



ASSESSMENT OF COSTS
FOR
DECOMMISSIONING
OF
AlChemIE, INC.
CENTRIFUGE PLANT DEMONSTRATION FACILITY (CPDF)
Oak Ridge, Tennessee

Submitted by
IT CORPORATION
312 Directors Drive
Knoxville, TN 37923

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8809260011 880912
PDR ADOCK 05000603
PDC

Regional Office

312 Directors Drive • Knoxville, Tennessee 37923 • 615-690-3211

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1. PROJECT DESCRIPTION

AlChemIE, Inc., will soon begin commercial operation of the 120 machine Centrifuge Plant Demonstration Facility (CPDF) in Oak Ridge, Tennessee, using the gas centrifuge technology to enrich various stable isotopes for commercial utilization. The gas centrifuge equipment and technology at the CPDF will be received from the Department of Energy (DOE). Before AlChemIE receives this equipment, the DOE requires assurance that adequate funding will be available for the final disposition of all classified and uranium contaminated equipment and materials received from DOE.

The gas centrifuge equipment and piping includes classified material, uranium contaminated material and Resource Conservation and Recovery Act (RCRA) controlled material. After commercial operations begin, this equipment, and associated auxiliaries (described in Table 1), will become contaminated or be further contaminated by the feed compounds (see Table 2). The product residue, in many cases, is a toxic material and must have its disposal strictly controlled.

Decommissioning of this facility at the end of its life will require disposal of parts of the process equipment and auxiliaries in one of the following classifications:

- Classified burial grounds
- Uranium contaminated burial grounds
- Toxic materials burial grounds
- Landfill for industrial refuse.

All classified equipment and materials must be buried in a DOE classified burial ground, and although uranium contaminated materials are acceptable at the DOE facility, toxic substances are not. All classified items contaminated with toxic material will be decontaminated before burial.

In each of the respective commercial burial grounds, uranium contaminated and toxic materials can be received but not co-mingled. Uranium contaminated materials must go to the radioactive material burial ground and toxic materials must go to the toxic material burial ground. Finally, industrial landfills may not receive any classified, uranium contaminated

or toxic materials. Therefore, a major portion of the decommissioning effort will involve segregating each class of material into discrete categories for final disposal while trying to keep the cost of the decommissioning to a minimum.

It should be noted that when the CPDF begins operations as a stable isotope enriching plant, the introduction of RCRA controlled substances will occur in two stages. Presently the 120 machines installed in the CPDF have low levels of uranium contamination internally. When operations begin, a cascade of 40 machines will be used to process various RCRA controlled substances. Approximately one year after operations begin, another 40 machines will begin being used to process materials that may leave RCRA controlled residues. Hence, the decommissioning scope, and therefore the cost, will increase with time. Centrifuge machines will also fail with time. This in turn will reduce the total decommissioning cost at plant shutdown since these failed classified and/or contaminated machine components received from DOE will be disposed of as appropriate and as required at the time of failure. Thus, estimates for decommissioning and disposal of the classified and contaminated equipment received from DOE or contaminated by AlChemIE are listed in Table 11 under two headings in order to establish a range of costs. These estimates are for: (1) 120 machine plant in operation employing 40 machines to process feed materials that may leave RCRA controlled residues, and (2) 120 machine plant in operation employing 80 machines to process feed materials that may leave RCRA controlled residues.

These estimates are given as "planning level" cost estimates for the decommissioning effort that will be involved in terminating operations at the CPDF in Oak Ridge, Tennessee. A complete plan for the appropriate stage of operation will be prepared during the engineering phase of the decommissioning.

II. DECOMMISSIONINGA. DECOMMISSIONING PLAN

The decommissioning, as appropriate, of the AlChemIE, Inc., CPDF facility in Oak Ridge, Tennessee, will be conducted in accordance with a decommissioning plan. The decommissioning plan will be prepared during the engineering phase of the decommissioning. The plan will serve as a description of the history of the facility and equipment to the time of termination, an outline of the decommissioning methodology and a forum where the goals of the decommissioning effort are stated. An outline of a decommissioning plan is given as Table 3.

