PLASMA1R.XLS		
Assay & Storage	Sampling 1 bbl in 60 = 26 samples @ $500 each	$13
Transportation	1530 bbls @ $17 each	$26
Long Term Disposal & Storage	11,300 cf @ $300/cf	$3,390
Supervision & Expenses	1% of waste disposal cost	$35
Total Annual Waste Disposal		$3,510

ALTERNATIVE THERMAL TREATMENT

CAPITAL COST ESTIMATE

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
ITEM	DESCRIPTION	UNIT	QTY	LABOR MHRS	LABOR RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	THERMAL TREATMENT EQUIPMENT - AREA 800												
100	DRUM FEED SYSTEM - 700 LB/HR	EA	1	1,277	$27.40		$350,000		$35,000	$0	$350,000	$0	$385,000
	4' OD X 10' LONG HORIZONTAL CYLINDER												
110	PRIMARY COMBUSTION CHAMBER	EA	1	5,474	$27.40		$1,500,000		$150,000	$0	$1,500,000	$0	$1,650,000
	8' OD X 8' HIGH REFRACTORY LINED/WATER												
	JACKETED STEEL VESSEL.												
380	CONC ORGANIC THERMAL TREATMENT	EA	1	500	$27.40		50000		$13,700	$0	$50,000	$0	$63,700
	OXIDATION FURNACE BURNER												
480	SECONDARY COMBUSTION	EA	1	1,624	$27.40		$263,250		$44,498	$0	$263,250	$0	$307,748
	REFRACTORY LINED COMBUSTION CHAMBER												
490	OFF-GAS TREATMENT	EA	1	678	$27.40		$67,200		$18,577	$0	$67,200	$0	$85,777
	MISCELLANEOUS EQUIPMENT												
560	MERCURY BAKEOUT	EA	1	1,250	$27.40		$120,000		$34,250	$0	$120,000	$0	$154,250
	ELECTRIC REFRACTORY LINED FURNACE												
562	MERCURY SEPARATION	EA	1	300	$27.40		$20,000		$8,220	$0	$20,000	$0	$28,220
	MERCURY ABSORPTION PACKED BED												
565	MERCURY CONDENSATION	EA	1	844	$27.40		$119,500		$23,126	$0	$119,500	$0	$142,626
	CONDENSED, REACTOR, PUMP, TANK, ETC.												
	SUBTOTAL EQUIPMENT			11,948	$27.40		2,489,950	0	327,370	0	2,489,950	0	$2,817,320
	PROCESS CONTROLS @ 20%	LOT	1	2,390	$27.40		$497,990		$65,474	$0	$497,990	$0	$563,464
	TOTAL DIRECT EQUIPMENT COST	LOT		14,337			$2,987,940		$392,844	$0	$2,987,940	$0	$3,380,784
	INDIRECT FIELD COST @ 28/75%								$294,633		$109,996	$0	$404,630
	TOTAL CONTRACTORS FIELD COST								$687,478	$0	$3,097,936	$0	$3,785,414
	CONTRACTORS O/H & P @ 5/15%								$103,122	$0	$154,897	$0	$258,018
	TOTAL CONTRACTORS FIELD COST								$790,600	$0	$3,252,833	$0	$4,043,433
	CONSTRUCTION MANAGEMENT @ 10%												$404,343
	TOTAL FIELD COSTS												$4,447,776
	ENGINEERING, DESIGN, INSPECT @ 25%												$1,111,944
	SUBTOTAL												$5,559,720
	PROJECT MANAGEMENT @ 6%												$333,583

