MLM-MU-89-67-0003

RECEIVED

JUL 22 1989

OSTI

ITEM NO. 3

PROCESS FACILITIES

COST ESTIMATES AND SCHEDULES

FOR

FACILITIES CAPABILITY ASSURANCE PROGRAM

NUCLEAR FACILITIES MODERNIZATION

FY 1989 LINE ITEM

AUTHORIZATION NO. D79

JULY 1989

EG&G MOUND APPLIED TECHNOLOGIES

P.O. BOX 3000

MIAMISBURG, OHIO 45343-0987

513-865-4020

operated for the UNITED STATES DEPARTMENT OF ENERGY

Contract No. DE-AC04-88-DP43495

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

NFM PROCESS FACILITIES

COST ESTIMATE SUMMARY

(Tabular dollars in thousands)

DETAILS OF COST ESTIMATE

A. Engineering Design & Inspection	Title I	Title II	Title III	Total
	-----	-----	-----	-----
735 Special Facilities				
1. Tritium Processing, Testing & Analysis	\$207	\$1,022	\$545	\$1,774
2. Material Preparation & Characterization	\$231	\$810	\$432	\$1,473
3. Historical Material Studies	\$108	\$483	\$258	\$849
4. Component Fabrication	\$90	\$233	\$126	\$449
Subtotal	\$636	\$2,549	\$1,360	\$4,545
		Subtotal		

B. Construction Cost *				\$13,543
735 Special Facilities				
1. Tritium Processing, Testing & Analysis		\$4,501		
2. Material Preparation & Characterization		\$5,132		
3. Historical Material Studies		\$2,243		
4. Component Fabrication		\$1,667		
C. Contingency @ 30.2% **				\$5,463
GRAND TOTAL				\$23,551

* This cost estimate summary sheet shows higher costs for the individual items than are shown on the detail sheets. The increase is the escalation which has factors calculated as stated in Chapter II of DOE Order AL5700.2C, dated 7/8/88.

** The contingency is based on a contingency analysis for each budget serial number element applying relative weights, risk, uncertainty and Q.A. factors.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

CONSTRUCTION COST ESTIMATE DETAIL

U.S. DEPARTMENT OF ENERGY MOUND FACILITY			BUDGET YEAR 1989	SHEET 1 OF 2
BASIS OF ESTIMATE SEE COST ESTIMATE SUMMARY SHEETS	TYPE TITLE I EST.	PROG. NO. 301	CONST. YEAR 1991,92,93	ORIG. EST. June,1988
PROJECT TITLE FCAP NFM FY 1989 PROCESS FACILITIES TITLE I SUBMITTAL		ESTIMATOR ENG'S	CHECKED BY RPPB	DATE EST. JULY,1989
DESCRIPTION	REFER TO AES		SUB TOTAL	TOTAL
735 SPECIAL FACILITIES				
TRITIUM PROCESSING, TESTING & ANALYSIS SYSTEM	B.S.# 99022			\$4,118,000
FUNCTION TEST	J 01261		\$971,860	
CALORIMETRY	J 01262		\$180,640	
MASS SPEC	J 01263		\$803,480	
HEALTH PHYSICS AREA	J 01264		\$437,160	
GLOVEBOXES	J 01265		\$425,500	
TRITIUM MONITORS	J 01266		\$111,840	
BOX SERVICES	J 01267		\$36,540	
VACUUM PUMP SYSTEM	J 01268		\$74,070	
INSTRUMENTATION	J 01269		\$806,080	
BOX PURGE	J 01270		\$96,140	
ELECTRICAL	J 01271		\$174,320	
MATERIALS PREPARATION AND CHARACTERIZATION	B.S.# 99023			\$4,697,000
SPECIAL PREP. # 1	J 01283		\$263,120	
SPECIAL PREP. # 2	J 01284		\$400,610	
CALORIMETRY	J 01285		\$669,520	
CHARACTERIZATION STUDIES	J 01286		\$345,780	
HOT INERT SYSTEM	J 01287		\$407,240	
GLOVEBOXES	J 01288		\$1,140,500	
TRITIUM MONITORS	J 01289		\$296,800	
BOX SERVICES	J 01290		\$100,810	
VACUUM PUMP SYSTEM	J 01291		\$148,140	
INSTRUMENTATION	J 01292		\$564,040	
BOX PURGE	J 01293		\$153,780	
ELECTRICAL	J 01294		\$207,030	

CONSTRUCTION COST ESTIMATE DETAIL

U.S. DEPARTMENT OF ENERGY MOUND FACILITY			BUDGET YEAR 1989	SHEET 2 OF 2
BASIS OF ESTIMATE SEE COST ESTIMATE SUMMARY SHEETS	TYPE TITLE I EST.	PROG. NO. 301	CONST. YEAR 1991,92,93	ORIG. EST. June, 1988
PROJECT TITLE FCAP NFM FY 1989 PROCESS FACILITIES TITLE I SUBMITTAL		ESTIMATOR ENG'S	CHECKED BY RPS	DATE EST. JULY, 1989
DESCRIPTION	REFER TO AES		SUB TOTAL	TOTAL
735 SPECIAL FACILITIES				
HISTORICAL MATERIAL STUDIES SYSTEMS	B.S.# 99024			\$2,049,000
HISTORICAL MATERIAL STORAGE & SAMPLING	J 01302		\$368,620	
CALORIMETRY	J 01303		\$173,960	
ENVIRONMENTAL CHAMBERS	J 01304		\$25,450	
GLOVEBOXES	J 01305		\$853,500	
TRITIUM MONITORS	J 01306		\$98,840	
BOX SERVICES	J 01307		\$82,810	
INSTRUMENTATION	J 01308		\$250,040	
BOX PURGE	J 01309		\$57,660	
ELECTRICAL	J 01310		\$138,280	
COMPONENT FABRICATION	B.S.# 99025			\$1,516,000
COLD PROCESS	J 01313		\$593,590	
GLOVEBOXES	J 01315		\$379,500	
MONITORS	J 01316		\$24,880	
INSTRUMENTATION	J 01322		\$237,520	
ELECTRICAL	J 01323		\$156,160	
MISC.TESTING & ACCEPTANCE EQUIP.	J 01324		\$124,360	
			TOTAL	\$12,380,000

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01261	DOE/AL AUTHORIZATION # D-79		AES TITLE TPTA FUNCTION TEST SYSTEM			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257	TASK No. L21	Project TEC \$1,423,930	Bud. Ser. No. 99022
HP No. (Assignee) 4974	ENG. GRP. N4	Assignee Ph. No. 3309	Date Prepared 15-JUNE-89	Date Required 10/92	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		6,688	\$22.00	\$147,140	880	FY: 1989 \$107,980
Drafting			\$16.00	\$0		FY: 1990 \$153,408
Inspection			\$18.00	\$0		FY: 1991 \$894,928
Overhd. @ 60%			60%	\$88,280		FY: 1992 \$267,614
Out. Eng. E/C 48		6,190	\$35.00	\$216,650	2,200	FY: 1993
Total Title I & II Estimate		12,878		\$452,070		Total 1424000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		494	\$19.00	\$9,386		Engineering \$19,360
Planner		494	\$19.00	\$9,386		Drafting \$0
Carpenter		364	\$16.00	\$5,824		Inspection \$0
Electrician		128	\$16.00	\$2,048		Eng Overhd \$11,620
Mechanic		2456	\$16.00	\$39,296		Out Eng. \$77,000
Pipefitter		2584	\$16.00	\$41,344		
Painter			\$16.00	\$0		
Welder		3232	\$16.00	\$51,712		TITLE III TOT \$107,980
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		9,752		\$159,000	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop		1200	\$18.00	\$21,600		Contract \$0
Total Labor		10,952		\$180,600	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$108,360	60%	TOTAL \$107,980
PO Mat'ls & Eq. by MRC				\$682,896		
Warehouse Mat'ls						
Out Cont'r E/C 49						
TITLE III SUBTOTAL				\$971,860		
TITLE I & II SUBTOTAL				\$452,070		
TOTAL ESTIMATE				\$1,423,930		

ROUTING:
 PROJ. MGT. CONT: _____
 PROJ. MGR.: _____
 AES CONTROL: _____
 ACCOUNTING: _____
 PROJ. ENG. _____
 AES4.wk1 2/9/89: BB

ESO DETAIL COST ESTIMATE - TRADES

Page 1 of 1

ESO NUMBER		ESO TITLE		ESO ASSIGNEE										DATE OF ESTIMATE				
		TPDA FUNCTION TEST SYS. # 1																
EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			CARPEN-TER 310	ELECTRI-CIAN 311	MECHANIC 312	PIPE-FITTER 313	SHEET-METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRON-IC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE	
		QTY.	UNIT COST	TOTAL COST														
I	THERMAL TEST CHAMBER	1					264	264		264						80		
	BELL JAR			110,000														
	LIFTING MECHANISM																	
	GLASS DISCS	2	1500	4,300														
	COOLING COIL	1	3,000	3,000														
	HEATERS	1	1,000	1,000														
II	LASER DRILL SYSTEM	1		57,350		264										32		
	POWER SUPPLY MUDS.			10,000														
	X/Y POSITIONER			15,000														
	ADDITIONAL HEAD																	
III	PROCESS SYSTEM	1				184,792			792							176		
A	EQUIPMENT																	
	CALIBRATED TEST TANK	9	1,000	9,000		648,108	54		432							124		
	VANE PUMP (MS)	2		18,600												600	60	
	SPENT OIL TANK	1	130	130														
	Helium COMPRESSOR	1		6,500														

MRC ML-3980 (11-86)
17 1148

*INCLUDES: AIR COND. MECH., H.D. OPER.,
LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