B. PROJECT APPROACH

The decommissioning activities to be conducted at the AlChemIE, Inc., CPDF facility in Oak Ridge, Tennessee, can be conducted in four discrete phases:

- Engineering
- Mobilization
- Decommissioning
- Demobilization

Each of these phases will be made up of a number of chronologically related tasks and subtasks. An outline of the tasks and subtasks for each phase is given in Table 4.

C. PROJECT ORGANIZATION

The decommissioning of the AlChemIE, Inc., CPDF facility in Oak Ridge, Tennessee, will take about one year and will involve approximately 25 people. A breakdown of personnel types and hours for this phase of the decommissioning is shown in Tables 5A and 5B. In any event, the Phase 3 decommissioning activities will be conducted on a 5 day per week basis. Shift structures for both conditions are given in Tables 6A and 6B. A breakdown of the labor hours associated with these activities is given in Tables 7A and 7B.

III. PROJECT COST

The cost associated with performing the decommissioning activities at the AlChemIE, Inc., CPDF facility in Oak Ridge, Tennessee, is given in Tables 8A and 8B. The estimates have been broken down by phase and cost category.

A. VARIABLES

There are a number of variables that affect the cost of performing any decommissioning project. A number of these variables are discussed below. The result of how these variables affect the cost of the decommissioning effort is reflected in Table 11.

1. Machine Use

As previously noted, all the machines presently installed in CPDF have low levels of uranium contamination internally. However, during the first year of operation, two-thirds of the machines will have only uranium or uranium and non-toxic contaminants present. This means uranium contaminated classified equipment or material in this category will not need to be decontaminated prior to classified disposal. The remaining one-third of the machines will be further contaminated with feed compounds, as listed in Table 10, that may produce RCRA controlled substances. In addition, machines that will be involved in processing the SbH_3 should be noted for special handling. Although this is not a RCRA controlled substance, there are added precautions that will be used in working with this substance and its residues.

It should also be noted that all of the toxic substances will be disposed of as "heavy metal" wastes. Burial grounds, such as ChemWaste Emelle of Emelle, Alabama, that dispose of heavy metal wastes do not discern between single and multiple contaminants. Therefore, the machines used to process any of the feed compounds given in Table 10 could be intermixed, from a decommissioning standpoint.

During the decommissioning, those machines that contain mixed waste will be decontaminated in a multi-stage process, if a mixed

waste burial facility does not exist. This multi-stage decontamination will consist of a wash step that removes all contaminants from the equipment surfaces and then multiple steps to discretely remove the radioactive contaminants or the RCRA controlled contaminants from the solution and finally to process the different waste streams for final disposal. Therefore, two discrete decontamination baths will be used for the decommissioning, one for uranium contaminated materials and one for mixed waste materials. This will minimize mixed waste processing.

2. Scrap

In segregating the unclassified waste, an effort should be made to set aside non-contaminated and decontaminated scrap. The scrap should then be gathered into discrete salvage bins that will be collected and hauled away to the scrap yard. This gives the double advantage of providing an income from the scrap as well as reducing the refuse transportation and refuse disposal costs.

Some equipment will have residual value to perform tasks for which it was designed. The mass spectrometers, pumps, and some of the electrical gear used in the facility will be able to be salvaged and sold for re-use. Table 9 gives the approximate value that could be realized by selling the scrap to an organization such as Southern Alloy of Rockwood, Tennessee.

3. Contract Type

The contractor performing this decommissioning will have some level of uncertainty in bidding this scope of work. Currently in the cost estimates there is a 15% contingency to cover this uncertainty, should the decommissioning be performed on a fixed price basis. Should the contract be changed to time-and-materials or cost-plus fixed fee, the contingency would not be appropriate in the bid. However, the contingency will then need to be added into the contract administrators budget to ensure adequate funds are available to cover unforeseen costs.

4. Concurrent Decommissioning

AlChemIE, Inc., will begin operation of a similar stable isotope separation plant containing up to 600 machines in Oliver Springs, Tennessee, within the next couple of years. The Oliver Springs facility will begin as a storage facility for gas centrifuge equipment removed from the Gas Centrifuge Enrichment Process (GCEP) facility in Portsmouth, Ohio.

After initial storage at the Oliver Springs facility, the GCEP equipment will be used to construct a 120 machine plant for enriching various stable isotopes for commercial utilization. As demand increases, the plant will be expanded in approximately 160 machine increments until the facility reaches its design maximum of 600 machines.