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	SUBTOTAL												$5,893,303
	CONTINGENCY @ 25%												$1,473,326
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$243,099
	TOTAL THERMAL TREATMENT EQUIPMENT - AREA 800												$7,609,728
	FINAL FORMS TREATMENT EQUIPMENT - AREA 900												
195	LEAD POLYMER ENCAPSULATION	EA	1	452	$27.4		$308,800		$12,385	$0	$308,800	$0	$321,185
395	MERCURY POLYMER SOLIDIFICATION	EA	1	36	$27.4		$15,700		$986	$0	$15,700	$0	$16,686
585	MERCUTY DISTILLATION	EA	1	92	$27.4		$24,000		$2,521	$0	$24,000	$0	$26,521
	SUBTOTAL DIRECT EQUIPMENT COST			580	$27.40	$0	$348,500	$0	$15,892	$0	$348,500	$0	$364,392
	PROCESS CONTROLS @ 20%	LOT	1	116	$27.70		$69,700		$3,213	$0	$69,700	$0	$72,913
	TOTAL DIRECT EQUIPMENT COST	LOT		696			$418,200		$19,105	$0	$418,200	$0	$437,305
	INDIRECT FIELD COST @ 28/75%								$14,329		$5,349	$0	$19,678
	SUBTOTAL CONTRACTORS FIELD COST								$33,434	$0	$423,549	$0	$456,984
	CONTRACTORS O/H & P @ 5/15%								$5,015	$0	$21,177	$0	$26,193
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$38,449	$0	$444,727	$0	$483,176
	CONSTRUCTION MANAGEMENT @ 10%												$48,318
	SUBTOTAL FIELD COSTS - W/CM												$531,494
	ENGINEERING, DESIGN, INSPECT @ 25%												$132,873
	SUBTOTAL - W/ED&I												$664,367
	PROJECT MANAGEMENT @ 6%												$39,862
	SUBTOTAL - W/PM												$704,229
	CONTINGENCY @ 25%												$176,057
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$29,049
	TOTAL FINAL FORMS TREATMENT EQUIPMENT - AREA 900												$909,336
	SUPPORT OPERATIONS EQUIPMENT - AREA 800												
100	FEED AND SEGREGATION HANDLING								$0	$36,936			$36,936
280	SECOND STAGE GAS HANDLING								$5,622	$102,600			$108,222
290	OFF-GAS CLEAN-UP								$8,040	$92,032			$100,072

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
650	ATMOSPHERIC PROTECTION								$25,639	$163,134			$188,773
900	CONTAINER DECONTAMINATION								$25,526	$151,426			$176,952
1100	LOW LEVEL WASTE HANDLING								$13,202	$80,903			$94,104
1200	PACKAGE ASSAY								$8,321	$263,682			$272,003
1300	ANALYTICAL LABORATORY								$14,056	$102,600			$116,656
1400	RECORD KEEPING								$5,622	$20,520			$26,142
	SUBTOTAL DIRECT SUPPORT OPERRATIONS COST								$106,029	$1,013,833			$1,119,862
	PROCESS CONTROLS @ 20%								$21,206	$202,767			$223,972
	TOTAL DIRECT SUPPORT OPERATIONS COST								$127,234	$1,216,599	$0	$0	$1,343,834
	INDIRECT FIELD COST @ 28/75%								$95,426	$35,626	$0	$0	$131,051
	SUBTOTAL CONTRACTORS FIELD COST								$222,660	$1,252,225	$0	$0	$1,474,885
	CONTRACTORS O/H & P @ 15/5/5%								$33,399	$62,611	$0	$0	$96,010
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$256,059	$1,314,836	$0	$0	$1,570,896
	CONSTRUCTION MANAGEMENT @ 10%												$157,090
	SUBTOTAL FIELD COSTS - W/CM												$1,727,985
	ENGINEERING, DESIGN, INSPECT @ 25%												$431,996
	SUBTOTAL - W/ED&I												$2,159,981
	PROJECT MANAGEMENT @ 6%												$129,599
	SUBTOTAL - W/PM												$2,289,580
	CONTINGENCY @ 25%												$572,395
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$94,445
	TOTAL SUPPORT OPERATIONS EQUIPMENT - AREA 800												$2,956,421
	SUPPORT OPERATIONS EQUIPMENT - AREA 900												
100	FEED AND SEGREGATION HANDLING								$0	$4,410			$4,410
280	SECOND STAGE GAS HANDLING								$671	$12,250			$12,921
290	OFF-GAS CLEAN-UP								$960	$10,988			$11,948
650	ATMOSPHERIC PROTECTION								$3,061	$19,478			$22,539
900	CONTAINER DECONTAMINATION								$3,048	$18,080			$21,127
1100	LOW LEVEL WASTE HANDLING								$1,576	$9,659			$11,236