232,080

DISTRIBUTION: 1. ESO COORD. & CONTROL
2. ACCOUNTING
3. ACCOUNTING
4. ESO ASSIGNEE

ESO DETAIL COST ESTIMATE TRADES

Page 2 of 2

ESO NUMBER		ESO TITLE		ESO ASSIGNEE										DATE OF ESTIMATE				
11111		TPTA FUNCTION TEST SYS. #1																
EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			310 CUTTER	311 ELECTR.	312 MECHANIC	313 PIPE FITTER	314 WELDING METAL	315 PAINTER	316 WELDER	317 WAGON	318 LABORER	319 ELECTRON. NO TECH.	320 MACHINE SHOP	OTHER	ESTIMATE SOURCE	
		QTY.	UNIT COST	TOTAL COST														
III	PROCESS SYSTEM																	
A	EQUIPMENT (CONT.)																	
	LUNTURE DISC 150 PSIA	15	500	7500														
	RUPTURE DISC 12000 PSIA	4	500	2000														
	FILTER 3/8" INLINE	3	165	495														
	MULE DRAG PUMP	1	2800	2800														
	TRAP, INLINE OIL	4	175	700														
	TRAP, COAXIAL FUEL LINE	1	195	195														
B	VALUES	124	N/A	39,598														
	(SEE PG 4 & 5 ATTACHED VALUE DESCRIPTION)																	
C	INSTRUMENTATION	N/A	N/A	280														
	(SEE PG 6 ATTACHED DESCRIPTION)																	

MRC ML-3980 (11 86)
17 1145

* INCLUDES AIR COND. MECH., H.D. OPER.,
LAB TECH., & GLASS BLOWER

** SEE REVERSE SIDE FOR CODES

53,560

DISTRIBUTION: 1. ESO COORD. & CONTROL
2. ACCOUNTING

3 ACCOUNTING
4 ESO ASSIGNEE

ESO DETAIL COST ESTIMATE - TRADES

Page 3 of 3

ESO NUMBER	ESO TITLE	DATE OF ESTIMATE
1111	TPTA FUNCTION TEST SYS # 1	

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			CARPEN-TER 310	ELECTRI-CIAN 311	MECHANIC 312	PIPE-FITTER 313	SHEET-METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRON-IC TECH. 321	MACHINE SHOP 322	OTHER	**ESTIMATE SOURCE	
		QTY.	UNIT COST	TOTAL COST														
III	PROCESS SYSTEM (CONT.)																	
D	PROCESS PIPING	20LF	2200	44,000														
	& FITTINGS																	
E	CYLINDER GAS SUPPLY																	
	GAS CYLINDERS	3	500	1,500				64	64		64					16		
	FUME HOOD, 3 CYLINDER	1	2,000	2,000														
	HYDROGEN ANALYSER	1	1,000	1,000														
	OXYGEN ANALYSER	1	1,000	1,000														
	REGULATOR	3	325	975														
F	LIQUID NITROGEN	100	300	30,000				64	64		64					16		
	VACUUM JACKET	Lf.																
	TUBING																	
	TOTALS			366,123			1360	1292	182		1616				64	600	510	

MRC ML-3980 (11 86)

ENCLOSURE

MRC ML-3980 (11 86)
17 1148

*INCLUDES AIR COND. MECH., H.D OPER., LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

80.475

DISTRIBUTION: 1. ESO COORD. & CONTROL
2. ACCOUNTING
3. ACCOUNTING
4. ESO ASSIGNEE

VALVES - MATERIAL LIST

ITEM -----	DESCRIPTION -----	UNIT	
		#	Q
C-21	VALVE, 3/8" OD CHECK, CIRCLE SEAL MODEL #232-T-3PP WITH 0.5 TO 1 PSI CRACKING PRESSURE & W/ 3/8" FPT END CONNECTIONS	125	1
C-***	VALVE, 1/4" 60,000 PSI BALL CHECK, AUTOCLAVE MODEL #CB4401-B W/ F-250 C END CONNECTIONS & W/ 20 PSI CRACKING PRESSURE	500	1
F-28	VALVE, 1/2" OD BALL, WORCESTER MODEL # 1/2"-466-T-SWO FOR 1/2" OD SST TUBING	125	1
G-***	VALVE, 1/4" DIAPHRAM, NUPRO MODEL #SS-8-DL-V-51 W/ 1/4" FEMALE VCR NUT END CONNECTIONS	154	1
N-02	VALVE, 1/4" OD NEEDLE, AUTOCLAVE ENGINEERS MODEL #30 VM 4071-B W/ F-250-C END CONNECTIONS	200	24
N-***	VALVE, 1/4" 30,000 PSI NORMALLY CLOSED AIR OPERATED NEEDLE, AUTOCLAVE ENGINEERS MODEL #30 VM-4-B W/ F-250 C END CONNECTIONS	500	1
N-***	VALVE, 1/4" NEEDLE, AUTOCLAVE ENGINEERS MODEL #30 VM-4071OMP W/ F-250 C END CONNECTIONS	500	1
PSV-28	VALVE, RELIEF, REFERENCE DWG #FSD-20246	200	1
R-32	VALVE, 3" OD, PRESSURE RELIEF, CRYOLAB MODEL #PRE-824-5F2 W/ 3 TO 5 PSIA ADJUSTABLE CRACKING PRESSURE REFERENCE DWG #FSD-871171 & FSD-871172 FOR VALVE ASSEMBLY DWGS	575	1
R-33	VALVE, 1/4" OD, PRESSURE RELIEF, CIRCLE SEAL MODEL #5132-T-2MP-140 W/ 118-162 PSI ADJUSTABLE CRACKING PRESSURE W/ 1/4" MPT INLET & 1/4" FPT OUTLET CONNECTIONS	225	1
R-***	VALVE, 1/2" PRESSURE RELIEF, CIRCLE SEAL MODEL #5132-T-4-MP-140 W/118-160 PSI ADJUSTABLE CRACKING PRESSURE & W/ 1/2" MPT INLET & 1/2" FPT OUTLET END CONNECTIONS	250	1
R-***	VALVE, 1/4" PRESSURE RELIEF, CIRCLE SEAL MODEL #5159-T-2MP-2000 W/ 1530-2400 PSI CRACKING PRESSURE & W/ 1/4" MPT INLET & 1/4" FPT OUTLET END CONNECTIONS	175	1
R-***	VALVE, 3/8" PRESSURE RELIEF, CIRCLE SEAL MODEL #5159-T-3MP-20 W/ 15-25 PSI ADJUSTABLE CRACKING PRESSURE & W/ 3/8" MPT INLET & 3/8" FPT OUTLET END CONNECTIONS	200	1

VALVES - MATERIAL LIST

ITEM -----	DESCRIPTION -----	UNIT			TOTAL
		#	Q	\$	
T-11	VALVE, 1-1/2" OD, RIGHT ANGLE, BELLOWS, HUNTINGTON MODEL #EV-150 W/ 2-3/4" OD VAC-U-FLAT FLANGED INLET AND OUTLET CONNECTIONS	400	4	160.	
T-56	VALVE, 1/2" OD, BELLOWS, NUPRO MODEL #SS-8UW-V19 W/ 1/2" FEMALE VCR NUTS ON INLET AND OUTLET CONNECTIONS	369	1	36	
T-57	VALVE, 3/8" OD, SHORT BODY, BELLOWS, NUPRO MODEL #SS-6UW-451 W/ 1/2" FEMALE VCR NUTS ON INLET AND OUTLET CONNECTIONS	350	79	27,65	
T-58	VALVE, 5/8" OD BELLOWS, HUNTINGTON MODEL #EV-0623	240	1	2	
T-59	VALVE, 1/2" OD, RIGHT ANGLE, NC, PNEUMATIC OPERATED, BELLOWS, HUNTINGTON MODEL #PV-053	285	1	2	
T-60	VALVE, 1-1/2" OD, RIGHT ANGLE, NC, PNEUMATIC OPERATED BELLOWS, HUNTINGTON MODEL #PV-150 W/ 2-3/4" OD VAC-U-FLAT FLANGED INLET AND OUTLET CONNECTIONS	425	1	4	
T-62	VALVE, 3/8" OD, NC PNEUMATIC OPERATED, BELLOWS HUNTINGTON MODEL #SS-6UW-94 NC-452 W/ 1/2" FEMALE VCR NUTS ON INLET AND OUTLET CONNECTIONS	700	1	70	
TOTAL					\$39,59