An assessment of costs associated with decommissioning the Oliver Springs facility has been made and submitted as a stand-alone document. However, should the need for decommissioning of the CPDF arise because AlChemIE, Inc., is insolvent, the Oliver Springs facility would most likely be in the same condition. Therefore, the possibility exists for concurrent decommissioning activities to be conducted at both CPDF and the Oliver Springs facility.

In the case of concurrent decommissioning, a major portion of the engineering, project management and to a lesser extent the equipment necessary for decommissioning would only need to be accounted for once. This document and the "Assessment of Costs Associated with Decommissioning the AlChemIE, Inc., Oliver Springs, Tennessee Facility" document are each written as stand-alone documents. A sum of the total costs given in the two documents would overstate the true concurrent decommissioning costs by approximately \$300,000. Therefore, \$300,000 could be subtracted from a sum of the totals of the two costs for a concurrent decommissioning effort.

Table 1. Centrifuge Sub-Assemblies and Other Classified
or Contaminated Equipment Description
at the CPDF

	Number	Final Volume (ft ³)	Weight/Unit (lbs)
Rotors	129 each	10	1000
Casings	129 each	15	8000
Heat shield	129 each	4	100
Diffusion pumps	129 each	0.25	20
Scoop post	129 each	2	40
Scoops, feed ports & SPIS	129 each	0.25	20
Upper suspension	129 each	18	300
Lower suspension	129 each	0.5	10
Lower drive and closure	129 each	9	400
Bottom yoke	129 each	13.5	100
Piping and manifold	129 each	2	100
Wiring harness	129 each	0.25	10
Vacuum gauges	129 each	0.1	1
Flex connectors	488 each	0.05	20
Machine valve sets	120 each	0.1	200
Aluminum pipe 1"	4000 feet	0.007	0.33
Aluminum pipe 4"	2500 feet	0.042	1.25
Steel pipe 4"	600 feet	0.042	4
Steel pipe 3"	500 feet	0.037	2
Steel pipe 2"	300 feet	0.025	1.7
Steel pipe 1/2"	300 feet	0.005	0.25
Aluminum pipe 2"	200 feet	0.025	1
MDP	130 each	3.0	100
MVIP	130 each	1.0	25
Cascade isolation valves	200 each	0.1	40
Sample valves	40 each	0.05	5
Sensor valves	70 each	0.05	5
PV and EV valves	50 each	0.1	30
Portable carts	34 each	10	150
Mass specs	2 each	1	500
RBCS & controls	1 each	405	10000
Assembly stands	1 each	405	6000
Recycle & Assembly tooling	2 each	50	2000
PV pumps	10 each	8	800
Chem traps	6 each	2	200
Portable feed systems	4 each	0.1	5
Portable withdrawal system	4 each	0.1	5

Table 2. Exposure of Centrifuges to Feed Compounds¹
AlChemIE Proprietary Information

Feed Compound ²	Number of Centrifuges Exposed to Feed Compound	Compound Used ³ Per Year (kg/year)
TeF ₆	20	500
(CH ₃) ₂ Hg	240	44,000
CF ₃ Cl	10	2,900
(CH ₃) ₂ Zn	20	2,600
SiF ₄	20	750
CrO ₂ F ₂	120	65
Fe(CO) ₅	20	276
BF ₃	120	2,500
GeF ₄	10	25
SeF ₆	3	2
CF ₃ Br	3	355
WF ₆	3	2
VF ₅	3	2
(CH ₃) ₃ Ga	3	12
MoF ₆	3	160
SbH ₃	2	2
IrF ₆	2	2
Pb(CH ₃) ₄	2	2
Ru(CO) ₄	2	2
(CH ₃) ₂ Cd	10	55
(CH ₃) ₃ In	2	2
SnH ₄	2	2
TaF ₅	2	2
ReF ₆	2	2
(C ₂ H ₅) ₂ Zn	60	3,100

¹Associate piping is also exposed. There are small feed and withdrawal systems exposed to each compound.

²Non-radioactive.

³Only some used each year.