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
ITEM	DESCRIPTION	UNIT	QTY	LABOR MHRS	LABOR RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
1200	PACKAGE ASSAY								$994	$31,483			$32,476
1300	ANALYTICAL LABORATORY								$1,678	$12,250			$13,928
1400	RECORD KEEPING								$671	$2,450			$3,121
	SUBTOTAL DIRECT SUPPORT OPERRATIONS COST								$12,659	$121,047			$133,707
	PROCESS CONTROLS @ 20%								$2,532	$24,209			$26,741
	TOTAL DIRECT SUPPORT OPERATIONS COST								$15,191	$145,257	$0	$0	$160,448
	INDIRECT FIELD COST @ 28/75%								$11,393	$4,254	$0	$0	$15,647
	SUBTOTAL CONTRACTORS FIELD COST								$26,585	$149,510	$0	$0	$176,095
	CONTRACTORS O/H & P @ 15/5/5%								$3,988	$7,476	$0	$0	$11,463
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$30,572	$156,986	$0	$0	$187,558
	CONSTRUCTION MANAGEMENT @ 10%												$18,756
	SUBTOTAL FIELD COSTS - W/CM												$206,314
	ENGINEERING, DESIGN, INSPECT @ 25%												$51,579
	SUBTOTAL - W/ED&I												$257,893
	PROJECT MANAGEMENT @ 6%												$15,474
	SUBTOTAL - W/PM												$273,366
	CONTINGENCY @ 25%												$68,342
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$11,276
	TOTAL SUPPORT OPERATIONS EQUIPMENT - AREA 900												$352,984
	BUILDING FACILITIES - AREA 800												
	EARTHWORK								$25,590	$2,233			$27,823
	CONCRETE								$684,682	$408,920			$1,093,601
	STEEL								$52,895	$117,486			$170,381
	ARCHITECTURAL								$5,205	$7,442		$383,824	$396,471
	HVAC								$242,969	$1,111,408		$101,016	$1,455,393
	MECHANICAL EQUIPMENT								$8,273	$201,300			$209,573
	PIPING								$529,669	$581,452		$72,468	$1,183,589
	ELECTRICAL								$509,128	$366,088			$875,216
	INSTRUMENTATION								$86,916	$777,472			$864,388