INSTRUMENTATION - MATERIAL LIST

ITEM	DESCRIPTION	UNIT	Q
FO-05	ORIFICE, 1/8" OD FLOW, MODIFY COPPER VCR GASKET, CAJON MODEL #CU-4-VCR-2-BL, BLIND GASKET TO BE DRILLED THROUGH 1/8" OD	1.0	1
PE-01	TRANSDUCER, 0-25 PSIA PRESSURE SENSOTEC MODEL #TJE W/ 1/4" FEMALE VCR NUT END CONNECTION AND MECHANICAL STOPS, REFERENCE DWG #STB-13410-01 (OPT #3) MOUND STOCK #	800	1
PE-10	PRESSURE TRANSDUCER, 0-150 PSIA PLUS MINUS 0.5% SENSOTEC MODEL 410, TWO WIRE 15-40 VDC, 4-20 MA, BENDIX PTH-12-10P ELEC CONNECTOR & W/ 1/4" FEMALE VCR NUT END CONNECTION	800	17
PE-11	TRANSDUCER, VACUUM GAUGE TUBE, HASTINGS RAYDIST MODEL #DV-36 W/ 1/2" FEMALE VCR NUT END CONNECTION REFERENCE DWG #FSB-20148 FOR ASSEMBLY DWGS	800	15
PE-**	TRANSDUCER, 0-15,000 PSI PRESSURE, SENSOTEC MODEL #TJE-5504-15,000 W/ F-250 C END CONNECTION	800	1
PE-**	TRANSDUCER, 0-2,500 PSIA PRESSURE, SENSOTEC MODEL #5499-2500 W/ 1/4" FEMALE VCR NUT END CONNECTIONS MOUND STOCK #10-7076-4	800	1
PE-**	TRANSDUCER, 0-200 PSIA PRESSURE, SENSOTEC MODEL #5482-200 W/ 1/4" FEMALE VCR NUT END CONNECTION MOUND STOCK #10-7074-4	800	1
PI-30	GAUGE, 1/4" OD COMPOUND PRESSURE/VACUUM, 60 PSIG TO 0 TO 26 IN MERCURY (VAC) W 1/4" FPT INLET, STOCK #07-3115	20	4
PI-**	GAGE, 0-5000 PSIG PRESSURE, HELICOID MODEL #J4J15AOD W/ 1/4" MPT BOTTOM CONNECTION	200	1
TE-27	THERMOCOUPLE, 1/8" OD TYPE "E" (GROUNDED) SST OMEGA #SXSS(DUAL) 18-S-S W/ 1/2" MALE VCR NUT, INTERNAL LENGTH 7-1/4", REFERENCE DWG #FSH-870554 DETAIL 15	300	1
TE-28	THERMOCOUPLE, 1/8" OD TYPE "E" (GROUNDED) SST OMEGA #OSK-6288/CTSS-182-(7-1/2") W/ 1/4" FEMALE VCR NUT, INTERNAL LENGTH 5-3/4", REFERENCE DWG #FSE-861222-2 TE TABLE "A"	300	4
TE-29	THERMOMETER, 1/8" OD PLATINUM RESISTANCE YSI #I-18950/ 1/8" / 8-1/2" / 539P, W/ 1/4" FEMALE VCR NUT, INTERNAL LENGTH 10-1/8" REFERENCE DWG #FSE-861222-2 TE TABLE "A"	750	6

TOTALS

#2

ESO DETAIL COST ESTIMATE - TRADES

Page 1 of 1

ESO NUMBER 1111	ESO TITLE TPTA FUNCTION TEST SYS. # 2	ESO ASSIGNEE	DATE OF ESTIMATE
--------------------	--	--------------	------------------

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE FITTER 313	SHEET-METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
I	THERMAL TEST CHAMBER	1					264	264			264					80	
	BELL JAR			110,000													
	LIFTING MECHANISM																
	GLASS DISCS	2	1500	4,500													
	COOLING COIL	1	3,000	3,000													
	HEATERS	1	1,000	1,000													
II	LASER DRILL SYSTEM																
	POWER SUPPLY MODS.																
	X/Y POSITIONER			15,000													
	ADDITIONAL HEAD			15,000													
III	PROCESS SYSTEM	1					184	792			792					176	
A	EQUIPMENT																
	CALIBRATED TEST TANK	9	1,000	9,000			648	108	54		432					124	
	VANE PUMP (MS)	2		18,600											600	60	
	SPENT OIL TANK	1	130	130													
	HELIUM COMPRESSOR	1		6,500													

MRC ML-3980 (11-86)
17 1148

*INCLUDES AIR COND. MECH., H.D. OPER.,
LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

DISTRIBUTION: 1. ESO COORD. & CONTROL
2. ACCOUNTING

3. ACCOUNTING
4. ESO ASSIGNEE

182,730

ESO DETAIL COST ESTIMATE TRADES

Page 2 of

ESO NUMBER <u> </u>	ESO TITLE <u>TPTA FUNCTION TEST SYS. # 2</u>	ESO ASSIGNEE <u> </u>	DATE OF ESTIMATE <u> </u>
---	---	---	---

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE FITTER 313	WELDING 314	PAINTER 315	WELDER 316	IRONWORKER 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
<u>III</u>	<u>PROCESS SYSTEM</u>																
<u>A</u>	<u>EQUIPMENT (CONT.)</u>																
	LUNTURE DISC 150 psia	15	500	7500													
	Rupture DISC 12,000 psia	4	500	2000													
	FILTER 3/8" INLINE	3	165	495													
	MULE-DRAW PUMP	1	2800	2800													
	TRAP, INLINE oil	4	175	700													
	TRAP, COAXIAL FUEL LINE	1	195	195													
<u>B</u>	<u>VALUES</u>	124	N/A	39,598													
	(SEE pg 4 & 5 ATTACHED VALUE DESCRIPTION)																
<u>C</u>	<u>INSTRUMENTATION</u>	N/A	N/A	280										64		6	
	(SEE pg 6 ATTACHED DESCRIPTION)																

Page 3 of

ESO ASSIGNEE

TTPTA FUNCTION TEST SYS # 2

DATE OF ESTIMATE

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			310 CARPENTER	311 ELECTRICAL	312 MECHANIC	313 PIPE FITTER	314 SHEET METAL	315 PAINTER	316 WELDER	317 MASON	318 LABORER	321 ELECTRONIC TECH.	322 MACHINE SHOP	OTHER	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
III	PROCESS SYSTEM (CONT.)																
D	PROCESS PIPING	20 LF.	2,200	44,000													
	& FITTINGS																
E	CYLINDER GAS SUPPLY																
	GAS CYLINDERS	3	500	1,500			64	64			64					16	
	FUME HOOD, 3 CYLINDER	1	2,000	2,000													
	HYDROGEN ANALYZER	1	1,000	1,000													
	OXYGEN ANALYZER	1	1,000	1,000													
	REGULATOR	3	325	975													
F	LIQUID NITROGEN	100	300	30,000				64	64		64					16	
	VACUUM JACKET	LF.															
	TUBING																
				316,773			1096	1292	182		1616						64 600 478

MARC ML-3980 (11 86)
17 1148

*INCLUDES AIR COND. MECH., H D OPER., LAB TECH., & GLASS BLOWER

..SEE REVERSE SIDE FOR CODES

DISTRIBUTION. 1. ESO COORD. & CONTROL
2 ACCOUNTING

3. ACCOUNTING

VALVES - MATERIAL LIST

ITEM -----	DESCRIPTION -----	UNIT	
		#	Q
C-21	VALVE, 3/8" OD CHECK, CIRCLE SEAL MODEL #232-T-3PP WITH 0.5 TO 1 PSI CRACKING PRESSURE & W/ 3/8" FPT END CONNECTIONS	125	1
C-***	VALVE, 1/4" 60,000 PSI BALL CHECK, AUTOCLAVE MODEL #CB4401-B W/ F-250 C END CONNECTIONS & W/ 20 PSI CRACKING PRESSURE	500	1
F-28	VALVE, 1/2" OD BALL, WORCESTER MODEL # 1/2"-466-T-SWO FOR 1/2" OD SST TUBING	125	1
G-***	VALVE, 1/4" DIAPHRAM, NUPRO MODEL #SS-8-DL-V-51 W/ 1/4" FEMALE VCR NUT END CONNECTIONS	154	1
N-02	VALVE, 1/4" OD NEEDLE, AUTOCLAVE ENGINEERS MODEL #30 VM 4071-B W/ F-250-C END CONNECTIONS	200	24
N-***	VALVE, 1/4" 30,000 PSI NORMALLY CLOSED AIR OPERATED NEEDLE, AUTOCLAVE ENGINEERS MODEL #30 VM-4-B W/ F-250 C END CONNECTIONS	500	1
N-***	VALVE, 1/4" NEEDLE, AUTOCLAVE ENGINEERS MODEL #30 VM-4071OMP W/ F-250 C END CONNECTIONS	500	1
PSV-28	VALVE, RELIEF, REFERENCE DWG #FSD-20246	200	1
R-32	VALVE, 3" OD, PRESSURE RELIEF, CRYOLAB MODEL #PRE-824-5F2 W/ 3 TO 5 PSIA ADJUSTABLE CRACKING PRESSURE REFERENCE DWG #FSD-871171 & FSD-871172 FOR VALVE ASSEMBLY DWGS	575	1
R-33	VALVE, 1/4" OD, PRESSURE RELIEF, CIRCLE SEAL MODEL #5132-T-2MP-140 W/ 118-162 PSI ADJUSTABLE CRACKING PRESSURE W/ 1/4" MPT INLET & 1/4" FPT OUTLET CONNECTIONS	225	1
R-***	VALVE, 1/2" PRESSURE RELIEF, CIRCLE SEAL MODEL #5132-T-4-MP-140 W/118-160 PSI ADJUSTABLE CRACKING PRESSURE & W/ 1/2" MPT INLET & 1/2" FPT OUTLET END CONNECTIONS	250	1
R-***	VALVE, 1/4" PRESSURE RELIEF, CIRCLE SEAL MODEL #5159-T-2MP-2000 W/ 1530-2400 PSI CRACKING PRESSURE & W/ 1/4" MPT INLET & 1/4" FPT OUTLET END CONNECTIONS	175	1
R-***	VALVE, 3/8" PRESSURE RELIEF, CIRCLE SEAL MODEL #5159-T-3MP-20 W/ 15-25 PSI ADJUSTABLE CRACKING PRESSURE & W/ 3/8" MPT INLET & 3/8" FPT OUTLET END CONNECTIONS	200	1