Table 3. Decommissioning Plan Outline

- 1.0 Introduction
- 2.0 Site Descriptions
 - 2.1 History
 - 2.2 Physical
 - 2.3 Radiological
- 3.0 Project Objective
- 4.0 Disposition Mode
- 5.0 Activity Descriptions
- 6.0 Waste Management
 - 6.1 Volume
 - 6.2 Type
 - 6.3 Packaging
 - 6.4 Disposition
- 7.0 Property Disposition
- 8.0 Safety
 - 8.1 Industrial
 - 8.2 Radiological
 - 8.3 Emergency Response & Readiness
- 9.0 Cost and Schedule
- 10.0 Project Control
 - 10.1 Management Organization
 - 10.2 Quality Assurance
 - 10.3 Training
 - 10.4 Health and Safety
 - Industrial
 - Radiological
 - 10.5 Financial
 - Cost Control
 - Funding

Table 4. Phase, Task and Subtask Description:

Phase 1: Engineering

Plans

- Decommissioning plan
- ALARA plan
- Safety and health plan
- Survey and sampling plan
- Release of facility
- QA plan
- Security

Procedures

- Work procedures
- Sampling procedures
- Survey procedures
- Waste packaging procedures
- Waste segregation procedures
- Waste shipping procedures
- Decontamination

Permits

- State of Tennessee
- NRC
- City of Oliver Springs
- DOE Use of Burial Grounds

Phase 2: Mobilization

Personnel

- Site-specific training
- Physicals & baseline bioassays

Equipment

- Rentals
- Consumables
- Special tooling
- Order long lead time items
- Assemble equipment at facility

Table 4.
(Continued)

Phase 3: Decommissioning

Pre-work survey

Radiological
Toxicological

D&D activities

Dismantle machines
Segregate waste types
Decontaminate as necessary
Package various waste forms
Ship waste to appropriate burial facility

Final release survey

Radiological
Toxicological

Third party check survey (QA)

Phase 4: Demobilization

Personnel

Exit physical & bioassay
Exit interview

Equipment

Return Rentals
Package & ship other equipment
Conduct final site inspection

Table 5A. Labor Hours
 120 Machine Plant in Operation -
 40 Machines Processing RCRA Substances

Labor	Phase 1: Engineering	Phase 2: Mobilization	Phase 3: Decom.	Phase 4: Demob.	Totals
Project Manager	346	80	1560	120	2106
Shift Supervisor	346	80	1560	120	2106
Engineer	692	80	1560	120	2452
Mixed Waste Chemist	173	80	1560	0	1813
HP Supervisor	173	80	1560	120	1933
HP Technician	0	80	4680	120	4880
IH Technician	173	80	3120	120	3493
Maintenance Supervisor	173	80	1560	0	1813
Maintenance Technician	0	80	1560	0	1640
Decon Technician	0	1440	14911	1440	17791
Clerk	0	80	1560	120	1760
Secretary	346	80	1560	120	2106
Total	2422	2320	36751	2400	43893

Table 5B. Labor Hours
 120 Machine Plant in Operation -
 80 Machines Processing RCRA Substances

Labor	Phase 1: Engineering	Phase 2: Mobilization	Phase 3: Decom.	Phase 4: Demob.	Totals
Project Manager	346	80	1560	120	2106
Shift Supervisor	346	80	1560	120	2106
Engineer	692	80	1560	120	2452
Mixed Waste Chemist	173	80	1560	0	1813
HP Supervisor	173	80	1560	120	1933
HP Technician	0	80	4680	120	4880
IH Technician	173	80	3120	120	3493
Maintenance Supervisor	173	80	1560	0	1813
Maintenance Technician	0	80	1560	0	1640
Decon Technician	0	1440	16511	1440	19391
Clerk	0	80	1560	120	1760
Secretary	346	80	1560	120	2106
Total	2422	2320	38351	2400	45493

Table 6A. Shift Manpower Loading
120 Machine Plant in Operation -
40 Machines Processing RCRA Substances

Shift 1	Shift 2	Shift 3
1 Project Manager	1 Shift Supervisor	1 Maintenance Supervisor
1 Engineer	1 HP Technician	1 Maintenance Technician
1 Mixed Waste Chemist	1 IH Technician	1 HP Technician
1 HP Supervisor	5 Decon Technicians	
1 HP Technician	1 Clerk	
1 IH Technician		
5 Decon Technicians		
1 Secretary		