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS								COSTS		
				LABOR	LABOR									
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	MECHANICAL UTILITY PAD								43471.528	90555.72			$134,027
	ELECTRICAL UTILITY PAD								$24,730	$36,328		$508	$61,565
	TOTAL DIRECT BUILDING FACILITIES COST								$2,213,529	$3,700,684	$0	$557,816	$6,472,029
	INDIRECT FIELD COST @ 28/75%								$1,660,147	$619,788	$0	$0	$2,279,935
	SUBTOTAL CONTRACTORS FIELD COST								$3,873,675	$4,320,472	$0	$557,816	$8,751,963
	CONTRACTORS O/H & P @ 15/5/5%								$581,051	$216,024	$0	$27,891	$824,966
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$4,454,727	$4,536,496	$0	$585,707	$9,576,929
	CONSTRUCTION MANAGEMENT @ 10%												$957,693
	SUBTOTAL FIELD COSTS - W/CM												$10,534,622
	ENGINEERING, DESIGN, INSPECT @ 20%												$2,106,924
	SUBTOTAL - W/ED&I												$12,641,546
	PROJECT MANAGEMENT @ 6%												$758,493
	SUBTOTAL - W/PM												$13,400,039
	CONTINGENCY @ 25%												$3,350,010
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$552,752
	TOTAL BUILDING FACILITIES - AREA 800												$17,302,800
	BUILDING FACILITIES - AREA 900												
	EARTHWORK								$10,047	$877			$10,924
	CONCRETE								$268,822	$160,551			$429,373
	STEEL								$20,768	$46,128			$66,896
	ARCHITECTURAL								$2,043	$2,922		$150,698	$155,664
	HVAC								$95,395	$436,364		$39,661	$571,421
	MECHANICAL EQUIPMENT								$3,248	$79,035			$82,283
	PIPING								$207,960	$228,291		$28,453	$464,704
	ELECTRICAL								199895.4178	143734.488			$343,630
	INSTRUMENTATION								$34,125	$305,254			$339,379
	MECHANICAL UTILITY PAD								17067.9196	35554.254			$52,622
	ELECTRICAL UTILITY PAD								$9,710	$14,263		$199	$24,172
	TOTAL DIRECT BUILDING FACILITIES COST								$869,082	$1,452,973	$0	$219,011	$2,541,067

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS					COSTS				
ITEM	DESCRIPTION	UNIT	QTY	LABOR MHRS	LABOR RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
	INDIRECT FIELD COST @ 28/75%								$651,812	$243,343	$0	$0	$895,155
	SUBTOTAL CONTRACTORS FIELD COST								$1,520,894	$1,696,316	$0	$219,011	$3,436,222
	CONTRACTORS O/H & P @ 15/5/5%								$228,134	$84,816	$0	$10,951	$323,900
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$1,749,028	$1,781,132	$0	$229,962	$3,760,122
	CONSTRUCTION MANAGEMENT @ 10%												$376,012
	SUBTOTAL FIELD COSTS - W/CM												$4,136,134
	ENGINEERING, DESIGN, INSPECT @ 20%												$827,227
	SUBTOTAL - W/ED&I												$4,963,361
	PROJECT MANAGEMENT @ 6%												$297,802
	SUBTOTAL - W/PM												$5,261,163
	CONTINGENCY @ 25%												$1,315,291
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$217,023
	TOTAL BUILDING FACILITIES - AREA 900												$6,793,477
	BUILDING FACILITIES - AREA 1000												
	EARTHWORK								$36,980	$3,226			$40,207
	CONCRETE								$989,421	$590,922			$1,580,344
	STEEL								$76,438	$169,777			$246,215
	ARCHITECTURAL								$7,521	$10,754		$554,657	$572,933
	HVAC								$351,110	$1,606,075		$145,976	$2,103,162
	MECHANICAL EQUIPMENT								$11,956	$290,895			$302,851
	PIPING								$765,415	$840,246		$104,722	$1,710,383
	ELECTRICAL								735731.9866	529026.936			$1,264,759
	INSTRUMENTATION								$125,600	$1,123,511			$1,249,112
	MECHANICAL UTILITY PAD								62819.9212	130860.438			$193,680
	ELECTRICAL UTILITY PAD								$35,737	$52,497		$733	$88,967
	TOTAL DIRECT BUILDING FACILITIES COST								$3,198,731	$5,347,792	$0	$806,089	$9,352,612
	INDIRECT FIELD COST @ 28/75%								$2,399,048	$895,645	$0	$0	$3,294,693
	SUBTOTAL CONTRACTORS FIELD COST								$5,597,779	$6,243,436	$0	$806,089	$12,647,304
	CONTRACTORS O/H & P @ 15/5/5%								$839,667	$312,172	$0	$40,304	$1,192,143