VALVES - MATERIAL LIST

ITEM	DESCRIPTION	UNIT	TOT
----	-----	# Q	\$
T-11	VALVE, 1-1/2" OD, RIGHT ANGLE, BELLOWS, HUNTINGTON MODEL #EV-150 W/ 2-3/4" OD VAC-U-FLAT FLANGED INLET AND OUTLET CONNECTIONS	400 4	160
T-56	VALVE, 1/2" OD, BELLOWS, NUPRO MODEL #SS-8UW-V19 W/ 1/2" FEMALE VCR NUTS ON INLET AND OUTLET CONNECTIONS	369 1	3
T-57	VALVE, 3/8" OD, SHORT BODY, BELLOWS, NUPRO MODEL #SS-6UW-451 W/ 1/2" FEMALE VCR NUTS ON INLET AND OUTLET CONNECTIONS	350 79	27,6
T-58	VALVE, 5/8" OD BELLOWS, HUNTINGTON MODEL #EV-0623	240 1	2
T-59	VALVE, 1/2" OD, RIGHT ANGLE, NC, PNEUMATIC OPERATED, BELLOWS, HUNTINGTON MODEL #PV-053	285 1	2
T-60	VALVE, 1-1/2" OD, RIGHT ANGLE, NC, PNEUMATIC OPERATED BELLOWS, HUNTINGTON MODEL #EV-150 W/ 2-3/4" OD VAC-U-FLAT FLANGED INLET AND OUTLET CONNECTIONS	425 1	4
T-62	VALVE, 3/8" OD, NC PNEUMATIC OPERATED, BELLOWS HUNTINGTON MODEL #SS-6UW-94 NC-451 W/ 1/2" FEMALE VCR NUTS ON INLET AND OUTLET CONNECTIONS	700 1	7

TOTAL

\$39,59

INSTRUMENTATION - MATERIAL LIST

ITEM	DESCRIPTION	UNIT	Q
FO-05	ORIFICE, 1/8" OD FLOW, MODIFY COPPER VCR GASKET, CAJON MODEL #CU-4-VCR-2-BL, BLIND GASKET TO BE DRILLED THROUGH 1/8" OD	1.0	1
PE-01	TRANSDUCER, 0-25 PSIA PRESSURE SENSOTEC MODEL #TJE W/ 1/4" FEMALE VCR NUT END CONNECTION AND MECHANICAL STOPS, REFERENCE DWG #STB-13410-01 (OPT #3) MOUND STOCK #	800	1
PE-10	PRESSURE TRANSDUCER, 0-150 PSIA PLUS MINUS 0.5% SENSOTEC MODEL 410, TWO WIRE 15-40 VDC, 4-20 MA, BENDIX PTM-12-10P ELEC CONNECTOR & W/ 1/4" FEMALE VCR NUT END CONNECTION	800	17
PE-11	TRANSDUCER, VACUUM GAUGE TUBE, HASTINGS RAYDIST MODEL #DV-36 W/ 1/2" FEMALE VCR NUT END CONNECTION REFERENCE DWG #FSE-20148 FOR ASSEMBLY INGS	800	15
PE-**	TRANSDUCER, 0-15,000 PSI PRESSURE, SENSOTEC MODEL #TJE-5504-15,000 W/ F-250 C END CONNECTION	800	1
PE-**	TRANSDUCER, 0-2,500 PSIA PRESSURE, SENSOTEC MODEL #5489-2500 W/ 1/4" FEMALE VCR NUT END CONNECTIONS MOUND STOCK #10-7076-4	800	1
PE-**	TRANSDUCER, 0-200 PSIA PRESSURE, SENSOTEC MODEL #5482-200 W/ 1/4" FEMALE VCR NUT END CONNECTION MOUND STOCK #10-7076-4	800	1
PI-30	GAUGE, 1/4" OD COMPOUND PRESSURE/VACUUM, 60 PSIG TO 0 TO 26 IN MERCURY (VAC) W 1/4" NPT INLET, STOCK #07-3115	20	4
PI-**	GAGE, 0-5000 PSIG PRESSURE, HELICOID MODEL #J4J15AOD W/ 1/4" NPT BOTTOM CONNECTION	200	1
TE-27	THERMOCOUPLE, 1/8" OD TYPE "E" (GROUNDED) SST OMEGA #SKS-18-028 W/ 1/2" FEMALE VCR NUT, INTERNAL LENGTH 7-1/4", REFERENCE DWG #FSE-870554 DETAIL 15	300	1
TE-28	THERMOCOUPLE, 1/8" OD TYPE "E" (GROUNDED) SST OMEGA #OSK-628 W/ 1/2" FEMALE VCR NUT, INTERNAL LENGTH 5-3/4", REFERENCE DWG #FSE-861222-2 TE TABLE "A"	300	4
TE-29	THERMOMETER, 1/8" OD PLATINUM RESISTANCE YSI #I-18950/ 1/8" / 8-1/2" / 539P, W/ 1/4" FEMALE VCR NUT, INTERNAL LENGTH 10-1/8" REFERENCE DWG #FSE-861222-2 TE TABLE "A"	750	6

TOTALS

#2.

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01262	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-TPTA-CALORIMETRY			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 259	TASK No. L21	Project TEC \$286,860	Bud. Ser. No 99022
HP No. (Assignee) 5502	ENG. GRP. N4	Assignee Ph. No. 4127		Date Prepared 7/5/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		2,800	\$22.00	\$61,600	400	FY: 1989 \$14,290
Drafting		300	\$16.00	\$4,800	8	FY: 1990 \$90,000
Inspection			\$18.00	\$0		FY: 1991 \$172,570
Overhd. @ 60%			60%	\$39,840		FY: 1992 \$10,000
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		3,100		\$106,240		Total \$286,860
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		24	\$19.00	\$460		Engineering \$8,800
Planner		24	\$19.00	\$460		Drafting \$128
Carpenter		80	\$16.00	\$1,280		Inspection \$0
Electrician		32	\$16.00	\$512		Eng Overhd \$5,360
Mechanic		320	\$16.00	\$5,120		Out Eng. \$0
Pipefitter		40	\$16.00	\$640		
Painter			\$16.00	\$0		
Welder		40	\$16.00	\$640		TITLE III TOT \$14,290
Mason			\$16.00	\$0		
Laborer		120	\$10.00	\$1,200		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		680		\$10,310	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop		1800	\$18.00	\$32,400		Contract \$0
Total Labor		2,480		\$42,710	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$25,630	60%	TOTAL \$14,290
PO Mat'ls & Eq. by MRC				\$110,500		ROUTING:
Warehouse Mat'ls				\$1,800		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$180,640		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$106,240		ACCOUNTING: _____
TOTAL ESTIMATE				\$286,880		PROJ. ENG. <i>DK</i>
						AES4.wk1 2/9/89 NFM1262

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J101121612	AES TITLE NFM BSN 99022	AES ASSIGNEE P. W. KASPERSKI	DATE OF ESTIMATE 7/3/89
--------------------------	----------------------------	---------------------------------	----------------------------

EQUIP. OR MATL. ITEM NO.	TYPE OF TRADE DESCRIPTION	QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	FOREMAN *OTHER	PLANNER
					310	311	312	313	314	315	316	317	318	321	322	325	326			
01	CALORIMETER JACKET 4.750	1	9000	9,000	8								16		120					
02	CALORIMETER JACKET 5.500	1	11000	11,000	8								16		120					
03	CALORIMETER JACKET 6.500	1	12500	12,500	8								16		120					
04	HEATER FORMS	3	1000	3,000									4		40					
05	REF. BRIDGE FORMS	3	1500	4,500	8								4		40					
06	ENVIRONMENTAL BATH	1	14000	14,000	40		16						32		80					
07	BATH CONTROL HARDWARE	1 LOT	8000	8,000											40					
08	CALORIMETER THERMELS	3	3500	10,500											1080					
09	OVERHEAD HOIST	1	8500	8,500	8		40								80					
10	INSTALLATION OF ITEMS INTO GLOVEBOX					32	264	40			40		32		80					24/24
11	COMPUTER, ELECTRONICS & CALORI-	1	31300	31,300																
	METER CONTROL HARDWARE	LOT																		
	TOTALS			112,300	80	32	320	40			40		120		1800					24/24

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date: Jul-89
AES NO. J01263	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-TPTA-MASS SPEC.			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 260	TASK No. L23	Project TEC \$939,500	Bud. Ser. No 99022
HP No. (Assignee) 2069	ENG. GRP. N1	Assignee Ph. No. 4354		Date Prepared JULY 3, 1989	Date Required MAR 92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		2,575	\$22.00	\$56,650	875	FY: 1989 \$51,940
Drafting		590	\$16.00	\$9,440	190	FY: 1990 \$450,000
Inspection			\$18.00	\$0		FY: 1991 \$437,560
Overhd. @ 60%			60%	\$39,650		FY: 1992
Out. Eng. E/C 48		865	\$35.00	\$30,280	465	FY: 1993
Total Title I & II Estimate		4,030		\$136,020		Total \$939,500
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		100	\$19.00	\$1,900		Engineering \$19,250
Planner		100	\$19.00	\$1,900		Drafting \$3,040
Carpenter		50	\$16.00	\$800		Inspection \$0
Electrician		240	\$16.00	\$3,840		Eng Overhd \$13,370
Mechanic		240	\$16.00	\$3,840		Out Eng. \$16,280
Pipefitter		2440	\$16.00	\$39,040		
Painter		50	\$16.00	\$800		
Welder		1625	\$16.00	\$26,000		TITLE VII TOT \$51,940
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		4,845		\$78,120	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		4,845		\$78,120	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$46,870	60%	TOTAL \$51,940
PO Mat'ls & Eq. by MRC				\$677,400		ROUTING:
Warehouse Mat'ls				\$1,090		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR: _____
TITLE III SUBTOTAL				\$803,480		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$136,020		ACCOUNTING: _____
TOTAL ESTIMATE				\$939,500		PROJ. ENG. <i>W.L.T.</i>
						AES4.wk1 2/9/89: BB

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER		AES TITLE		AES ASSIGNEE		DATE OF ESTIMATE	
U01121613		NFM - TPTA - MASS SPEC.		10NRC		7/3/89	