Table 6B. Shift Manpower Loading
120 Machine Plant in Operation -
80 Machines Processing RCRA Substances

Shift 1	Shift 2	Shift 3
1 Project Manager	1 Shift Supervisor	1 Maintenance Supervisor
1 Engineer	1 HP Technician	1 Maintenance Technician
1 Mixed Waste Chemist	1 IH Technician	1 HP Technician
1 HP Supervisor	5 Decon Technicians	
1 HP Technician	1 Clerk	
1 IH Technician		
6 Decon Technicians		
1 Secretary		

Table 7A. Decontamination Technician Work Breakdown (Phase III)
120 Machine Plant in Operation -
40 Machines Processing RCRA Substances

Man Hours	Work Description
8385	Disassemble, decon/dispose 129 machines x 65 mhrs
1000	Remove (8500') valves, connections, etc.
2500	Decontaminate mixed waste piping and machine subassemblies
500	Process mixed waste decon solutions to non-mixed waste status
13	MDP dispose 130 x 0.1 mhrs
13	MVIP dispose 130 x 0.1 mhr
400	RBCS and controls
300	Assembly stand
1800	Miscellaneous
14911	

Table 7B. Decontamination Technician Work Breakdown (Phase III)
120 Machine Plant in Operation -
80 Machines Processing RCRA Substances

Man Hours	Work Description
8385	Disassemble, decon/dispose 129 machines x 65 mhrs
1000	Remove (8500') valves, connections, etc.
3500	Decontaminate mixed waste piping and machine subassemblies
500	Process mixed waste decon solutions to non-mixed waste status
13	MDP dispose 130 x 0.1 mhrs
13	MVIP dispose 130 x 0.1 mhr
400	RBCS and controls
300	Assembly stand
2400	Miscellaneous
16511	

TABLE 8A

120 Machine Plant in Operation -
40 Machines Processing RCRA Substances

ALCHEMIE DECOMMISSIONING
ALCHEMIE, INC.
DAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMobilIZATION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
LABOR											
PROJECT MANAGER	\$25.00	346	\$8650.00	80	\$2000.00	1560	\$39000.00	120	\$3000.00	2106	\$52650.00
SHIFT SUPERVISOR	\$18.00	346	\$5536.00	80	\$1280.00	1560	\$24960.00	120	\$1920.00	2106	\$33696.00
ENGINEER	\$15.00	692	\$10380.00	80	\$1200.00	1560	\$23400.00	120	\$1800.00	2452	\$36760.00
MIXED WASTE CHEMIST	\$30.00	173	\$5190.00	80	\$2400.00	1560	\$46800.00	0	\$0.00	1813	\$54390.00
HP SUPERVISOR	\$15.00	173	\$2595.00	80	\$1200.00	1560	\$23400.00	120	\$1800.00	1933	\$28995.00
HP TECHNICIAN	\$12.00	0	\$0.00	80	\$960.00	4680	\$56160.00	120	\$1440.00	4880	\$58560.00
IH TECHNICIAN	\$15.00	173	\$2595.00	80	\$1200.00	3120	\$46800.00	120	\$1800.00	3493	\$52395.00
MAINTENANCE SUPERVISOR	\$15.00	173	\$2595.00	80	\$1200.00	1560	\$23400.00	0	\$0.00	1813	\$27195.00
MAINTENANCE TECHNICIAN	\$10.00	0	\$0.00	80	\$800.00	1560	\$15600.00	0	\$0.00	1640	\$16400.00
DECOM TECHNICIAN	\$8.00	0	\$0.00	1440	\$11520.00	14911	\$119288.00	1440	\$11520.00	17791	\$142328.00
CLERK	\$5.00	0	\$0.00	80	\$400.00	1560	\$7800.00	120	\$600.00	1760	\$8800.00
SECRETARY	\$6.00	346	\$2076.00	80	\$480.00	1560	\$9360.00	120	\$720.00	2106	\$12636.00
SUBTOTAL			\$39617.00		\$24640.00	36751	\$435968.00		\$24600.00		\$524825.00
OVERHEAD	1.3		\$51502.10		\$32032.00		\$566758.40		\$31980.00		\$682272.50
G & A	0.12		\$10934.29		\$6800.64		\$120327.17		\$6789.60		\$144951.70
TOTAL LABOR			\$102053.39		\$63472.64		\$1123053.57		\$63369.60		\$1351949.20

TABLE 8A (cont.)