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

ITEM	DESCRIPTION	UNIT	QTY	UNIT FACTORS LABOR MHRS	UNIT FACTORS LABOR RATE	UNIT FACTORS MAT	EQUIP	S/C	COSTS LAB	COSTS MAT.	COSTS EQUIPT.	COSTS SUBCONT.	TOTAL
	TOTAL CONTRACTORS FIELD COST - W/MARKUP								$6,437,445	$6,555,608	$0	$846,394	$13,839,447
	CONSTRUCTION MANAGEMENT @ 10%												$1,383,945
	SUBTOTAL FIELD COSTS - W/CM												$15,223,392
	ENGINEERING, DESIGN, INSPECT @ 20%												$3,044,678
	SUBTOTAL - W/ED&I												$18,268,070
	PROJECT MANAGEMENT @ 6%												$1,096,084
	SUBTOTAL - W/PM												$19,364,155
	CONTINGENCY @ 25%												$4,841,039
	ESCALATION FROM 1ST QTR FY92 TO 4 QTR FY93												$798,771
	TOTAL BUILDING FACILITIES - AREA 1000												$25,003,965

NOTES

THERMAL TREATMENT EQUIPMENT COSTS - AREA 800

THE PURCHASED EQUIPMENT COSTS ARE ESTIMATED FROM THE SAIC WASTE MANAGEMENT TECHNOLOGY DIVISION PROCESS EQUIPMENT LIST, DATED 7/20/93.

LABOR COSTS FOR INSTALLING THE EQUIPMENT ARE FACTORED AT 20% OF THE DIRECT EQUIPMENT COST.

FIELD INDIRECTS, CONTRACTORS OH&P, CONSTRUCTION MANAGEMENT, A/E COSTS AND CONTINGENCY ARE CALCULATED USING THE SAME FACTORS AS THE BECHTEL COST ESTIMATE.

ESCALATION IS ADDED TO BRING THE COSTS FORWARD FROM THE 1ST QUARTER OF FY92, TO THE 4TH QUARTER OF FY93.

THE ESCALATION FACTORS WERE TAKEN FROM THE DRI - ANTICIPATED ECONOMIC ESCALATION RATES FOR DOE CONSTRUCTION PROJECTS, UPDATED FEBRUARY 1993, AS SUPPLIED BY THE ENGINEERING FACILTIES DIVISION OF LOS ALAMOS NATIONAL LABORATORY.

FINAL FORMS TREATMENT EQUIPMENT COSTS - AREA 900

THE PURCHASED EQUIPMENT COSTS ARE TAKEN FROM THE BECHTEL MWTP BASELINE PROCESS EQUIPMENT LIST, PAGES 9/14 & 10/14, DATED 9/3/92.

LABOR COSTS FOR INSTALLING THE EQUIPMENT ARE TAKEN FROM THE BECHTEL MWTP BASELINE COST SUMMARY FOR THE FINAL FORMS TREATMENT AREA 900

FIELD INDIRECTS, CONTRACTORS OH&P, CONSTRUCTION MANAGEMENT, A/E COSTS AND CONTINGENCY ARE CALCULATED USING THE SAME FACTORS AS THE BECHTEL COST ESTIMATE.

ESCALATION IS ADDED TO BRING THE COSTS FORWARD FROM THE 1ST QUARTER OF FY92, TO THE 4TH QUARTER OF FY93.