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	OTHER
	Equipment Installation including Labor & Misc. parts & pieces based on Make Equipment Items:																			
1	MARI Poles		4	5000	20,000			20	20			80								
2	H/X in		2	500	1,000		8		8											
3	Filters		10	200	2000				8											
4	Rupt. Disc.		5	200	1000				8											
	Bath		1	500	500		8		8											
	Diff. Pump		2	2000	4000		8	20	8											
	Pump, ALKATEC		5	3000	15000		8	40	16											
	Pump, Turbo		2	4000	8000		8	20	16											
	REGULATORS		10	400	4000				16											
	TRAPS		7	500	3500				20											
	TANKS		5	2000	10,000			20	40			500								
	VOLUMES		14	3000	42,000			10	10			300								
	Pump, Sublimation		1	2000	2,000			10	8											
	Gauges, Thermometers		20	200	4000				8			5								

*INCLUDES - AIR COND MECH, H D OPER, 1 AD TECH & 1 ACCESSORY

DISTRIBUTION: 1 AES CLERK 3 AES ASSIGNEE

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER 10112613	AES TITLE NFM- TDTA- MASS SPEC.	AES ASSIGNEE Tonne	DATE OF ESTIMATE 7/3/89
------------------------	------------------------------------	-----------------------	----------------------------

[illegible]

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01264	DOE/AL AUTHORIZATION # D-79		AES TITLE T. P. T. & A HEALTH PHYSICS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 226	TASK No. L-23	Project TEC	Bud. Ser. No 99022
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220		Date Prepared 6/30/89	Date Required 9/30/89	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	1,000	\$22.00	\$22,000	150	FY: 1989	\$9,596
Drafting	640	\$16.00	\$10,240	96	FY: 1990	\$24,350
Inspection		\$18.00	\$0		FY: 1991	\$234,570
Overhd. @ 60%		60%	\$19,340		FY: 1992	\$160,210
Out. Eng. E/C 48		\$35.00	\$0		FY: 1993	\$10,015
Total Title I & II Estimate	1,640		\$51,580		Total	\$438,740
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman		\$19.00	\$0		Engineering	\$3,300
Planner		\$19.00	\$0		Drafting	\$1,536
Carpenter		\$16.00	\$0		Inspection	\$0
Electrician		\$16.00	\$0		Eng Overhd	\$2,900
Mechanic		\$16.00	\$0		Out Eng.	\$0
Pipefitter		\$16.00	\$0			
Painter		\$16.00	\$0			
Welder		\$16.00	\$0		TITLE VII TOTAL	\$7,736
Mason		\$16.00	\$0			
Laborer		\$10.00	\$0		Trades	\$0
A/C Mechanic		\$16.00	\$0		Elec-Tech	\$0
H/D Operator		\$16.00	\$0		Machinists	\$0
Other		\$16.00	\$0		Overhead	\$0
Trades Labor	0		\$0	0	PO Mat's	\$0
					Whse Mat'l	\$0
					Contract	\$0
Electronic Tech.	640	\$15.00	\$9,600			
Machine Shop		\$18.00	\$0		TITLE III TOTAL	\$0
Total Labor	640		\$9,600	0	TOTAL	\$7,736
Overhd. @ 60%		60%	\$5,760	60%	ROUTING:	
PO Mat'ls & Eq. by MRC			\$371,800		PROJ. MGT. CONT: _____	
Warehouse Mat'ls					PROJ. MGR.: _____	
Out Cont'r E/C 49			\$50,000		AES CONTROL: _____	
TITLE III SUBTOTAL			\$437,160		ACCOUNTING: _____	
TITLE I & II SUBTOTAL			\$51,580		PROJ. ENG. _____	
TOTAL ESTIMATE			\$488,740		NFM1264.WK1	

05-Jul-89 MATERIAL LIST

Requestor R.C. RANSBOTTOM		PHONE 4220		Date Requested				Page 1 OF 1		
ENGINEER R.C. RANSBOTTOM		PLANNER		TRADES START DATE				INSTALLATION LOCATION T-226		
PROJECT TITLE T.P.T.& A. HEALTH PHYSICS CONTROL ROOM		ESO # J-01264		MGR #		LEDGER 2320		CC L00		EC
MAT'L LIST NO.	DESCRIPTION	MFG STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFO		
			UNIT OF ISSUE	#OF UNITS	01	C BD			DEL DATE	UNIT COST
1	SYSTEM, FOXBORO		EA	1					170,000	170,000
2	CONNECTION, TERF COMMUNICATION		EA	1					28,000	28,000
3	CONNECTION, T-38 CONTROL ROOM		EA	1					12,500	12,500
4	DISPLAY, MURAL		EA	1					20,000	20,000
5	COMPUTER, COMPAQ 386 W/ ACCESSORIES		EA	1					10,000	10,000
6	COUNTERS, PROPORTIONAL		EA	8					5,000	40,000
7	COUNTER, TRICARB LIQUID SCINTILLATION		EA	1					30,000	30,000
8	CABLES AND CONNECTORS		LT	1					7,000	7,000
9	MISCELLANEOUS		LT	1					30,000	30,000
10	SHELVES AND FURNITURE		LT	1					10,000	10,000
11	FLOOR, RAISED		SF	340					20	6,800
12	WALLS, SOUNDPROOFED		LT	1					5,000	5,000
13	INTERCOM, T-38, T-226, TERF		EA	1					2,500	2,500
14									0	0
15									0	0
16									0	0
17									0	0
18									0	0
19									0	0
20									0	0
									TOTAL	371,800

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jun-89
AES NO. J01265	DOE/JAL AUTHORIZATION # D79		AES TITLE NFM-TPTA-GLOVEBOXES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 257	TASK No. L25	Project TEC \$479,000	Bud. Ser. No 99022
HP No. (Assignee) 9682	ENG. GRP. N4	Assignee Ph. No. 3832		Date Prepared 6/15/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		400	\$22.00	\$8,800	136	FY: 1989 \$40,800
Drafting		36	\$16.00	\$580		FY: 1990 \$398,200
Inspection			\$18.00	\$0		FY: 1991 \$40,000
Overhd. @ 60%			60%	\$5,630		FY: 1992
Out. Eng. E/C 48		1,100	\$35.00	\$38,500	1,029	FY: 1993
Total Title I & II Estimate		1,536		\$53,500		Total \$479,000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		75	\$19.00	\$1,430		Engineering \$3,000
Planner		75	\$19.00	\$1,430		Drafting \$0
Carpenter		40	\$16.00	\$640		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$1,800
Mechanic		975	\$16.00	\$15,600		Out Eng. \$36,000
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		
A/C Mechanic			\$16.00	\$0		
H/D Operator			\$16.00	\$0		
Other			\$16.00	\$0		
Trades Labor		1,165		\$19,100	0	TITLE III TOT \$40,800
Electronic Tech.			\$15.00	\$0		Trades \$0
Machine Shop			\$18.00	\$0		Elec-Tech \$0
						Machinists \$0
						Overhead \$0
						PO Mat's \$0
						Whse Mat'l \$0
						Contract \$0
Total Labor		1,165		\$19,100	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$11,460	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$394,000		PROJ. MGT. CONT: _____
Warehouse Mat'ls				\$940		PROJ. MGR: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$425,500		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$53,500		PROJ. ENG. <i>W.A. C. Jr.</i>
TOTAL ESTIMATE				\$479,000		AES4.wk1 2/9/89 NFM1265

AES DETAIL COST ESTIMATE (IN HOURS)

PAGE - 01

AES NUMBER 101121615	AES TITLE / CAP NEM TRIPPLIST PROCESS, TEST & ANAL. - GLOVEBOXES	AES ASSIGNEE W. A. CILLET	DATE OF ESTIMATE 6/15/87
-------------------------	---	------------------------------	-----------------------------

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	OTHER
	DECON/ASSY																			
	GLOVEBOX C1/C2		1	27000	27000	24		64												75
	SYSTEM 2 VOL. MEASURE																			
	GLOVEBOX C3		1	37000	37000			96												
	SYSTEM 2 BELL JAR																			
	GLOVEBOX C4		1	41000	41000			104												
	ASSY / DISASSY																			
	GLOVEBOX D2		1	27000	27000			64												
	SYSTEM 2 BELL JAR																			
	GLOVEBOX D3		1	41000	41000			104												
	VOLUME MEASURE																			
	GLOVEBOXES D4 & D5		1	56000	56000			144												
	PAGE 2 TOTAL				229,000	24		576												75

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER 119124615 AES TITLE FCAP NEM TREATMENT AES ASSIGNEE W. A. CLIFT DATE OF ESTIMATE 6/15/89

PAGE 3 OF 3

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	*OTHER
	<u>RADIOGRAPHY</u>																			
	<u>GLOVEBOX D6</u>		1	31500	31500	16		64												75
	<u>CALORIMETRY</u>																			
	<u>GLOVEBOX D1</u>		1	31500	31500			64												
	<u>MASS SPECTROMETRY</u>																			
	<u>GLOVEBOXES K1 & K2</u>		1	63000	63000			156												
	<u>VACUUM PUMP SYSTEM</u>																			
	<u>GLOVEBOX E3</u>		1	37000	37000			115												
	<u>MISC. MATERIALS</u>		-	-	2000			-												
	<u>WAREHOUSE MATERIALS</u>		-	-	940			-												
	<u>PAGE 3 TOTAL</u>				165940	16		399												75
	<u>PAGE 2 TOTAL</u>				229000	24		576												75
	<u>TOTAL</u>				394940	40		975												150

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01266	DOE/AL AUTHORIZATION # D-79		AES TITLE T. P. T. & A TRITIUM MONITORS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257	TASK No. L-26	Project TEC	Bud. Ser. No 99022
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220		Date Prepared 7/5/89	Date Required 9/30/89	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		160	\$22.00	\$3,520	32	FY: 1989 \$1,946
Drafting		160	\$16.00	\$2,560	32	FY: 1990 \$3,892
Inspection			\$18.00	\$0		FY: 1991 \$68,666
Overhd. @ 60%			60%	\$3,650		FY: 1992 \$47,066
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$0
Total Title I & II Estimate		320		\$9,730		Total \$121,570
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$704
Planner			\$19.00	\$0		Drafting \$512
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$730
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE VII TOTAL \$1,946
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$0
Electronic Tech.		160	\$15.00	\$2,400		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		160		\$2,400	0	TITLE III TOTAL \$0
Overhd. @ 60%			60%	\$1,440	60%	TOTAL \$1,946
PO Mat'ls & Eq. by MRC				\$108,000		ROUTING:
Warehouse Mat'ls				\$0		PROJ. MGT. CONT: _____
Out Cont'r E/C 49				\$0		PROJ. MGR.: _____
TITLE III SUBTOTAL				\$111,840		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$9,730		ACCOUNTING: _____
TOTAL ESTIMATE				\$121,570		PROJ. ENG. _____
						NFMC1266.WK1

fer to instructions on reverse side.