ALCHEMIE DECOMMISSIONING
 ALCHEMIE, INC.
 OAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMobilIZATION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
MATERIALS & SUPPLIES											
SAMPLES	\$175.00	0	\$0.00	150	\$26250.00	1000	\$175000.00				
EQUIPMENT & SUPPLIES			\$3900.00		\$5938.00		\$613132.50		\$5141.50		\$628112.00
BONDS/PERMITS	\$0.00		\$37500.00		\$0.00		\$0.00		\$0.00		\$37500.00
SUBTOTAL			\$41400.00		\$32188.00		\$788132.50		\$5141.50		\$866862.00
G & A	0.12		\$4968.00		\$3862.56		\$94575.90		\$616.00		\$104623.44
TOTAL M & S			\$78900.00		\$32188.00		\$788132.50		\$5141.50		\$904362.00

TABLE 8A (cont.)

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		DEMOLITION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
SUBCONTRACTS											
WASTE DISPOSAL											
CLASSIFIED	\$0.56	0	\$0.00	0	\$0.00	5937.1	\$3324.78	0	\$0.00	0	\$0.00
CONTAMINATED	\$33.00	0	\$0.00	0	\$0.00	2500	\$82500.00	0	\$0.00	0	\$0.00
TOXIC	\$44.00	0	\$0.00	0	\$0.00	2310.5	\$101662.00	0	\$0.00	0	\$0.00
REFUSE	\$1.00	0	\$0.00	0	\$0.00	1600	\$1600.00	0	\$0.00	0	\$0.00
OIL	\$450.00	0	\$0.00	0	\$0.00	15	\$6750.00	0	\$0.00	0	\$0.00
TRANSPORT CLASSIFIED	\$250.00	0	\$0.00	0	\$0.00	4.74545	\$1186.36	0	\$0.00	0	\$0.00
TRANSPORT CONTAMINATED	\$700.00	0	\$0.00	0	\$0.00	2	\$1400.00	0	\$0.00	0	\$0.00
TRANSPORT TOXIC	\$900.00	0	\$0.00	0	\$0.00	9.06825	\$8161.43	0	\$0.00	0	\$0.00
TRANSPORT OIL	\$900.00	0	\$0.00	0	\$0.00	1	\$900.00	0	\$0.00	0	\$0.00
TRANSPORT REFUSE	\$90.00	0	\$0.00	0	\$0.00	40	\$3600.00	0	\$0.00	0	\$0.00
SUBTOTAL			\$0.00		\$0.00		\$211084.56		\$0.00		\$211084.56
G & A	0.12		\$0.00		\$0.00		\$25330.15		\$0.00		\$25330.15
TOTAL SUBCONTRACTS			\$0.00		\$0.00		\$214684.56		\$0.00		\$214684.56

TABLE 8A (cont.)

ALCHEMIE DECOMMISSIONING
 ALCHEMIE, INC.
 OAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMOLITION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
PROJECT TOTAL			\$181540.85		\$95833.51		\$2130686.35		\$68733.36		\$2476794.08
CONTINGENCY	0.15		\$27231.13		\$14375.03		\$319602.95		\$10310.00		\$371519.11
FEE	0.1		\$20877.20		\$11020.85		\$245028.93		\$7904.34		\$284831.32
BID PRICE			\$229649.17		\$121229.39		\$2695318.23		\$86947.71		\$3133144.51