THE ESCALATION FACTORS WERE TAKEN FROM THE DRI - ANTICIPATED ECONOMIC ESCALATION RATES FOR DOE CONSTRUCTION PROJECTS,

MIXED WASTE INTEGRATED PROGRAM

PLASMA ARC COST EFFECTIVENESS STUDY

ALTERNATIVE THERMAL FLOWSHEET

CAPITAL COST ESTIMATE

FILENAME: PLASMA6.XLW

OCTOBER 19, 1993

				UNIT FACTORS							COSTS		
				LABOR	LABOR								
ITEM	DESCRIPTION	UNIT	QTY	MHRS	RATE	MAT	EQUIP	S/C	LAB	MAT.	EQUIPT.	SUBCONT.	TOTAL
UPDATED FEBRUARY 1993, AS SUPPLIED BY THE ENGINEERING FACILTIES DIVISION OF LOS ALAMOS NATIONAL LABORATORY.													
SUPPORT OPERATIONS COSTS - AREA 800													
THE DIRECT COSTS FOR SUPPORT OPERATIONS WERE CALCULATED FROM THE DIRECT RATIO OF EQUIPMENT COSTS FOR THE THERMAL TREATMENT, AREA 800													
AGAINST THE TOTAL DIRECT COST FOR ALL PROCESS EQUIPMENT. THIS PERCENTAGE APPROXIMATED 20.5%.													
ALL INDIRECT COSTS WERE ALLOCATED USING THE BECHTEL RATIOS, AND ESCALATION WAS ADDED AS INDICATED IN THE THE PROCESS EQUIPMENT SECTION.													
SUPPORT OPERATIONS COSTS - AREA 900													
THE DIRECT COSTS FOR SUPPORT OPERATIONS WERE CALCULATED FROM THE DIRECT RATIO OF EQUIPMENT COSTS FOR THE FINAL FORMS TREATMENT AREA 900													
AGAINST THE TOTAL DIRECT COST FOR ALL PROCESS EQUIPMENT. THIS PERCENTAGE APPROXIMATED 2.45%.													
ALL INDIRECT COSTS WERE ALLOCATED USING THE BECHTEL RATIOS, AND ESCALATION WAS ADDED AS INDICATED IN THE THE PROCESS EQUIPMENT SECTION.													
BUILDING FACILITIES COSTS - AREA 800													
USING THE DATA SHOWN IN THE DIRECT COSTS SECTION OF THE BECHTEL MWTP BASELINE ESTIMATE FOR THE PROCESS BUILDINGS, THE COSTS WERE FACTORED USING													
THE RATIO OF BUILDING SPACE ALLOCATION FROM TABLE II OF THE BECHTEL STUDY. THIS FACTOR APPROXIMATED 12.2%. OF THE BUILDING FLOOR AREA (6,750 SF/55,300SF).													
ALL INDIRECT COSTS WERE FACTORED USING THE BECHTEL STUDY FACTORS.													
ESCALATION WAS ADDED IN THE SAME RATIO AS SHOWN IN THE EQUIPMENT COSTS.													
BUILDING FACILITIES COSTS - AREA 900													
USING THE DATA SHOWN IN THE DIRECT COSTS SECTION OF THE BECHTEL MWTP BASELINE ESTIMATE FOR THE PROCESS BUILDINGS, THE COSTS WERE FACTORED USING													
THE RATIO OF BUILDING SPACE ALLOCATION FROM TABLE II OF THE BECHTEL STUDY. THIS FACTOR APPROXIMATED 4.8%. OF THE BUILDING FLOOR AREA (2,650SF/55,300SF).													
ALL INDIRECT COSTS WERE FACTORED USING THE BECHTEL STUDY FACTORS.													
ESCALATION WAS ADDED IN THE SAME RATIO AS SHOWN IN THE EQUIPMENT COSTS.													
BUILDING FACILITIES COSTS - AREA 1000													
USING THE DATA SHOWN IN THE DIRECT COSTS SECTION OF THE BECHTEL MWTP BASELINE ESTIMATE FOR THE PROCESS BUILDINGS, THE COSTS WERE FACTORED USING													
THE RATIO OF BUILDING SPACE ALLOCATION FROM TABLE II OF THE BECHTEL STUDY. THIS FACTOR APPROXIMATED 17.1%. OF THE BUILDING FLOOR AREA (9,750SF/55,300SF).													
ALL INDIRECT COSTS WERE FACTORED USING THE BECHTEL STUDY FACTORS.													
ESCALATION WAS ADDED IN THE SAME RATIO AS SHOWN IN THE EQUIPMENT COSTS.													

DATE
FILMED
6/27/94
END