MATERIAL LIST

requestor R.C. RANSBOTTOM Date Requested Page 1 of 1

ENGINEER R.C.RANSBOTTOM			PLANNER		TRADE START DATE			INSTALLATION LOCATION		
PROJECT TITLE		AES # J-01266 INFN TRIT. PROC. TRITIUM MONITORS -L26 (J-01295)		MSR #	LEDGER 2320 EXPENSE 4810		CAPITAL 2320		ICC L00	EC
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION		
			UNIT OF ISSUE	# OF UNITS	BD	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST
1	CHAMBER, TRITIUM MONITOR ROOM ION		EA	2					\$3,000	\$6,000
2	ENCLOSURE, TRITIUM MONITOR ROOM		EA	2					\$6,000	\$12,000
3	CHAMBER, TRITIUM MONITOR DUCT ION		EA	1					\$3,000	\$3,000
4	CHAMBER, TRITIUM MONITOR GLOVEBOX ION		EA	4					\$3,000	\$12,000
5	ANALYZER, PANAMETRICS SYSTEM 1/02 OXYGEN		EA	2					\$8,000	\$16,000
6	CABLE AND CONNECTORS		LT	1					\$3,000	\$3,000
7	MISCELLANEOUS (10% OF TOTAL)		LT	1					\$10,000	\$10,000
8	CHASSIS, MAIN READOUT		EA	7					\$6,000	\$42,000
9	TUBE, HASTINGS DV-36 GAGE		EA	4					\$300	\$1,200
10	CONTROLLER, HASTINGS CVT-16		EA	4					\$550	\$2,200
11										\$0
12										\$0
13										\$0
14										\$0
15										\$0
16										\$0

\$107,400

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01267	DOE/AL AUTHORIZATION # D-79		AES TITLE TPTA BOX SERVICES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257	TASK No. L27	Project TEC \$31,820	Bud. Ser. No 99022
HP No. (Assignee) 4974	ENG. GRP. N4	Assignee Ph. No. 3309	Date Prepared 15-JULY-89	Date Required 10/92	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		226	\$22.00	\$4,970	30	FY: 1989 \$2,460
Drafting			\$16.00	\$0		FY: 1990 \$5,260
Inspection			\$18.00	\$0		FY: 1991 \$27,448
Overhd. @ 60%			60%	\$2,980		FY: 1992 \$16,392
Out. Eng. E/C 48		202	\$35.00	\$7,070	40	FY: 1993
Total Title I & II Estimate		428		\$15,020		Total 52000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		40	\$19.00	\$760		Engineering \$660
Planner		40	\$19.00	\$760		Drafting \$0
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$400
Mechanic		56	\$16.00	\$896		Out Eng. \$1,400
Pipefitter		409	\$16.00	\$6,544		
Painter		140	\$16.00	\$2,240		
Welder		145	\$16.00	\$2,320		TITLE I/II TOT \$2,460
Mason			\$16.00	\$0		
Laborer		56	\$10.00	\$560		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other: Sheet Metal		16	\$16.00	\$256		Overhead \$0
Trades Labor		902		\$14,340	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		902		\$14,340	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$8,600	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$13,600		PROJ. MGT. CONT: _____
Warehouse Mat'ls						PROJ. MGR.. _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$36,540		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$15,020		PROJ. ENG. _____
TOTAL ESTIMATE				\$51,560		AES4.wk1 2/9/89: 8B

ESO DETAIL COST ESTIMATE · TRADES

Page 1 of

ESO NUMBER		ESO TITLE			ESO ASSIGNEE										DATE OF ESTIMATE		
J.O. 11267		Box SERVICES (L-27)			JIM STRONG										7/15/69		
EQUIP. OR MATERIAL ITEM NO	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE FITTER 313	SHEET METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	OTHER 323	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
I	ROOM T-257 GAS SERVICES						56	409	16	140	145		56			80	
	IN SUPPORT OF glove box																
	OPERATIONS L-27																
	<u>REQUIRED ITEMS</u>																
1	VALVE, CHECK 1/2"	8	120	960													
2	VALVE, WORCESTER BALL 1/2"	35	45	1575													
3	VALVE, WORCESTER BALL 1/4"	12	38	456													
4	VALVE, GLOBE, 3/4"	8	100	800													
5	ORIFICE, FLOW RESTRICTOR	14	75	1050													
6	FILTER, SCHLACKER BELLUNG	4	100	400													
7	GAGE, PRESSURE ASHCROFT	12	150	1800													
8	REGULATOR, PRESSURE, 20 PSI INLET	8	75	600													
9	REGULATOR, PRESSURE, 300 PSI INLET	4	250	1000													
10	LUBRICATOR, AIR	6	40	240													
11	COPPER TUBING - 3/4 LF		.70/Ft	104													
12	FITTINGS @ 1/2" TUBING		.10/Ft	24													
	COST																

MRC ML 3980 (11 86)
17 1148

*INCLUDES AIR COND MECH, H.D. OPER,
LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

DISTRIBUTION: 1 ESO COORD. & CONTROL
2. ACCOUNTING

3 ACCOUNTING
4 ESO ASSIGNEE

(9069)

ESO DETAIL COST ESTIMATE TRADES

Page 2 of

ESO NUMBER J 101121617	ESO TITLE Box SERVICES (L-27)	ESO ASSIGNEE JIM STRUNG	DATE OF ESTIMATE 7/15/89
----------------------------------	---	-----------------------------------	------------------------------------

EQUIP OR MATERIAL ITEM NO	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE FITTER 313	SHEET METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
II	ROOM 258 CHILL WATER																
	SERVICES IN SUPPORT OF																
	GLOVEBOX OPERATIONS L-27																
	REQUIRED ITEMS																
13	VALVE, BALL, PNEUMATIC 1/2"	8	250	2000													
14	VALVE, BALL, 1/2"	16	50	800													
15	PETES PLUG	4	35	140													
16	SWITCH, WATER FLOW	4	150	600													
17	GAUGE, PRESSURE	2	100	200													
18	THERMOMETER	2	23	46													
19	TANK, EXPANSION	4	35	140													
20	TUBING 2" DIA (1/4 OF 234.8')		4.24/FT	245.71													
21	TUBING 1/2" DIA (68.6')		.70/FT	48.62													
22	TUBING 3/4" DIA (12.9')		1.09/FT	17.06													
23	FITTINGS, Q 1590 OF			46.17													
	TUBING COST																

MHC ML 3980 (11 86)
17 1148

*INCLUDES AIR COND MECH, H.D. OPER.,
LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

4280

DISTRIBUTION 1 ESO COORD. & CONTROL
2 ACCOUNTING

3 ACCOUNTING
4 ESO ASSIGNEE

ESO DETAIL COST ESTIMATE TRADES

Page 3 of 1

ESO NUMBER		ESO TITLE		ESO ASSIGNEE		DATE OF ESTIMATE											
10111		BOX SERVICES (C.)		JIM STRONG		7/15/89											
EQUIP OR MATERIAL ITEM NO	DESCRIPTION	MATERIAL			TRADES												
		QTY.	UNIT COST	TOTAL COST	310	311	312	313	314	315	316	317	318	321	322	OTHER	ESTIMATE SOURCE
II	Room T-258 CHILL WATER																
	SERVICES (CONT.)																
	REQUIRED ITEMS																
24	INSULATION FUR:																
	VALUES	16	1.70	27.20													
	SWITCHES	4	1.70	6.80													
	EXPANSION TANKS	8	1.70	13.60													
	TUBING (139.75')		1.10	153.13													
25	ADHESIVE			27.23													
	TOTAL MATERIALS			13,606													

WMC ML 3980 (11/86) 171148

*INCLUDES AIR COND MECH, H O OPER, LAB TECH, & GLASS BLOWER

DISTRIBUTION 1 ESO COORD. & CONTROL 2 ACCOUNTING 3 ACCOUNTING 4 ESO ASSIGNEE

**SEE REVERSE SIDE FOR CODES

TITLE: UTILITY PIPING (C)

JOB CODE	DESCRIPTION	CUR-MTH HRS	EST HRS	LTD HRS	OVER/ UNDER
1010	ENGINEER			69	69-
2010	ENGINEER			1683	1683-
	TOTAL ENGINEERING			1752	1752-
2030	DRAFTSMAN			2033	2033-
	TOTAL DRAFTING			2033	2033-
2040	FOREMAN			275	275-
2080	PLANNER			301	301-
2100	CARPENTER			85	85-
2110	ELECTRICIAN			81	81-
2120	MECHANIC			370	370-
2130	PIPEFITTER			2698	2698-
2140	SHEETMETAL			105	105-
2150	PAINTER			921	921-
2160	WELDER			956	956-
2170	MASON			32	32-
2180	LABORER			373	373-

BASIS FOR LABOR HOURS			
AES #	PROJECT	Box Length	LABOR HRS
100444	KYLE	330 LF	ACTUAL
101267	TOTA	50 LF	EST
101290	MPL	169 LF	EST
101307	HMS	130 LF	EST.