TABLE 8B

120 Machine Plant in Operation -
80 Machines Processing RCRA Substances

ALCHEMIE DECOMMISSIONING
ALCHEMIE, INC.
OAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MODIFICATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMOLITION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
LABOR											
PROJECT MANAGER	\$25.00	346	\$8650.00	80	\$2000.00	1560	\$39000.00	120	\$3000.00	2106	\$52650.00
SHIFT SUPERVISOR	\$16.00	346	\$5536.00	80	\$1280.00	1560	\$24960.00	120	\$1920.00	2106	\$33696.00
ENGINEER	\$15.00	692	\$10380.00	80	\$1200.00	1560	\$23400.00	120	\$1800.00	2452	\$36780.00
MIXED WASTE CHEMIST	\$30.00	173	\$5190.00	80	\$2400.00	1560	\$46800.00	0	\$0.00	1813	\$54390.00
HP SUPERVISOR	\$15.00	173	\$2595.00	80	\$1200.00	1560	\$23400.00	120	\$1800.00	1933	\$28995.00
HP TECHNICIAN	\$12.00	0	\$0.00	80	\$960.00	4880	\$58560.00	120	\$1440.00	4880	\$58560.00
IH TECHNICIAN	\$15.00	173	\$2595.00	80	\$1200.00	3120	\$46800.00	120	\$1800.00	3493	\$52395.00
MAINTENANCE SUPERVISOR	\$15.00	173	\$2595.00	80	\$1200.00	1560	\$23400.00	0	\$0.00	1813	\$27195.00
MAINTENANCE TECHNICIAN	\$10.00	0	\$0.00	80	\$800.00	1560	\$15600.00	0	\$0.00	1640	\$16400.00
DECON TECHNICIAN	\$8.00	0	\$0.00	1440	\$11520.00	16511	\$132088.00	1440	\$11520.00	19391	\$155178.00
CLERK	\$5.00	0	\$0.00	80	\$400.00	1560	\$7800.00	120	\$600.00	1760	\$8800.00
SECRETARY	\$4.00	346	\$2076.00	80	\$480.00	1560	\$9360.00	120	\$720.00	2106	\$12676.00
SUBTOTAL			\$39617.00		\$24640.00	38351	\$448768.00		\$24600.00		\$537625.00
OVERHEAD	1.3		\$51502.10		\$32032.00		\$583398.40		\$31980.00		\$698912.50
S & A	0.12		\$10934.29		\$6800.64		\$123859.97		\$6789.60		\$148384.50
TOTAL LABOR			\$102053.39		\$63472.64		\$1156026.37		\$63369.60		\$1364922.00

TABLE 88 (cont.)

ALCOA DECOMMISSIONING
ALCOA, INC.
OAK RIDGE, TENNESSEE

COST ITEM	RATE \$/hr	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMOBILIZATION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
TRAVEL & LIVING											
PER DIEM	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00		\$0.00
MILEAGE	\$0.21	2497.69	\$524.51	735	\$154.35	20475	\$4299.75	945	\$198.45		\$5177.06
AIRFARE	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00		\$0.00
			\$524.51		\$154.35		\$4299.75		\$198.45		\$5177.06
SUBTOTAL			\$524.51		\$154.35		\$4299.75		\$198.45		\$5177.06
G & A	0.12		\$62.94		\$18.52		\$515.97		\$23.81		\$621.25
TOTAL T & L			\$587.46		\$172.87		\$4815.72		\$222.26		\$5798.31

INTERNATIONAL TECHNOLOGY CORPORATION

TABLE 8B (cont.)

ALCHEMIE DECOMMISSIONING
 ALCHEMIE, INC.
 OAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMobilIZATION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
MATERIALS & SUPPLIES											
SAMPLES	\$175.00	0	\$0.00	150	\$26250.00	1250	\$218750.00	0	\$0.00		\$245000.00
EQUIPMENT & SUPPLIES			\$3900.00		\$5938.00		\$613132.50		\$5141.50		\$628112.00
EDMDS/PERMITS	\$0.00		\$37500.00		\$0.00		\$0.00		\$0.00		\$37500.00
SUBTOTAL			\$41400.00		\$32188.00		\$831882.50		\$5141.50		\$910612.00
G & A	0.12		\$4968.00		\$3862.56		\$99825.90		\$616.98		\$109273.44
TOTAL M & S			\$78900.00		\$32188.00		\$831882.50		\$5141.50		\$948112.00

TABLE 8B (cont.)