* LABOR HRS HAVE BEEN DIVIDED BASED ON THE OVERALL GLOVEBOX LENGTH EACH ACTIVITY MUST SUPPORT

151 400 | Copper Pipe & Tubing

401		CREW	DAILY OUTPUT	MAN-HOURS	UNIT	BARE COSTS				TOTAL INCL. O&P
						MAT	LABOR	EQUIP	TOTAL	
1300	3" diameter									
1320	3-1/2" diameter	Q-1	28	571	L.F.	9 56	12 25		21 81	29
1330	4" diameter		24	667		12 57	14 30		26 97	35
1340	5" diameter		22	727		15 79	15 60		31 39	40
1360	6" diameter		18	889		37 88	19 10		56 98	70
1380	8" diameter	Q-2	23	1 040		53 47	23		76 47	93
1390	For other than full hard temper, add		20	1 200		94 71	27		121 71	145
1440	For silver solder, add					25%				
1800	For medical clean, (oxygen class), add						15%			
1950	To delete cpigs & hngs., 1/4"-3/4" ppe, subtract					3.50%				
1960	1/4"-1-1/2" ppe, subtract					27%	40%			
1970	2"-6" ppe, subtract					14%	29%			
1980	8" ppe, subtract					10%	31%			
2000	Type L tubing, couplings & hangers 10' O.C.					19%	31%			
2100	1/4" diameter									
2120	3/8" diameter	1 Plum	59	.136	L.F.	.48	3.23		3.71	5.30
2140	1/2" diameter		56	.143		.65	3.41		4.06	5.70
2160	3/4" diameter		53	.151		.75	3.60		4.35	6.10
2180	1" diameter		49	.163		1.03	3.89		4.92	6.85
2200	1-1/4" diameter		44	.182		1.11	4.34		5.45	7.60
2220	1-1/2" diameter		36	.222		1.57	5.30		6.87	9.50
2240	2" diameter		29	.276		2.11	6.60		8.71	12
2260	2-1/2" diameter		27	.296		2.65	7.05		9.70	13.30
2280	3" diameter	Q-1	23	.348		3.95	8.30		12.25	16.50
2300	3-1/2" diameter		33	.485		5.75	10.40		16.15	22
2320	4" diameter		30	.533		7.86	11.45		19.31	25
2340	5" diameter		25	.640		10.92	13.75		24.67	32
2360	6" diameter		23	.696		13.14	14.95		28.09	36
2380	8" diameter		19	.842		33.88	18.10		51.98	64
2400	For other than full hard temper, add	Q-2	24	1		41.47	22		63.47	78
2410	For silver solder, add		21	1.140		72.71	25		97.71	115
2590	For medical clean, (oxygen class), add					25%				
2900	To delete cpigs & hngs., 1/4"-3/4" ppe, subtract					3.50%				
2940	1/4"-1" ppe, subtract					37%	43%			
2950	1-1/4"-3" ppe, subtract					22%	38%			
2960	3-1/4"-6" ppe, subtract					12%	27%			
2970	8" ppe, subtract					12%	37%			
2980	Type M tubing, couplings & hangers 10' O.C.					24%	33%			
3000	1/4" diameter									
3100	3/8" diameter	1 Plum	61	.131	L.F.	.46	3.13		3.59	5.10
3120	1/2" diameter		59	.136		.47	3.23		3.70	5.25
3140	3/4" diameter		56	.143		.59	3.41		4	5.65
3160	1" diameter		51	.157		.79	3.74		4.53	6.35
3180	1-1/4" diameter		46	.174		.86	4.15		5.01	7.05
3200	1-1/2" diameter		37	.216		1.21	5.15		6.36	8.90
3220	2" diameter		30	.267		1.73	6.35		8.08	11.25
3240	2-1/2" diameter		28	.286		2.37	6.80		9.17	12.60
3260	3" diameter	Q-1	24	.333		3.64	7.95		11.59	15.65
3280	3-1/2" diameter		35	.457		5.06	9.80		14.86	19.95
3300	4" diameter		32	.500		6.54	10.75		17.29	22
3320	5" diameter		27	.593		9.35	12.70		22.05	29
3340	6" diameter		24	.667		11.64	14.30		25.94	34
3360	8" diameter	Q-2	20	.800		29.88	17.15		47.03	58
3370	For other than full hard temper, add		25	.960		37.47	21		58.47	73
3380	For silver solder, add		22	1.090		63.71	24		87.71	105
3440	For medical clean, (oxygen class), add					25%				
3950						3.50%	15%			

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01268	DOE/AL AUTHORIZATION # D-79		AES TITLE TPTA VACUUM PUMP SYSTEM			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 259	TASK No. L27	Project TEC 110K	Bud. Ser. No 99022
HP No. (Assignee) 4848	ENG. GRP. N4	Assignee Ph. No. 4782		Date Prepared 15-JUNE-89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	535	\$22.00	\$11,770	90	FY: 1989	\$8,618
Drafting	80	\$16.00	\$1,280	8	FY: 1990	\$25,000
Inspection		\$18.00	\$0		FY: 1991	\$76,382
Overhd. @ 60%		60%	\$7,830		FY: 1992	
Out. Eng. E/C 48	430	\$35.00	\$15,050	150	FY: 1993	
Total Title I & II Estimate		1,045		\$35,930		Total \$110,000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman	80	\$19.00	\$1,520			Engineering \$1,980
Planner	80	\$19.00	\$1,520			Drafting \$128
Carpenter		\$16.00	\$0			Inspection \$0
Electrician		\$16.00	\$0			Eng Overhd \$1,260
Mechanic		\$16.00	\$0			Out Eng. \$5,250
Pipefitter		\$16.00	\$0			
Painter		\$16.00	\$0			
Welder		\$16.00	\$0			TITLE III TOT \$8,618
Mason		\$16.00	\$0			
Laborer		\$10.00	\$0			Trades \$0
A/C Mechanic		\$16.00	\$0			Elec-Tech \$0
H/D Operator		\$16.00	\$0			Machinists \$0
Other	525	\$16.00	\$8,400			Overhead \$0
Trades Labor	685		\$11,440	0		PO Mat's \$0
						Whse Mat'l \$0
						Contract \$0
Electronic Tech.		\$15.00	\$0			
Machine Shop		\$18.00	\$0			TITLE III TOT \$0
Total Labor	685		\$11,440	0		TOTAL \$8,618
Overhd. @ 60%		60%	\$6,860	60%		ROUTING:
PO Mat'ls & Eq. by MRC			\$53,000			PROJ. MGT. CONT: _____
Warehouse Mat'ls			\$2,770			PROJ. MGR.: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL			\$74,070			ACCOUNTING: _____
TITLE I & II SUBTOTAL			\$35,930			PROJ. ENG. _____
TOTAL ESTIMATE			\$110,000			AES4.wk1 2/9/89: BB

AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE
J101121618	TPTA VACUUM PUMP SYSTEM	VAN PATTEN	7/11/89

FOR FLOW/PLA...

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01269	DOE/AL AUTHORIZATION # D-79		AES TITLE T. P. T. & A INSTRUMENTATION			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257	TASK No. L-28	Project TEC	Bud. Ser. No 99022
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220		Date Prepared 6/26/89	Date Required 9/30/89	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		9,660	\$22.00	\$212,520	1,449	FY: 1989 \$78,296
Drafting		6,180	\$16.00	\$98,880	927	FY: 1990 \$206,416
Inspection			\$18.00	\$0		FY: 1991 \$529,380
Overhd. @ 60%			60%	\$186,840		FY: 1992 \$490,228
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$0
Total Title I & II Estimate		15840		\$498,240		Total 1304320
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$31,878
Planner			\$19.00	\$0		Drafting \$14,832
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$28,026
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE VII TOTAL \$74,736
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$3,560
Electronic Tech.		3,920	\$15.00	\$58,800		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		3,920		\$58,800	0	TITLE III TOTAL \$3,560
Overhd. @ 60%			60%	\$35,280	60%	TOTAL \$78,296
PO Mat'ls & Eq. by MRC				\$712,000		ROUTING:
Warehouse Mat'ls						PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$806,080		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$498,240		ACCOUNTING: _____
TOTAL ESTIMATE				\$1,304,320		PROJ. ENG. _____
						NFMC1269.WK1

ML-7093A (2/89)

Refer to instruction on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 1 of 2