ALCHEMIE DECOMMISSIONING
 ALCHEMIE, INC.
 OAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1 ENGINEERING		PHASE 2 MOBILIZATION		PHASE 3 DECOMMISSIONING		PHASE 4 DEMOLITION		TOTALS	
		QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$	QUANTITY HRS	TOTAL \$
SUBCONTRACTS											
WASTE DISPOSAL											
CLASSIFIED	\$0.56	0	\$0.00	0	\$0.00	5937.1	\$3324.78	0	\$0.00		\$3324.78
CONTAMINATED	\$33.00	0	\$0.00	0	\$0.00	2500	\$82500.00	0	\$0.00		\$82500.00
TOXIC	\$44.00	0	\$0.00	0	\$0.00	4358.5	\$191774.00	0	\$0.00		\$191774.00
REFUSE	\$1.00	0	\$0.00	0	\$0.00	1600	\$1600.00	0	\$0.00		\$1600.00
OIL	\$450.00	0	\$0.00	0	\$0.00	15	\$6750.00	0	\$0.00		\$6750.00
TRANSPORT CLASSIFIED	\$250.00	0	\$0.00	0	\$0.00	4.74545	\$1186.36	0	\$0.00		\$1186.36
TRANSPORT CONTAMINATED	\$700.00	0	\$0.00	0	\$0.00	2	\$1400.00	0	\$0.00		\$1400.00
TRANSPORT TOXIC	\$900.00	0	\$0.00	0	\$0.00	17.9043	\$16113.83	0	\$0.00		\$16113.83
TRANSPORT OIL	\$900.00	0	\$0.00	0	\$0.00	1	\$900.00	0	\$0.00		\$900.00
TRANSPORT REFUSE	\$90.00	0	\$0.00	0	\$0.00	40	\$3600.00	0	\$0.00		\$3600.00
SUBTOTAL			\$0.00		\$0.00		\$309148.96		\$0.00		\$309148.96
G & A	0.12		\$0.00		\$0.00		\$37097.88		\$0.00		\$37097.88
TOTAL SUBCONTRACTS			\$0.00		\$0.00		\$312748.96		\$0.00		\$312748.96

INTERNATIONAL TECHNOLOGY CORPORATION

TABLE 8B (cont.)

ALCOA DECOMMISSIONING
ALCOA, INC.
DAK RIDGE, TENNESSEE

COST ITEM	RATE \$/HR	PHASE 1	TOTAL	PHASE 2	TOTAL	PHASE 3	TOTAL	PHASE 4	TOTAL	TOTALS	TOTAL
		ENGINEERING QUANTITY HRS	\$	MOBILIZATION QUANTITY HRS	\$	DECOMMISSIONING QUANTITY HRS	\$	DEMOLITION QUANTITY HRS	\$	QUANTITY HRS	\$
PROJECT TOTAL			\$181540.85		\$95833.51		\$2305473.55		\$68733.36		\$2651581.28
CONTINGENCY	0.15		\$27231.13		\$14375.03		\$345821.03		\$10310.00		\$397737.19
FEE	0.1		\$20877.20		\$11020.85		\$265129.46		\$7904.34		\$304931.85
BID PRICE			\$229649.17		\$121229.39		\$2916424.04		\$86947.71		\$3354250.31

INTERNATIONAL TECHNOLOGY CORPORATION
 Table 9. Scrap Value CPDF

Item	Total Scrap (lbs)	Value (\$/lb)	Total Value
Plant Equipment	---	---	\$200,000
Steel	2,000,000	0.01	20,000
Aluminum	100,000	.20	20,000
Copper	10,000	.40	4,000
Lead	5,000	.20	<u>1,000</u>
			<u>\$245,000</u>

Table 11. Summary of Decommissioning Costs & Funding Requirements
for CPDF²

	120 Machine Plant in Operation - 40 RCRA	120 Machine Plant in Operation - 80 RCRA
Total Cost	\$3,133,144.00	\$3,354,250.00
Scrap Value	<u>245,000.00</u>	<u>245,000.00</u>
Net Total Cost	\$2,888,144.00	\$3,109,250.00
Concurrent ¹ Decommissioning Savings	<u>300,000.00</u>	<u>300,000.00</u>
Net Funding Requirements	<u>\$2,588,144.00</u>	<u>\$2,809,250.00</u>

¹See Paragraph III.A.4.

²See companion report for decommissioning of the AlChemIE, Oliver Springs facility. The total funding requirements can be determined by combining those listed above with those listed in Table 12 of the new facility.