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE : NFM FUNCTION TEST INSTRUMENTATION - L21, L22 (J-01276)											AES # J-01269 : MSR # : LEDGER 2320 : X1CAPITAL 2320 : ICC : IEC												
DESCRIPTION											C JEXPENSE 4810												
MAT'L LIST NO.	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY	STORAGE	LOC.	UNIT OF ISSUE	#OF UNITS	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST	ADDITIONAL INFORMATION											
1	1 DATAPAC, DAYTRONIC 10K6A-2	1			1EA	2					\$8,000	\$16,000											
2	1 DATAPAC, DAYTRONIC 10K4T-D	1			1EA	4					\$3,000	\$12,000											
3	1 BOARD, DAYTRONIC # 10A11 T/C PROCESSOR	1			1EA	2					\$200	\$400											
4	1 BOARD, DAYTRONIC #10A10-4 T/C CONDITIONER	1			1EA	10					\$450	\$4,500											
5	1 BOARD, DAYTRONIC #10A16-4A RTD CONDITIONER	1			1EA	8					\$500	\$4,000											
6	1 BOARD, DAYTRONIC #10A72-2 STRAIN GAGE CONDITIONER	1			1EA	26					\$500	\$13,000											
7	1 BOARD, DAYTRONIC #10A80-8 ANALOG OUTPUT	1			1EA	2					\$700	\$1,400											
8	1 BOARD, DAYTRONIC #10B10-16 LOGIC I/O	1			1EA	4					\$600	\$2,400											
9	1 CARD, DAYTRONIC #10BDR4 SATELLITE INTERFACE	1			1EA	2					\$1,800	\$3,600											
10	1 CARD, DAYTRONIC #10BD1 SATELLITE SLAVE	1			1EA	4					\$1,400	\$5,600											
11	1 MONITOR, DAYTRONIC #10VCH14	1			1EA	2					\$1,800	\$3,600											
12	1 CARD, DAYTRONIC #10VF0132 FORMATTED OUTPUT	1			1EA	2					\$700	\$1,400											
13	1 PROCESSOR, DAYTRONIC #10CV10P VIDEO I/O	1			1EA	2					\$500	\$1,000											
14	1 COMPUTER, COMPAQ 386 W/ACCESSORIES	1			1EA	2					\$10,000	\$20,000											
15	1 CONTROLLER, EUROTHERM PID HEAT/COOL	1			1EA	2					\$900	\$1,800											
16	1 CONTROLLER, EUROTHERM SCR POWER	1			1EA	2					\$400	\$800											

Refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 2 of 2

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT : AES # J-01276 MSR # LEDGER 2320
 TITLE : INFN FUNCTION TEST INSTRUMENTATION - L21, L22 (J-01276) [EXPENSE 4B10 [X] CAPITAL 2320
 ICC IL00 IEC

MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST	
17	TUBE, HASTINGS GAGE #DV-36		1EA	36					\$300	\$10,800	
18	READOUT, HASTINGS #BG-6		1EA	30					\$525	\$15,750	
19	CONTROLLER, HASTINGS #CVT-16		1EA	4					\$550	\$2,200	
20	CONTROLLER, HASTINGS #CVT-26 DUAL SETPOINT		1EA	2					\$600	\$1,200	
21	THERMOCOUPLES, E TYPE		1EA	34					\$30	\$1,020	
22	THERMOCOUPLES, DUAL E TYPE		1EA	4					\$50	\$200	
23	RTD, 1/8"		1EA	26					\$250	\$6,500	
24	TRANSDUCER, SENSOTEC STRAIN GAGE		1EA	50					\$1,000	\$50,000	
25	INTERFACE, OPT022		1EA	2					\$1,000	\$2,000	
26	CONTROLLER, EURO THERM REMOTE SETPOINT		1EA	2					\$400	\$800	
27	CABLE & CONNECTORS		1LT	1					\$3,000	\$3,000	
28	MISCELLANEOUS MATERIAL (5% OF TOTAL)		1LT	1					\$20,000	\$20,000	
29										\$0	
30										\$0	
31										\$0	
32										\$0	

\$204,970

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01270	DOE/AL AUTHORIZATION # D - 79		AES TITLE NFM-TPTA Box Purge			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. 301	BLDG. T	ROOM 257	TASK No. L29	Project TEC \$179,700	Bud. Ser. No 99022
HP No. (Assignee) 5376	ENG. GRP. N4	Assignee Ph. No. 3449		Date Prepared 7/12/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		845	\$22.00	\$18,590	110	FY: 1989 \$12,000
Drafting		188	\$16.00	\$3,010	30	FY: 1990 \$52,400
Inspection			\$18.00	\$0		FY: 1991 \$95,300
Overhd. @ 60%			60%	\$12,960		FY: 1992 \$20,000
Out. Eng. E/C 48		1,400	\$35.00	\$49,000	210	FY: 1993
Total Title I & II Estimate		2,433		\$83,560		Total \$179,700
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL
Foreman		140	\$19.00	\$2,660		Engineering \$2,420
Planner		140	\$19.00	\$2,660		Drafting \$486
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$1,740
Mechanic		188	\$16.00	\$3,008		Out Eng. \$7,350
Pipefitter		750	\$16.00	\$12,000		
Painter		188	\$16.00	\$3,008		
Welder		750	\$16.00	\$12,000		TITLE III TOT \$12,000
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		2,156		\$35,340	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		2,156		\$35,340	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$21,200	60%	TOTAL \$12,000
PO Mat'ls & Eq. by MRC				\$39,600		ROUTING:
Warehouse Mat'ls						PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$96,140		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$83,560		ACCOUNTING: _____
TOTAL ESTIMATE				\$179,700		PROJ. ENG. _____
						AES4.wk1 2/9/ NFM1270

ML-7093A (2/89)

AES DETAIL COST ESTIMATE (IN HOURS)			
AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE
J10112710	TPTA Box PURGE	S.A. RAISOR	6/89

 

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01271	DOE/AL AUTHORIZATION # D-79		AES TITLE NFM - T. P. T. & A. (Electrical)			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM	TASK No. L-30	Project TEC 206,910	Bud. Ser. No 99022
HP No. (Assignee) 0665	ENG. GRP. G-2	Assignee Ph. No. 3129		Date Prepared 6-15-89	Date Required 7-1-92	Rev. No.
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		650	\$22.00	\$14,300	162	FY: 1989 \$9,544
Drafting		600	\$16.00	\$9,600	150	FY: 1990 \$32,050
Inspection			\$18.00	\$0		FY: 1991 \$86,440
Overhd. @ 60%			60%	\$14,340		FY: 1992 \$84,530
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		1,250		\$38,240		Total \$212,560
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	1
Foreman		400	\$19.00	\$7,600		Engineering \$3,564
Planner		200	\$19.00	\$3,800		Drafting \$2,400
Carpenter			\$16.00	\$0		Inspection \$0
Electrician		4210	\$16.00	\$67,360		Eng Overhd \$3,580
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder		16	\$16.00	\$256		TITLE III TOTAL \$9,544
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		4,826		\$79,020	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		4,826		\$79,020	0	TITLE III TOTAL \$0
Overhd. @ 60%			60%	\$47,410	60%	TOTAL \$9,544
PO Mat'ls & Eq. by MRC				\$45,400		ROUTING:
Warehouse Mat'ls				\$2,485		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$174,320		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$38,240		ACCOUNTING: _____
TOTAL ESTIMATE				\$212,560		PROJ. ENG. <i>R. Salys</i>
						NFMC1271

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALTER

Date Requested

Page 1 of

ENGINEER L. SALTER			PLANNER		TRADE START DATE		INSTALLATION LOCATION				
PROJECT TITLE TRIT. PROCESS (L-21/L-22)		ARS #J-01271		MSR #		LEDGER 2320		XJCAPITAL 2320		ICC	
FILE NAME-NT127101						EXPENSE 4810				L&O	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.	ADDITIONAL INFORMATION		DEL. DATE	UNIT COST	TOTAL COST	
			UNIT OF ISSUE	# OF UNITS		DOCK	ROOM				
1	MODICON PROGRAMMABLE CONTROLLER # M84A-002 (2K)		EA	2	T	T-2	88	BECKER ELECTRIC	\$600.00	\$1,200.00	
2	MODICON INPUT MODULES # B351-001		EA	10	T	T-2	88	BECKER ELECTRIC	\$150.00	\$1,500.00	
3	MODICON EXPROM MODULE # P371-002		EA	2	T	T-2	88	BECKER ELECTRIC	\$150.00	\$300.00	
4	MODICON PROGTANNING PANEL # P-370		EA	1	T	T-2	88	BECKER ELECTRIC	\$450.00	\$450.00	
5	MODICON OUTPUT MODULE # B350-001		EA	10	T	T-2	88	BECKER ELECTRIC	\$200.00	\$2,000.00	
6	CIRCUIT BREAKERS, SQUARE D		EA	36	T	T-2	88	DUELLMAN ELECTRIC	\$8.00	\$288.00	
7	PHOTO SENSORS(GLOVE PORT INTERLOCKS)GE # CR215PE205A1		EA	20	T	T-2	88	SUMMIT INDUSTRIES	\$100.00	\$2,000.00	
8	MOTOR CONTROL(BELL JAR LIFT)ALLEN BRADLEY#505AAD-105		EA	2	T	T-2	88	ALL-PHASE ELECTRIC	\$400.00	\$800.00	
9			EA		T	T-2	88			\$0.00	
10			EA		T	T-2	88			\$0.00	
11	VENT RAK CONTROL RACK W/CASTER BASE & FRONT PHLS.		EA	9	T	T-2	88	ELECTRONIC COMPONENTS INC.	\$1,200.00	\$10,800.00	
12	HARDWARE, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		LT	1	T	T-2	88		\$2,000.00	\$2,000.00	
13	HARDWARE, MOTOR STARTERS, CONTACTORS, PANEL P.B. ECT		LT	1	T	T-2	88		\$1,000.00	\$1,000.00	
14										\$0.00	
15										\$0.00	
16										\$0.00	

\$22,338.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 2 of

ENGINEER L. SALYER		PLANNER		TRADE START DATE				INSTALLATION LOCATION					
PROJECT TITLE TRIT. PROCESS L-23 FILE NAME MT127102		AES #J-01271		MSR #		LEDGER 2320 []EXPENSE 4810		[X]CAPITAL 2320		ICC IL00		EC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION					
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST		
17	ISOLA POWER CONDITIONER # 63-13-210-5 (1 KVA)		EA	1	IT	IT-2	88	BECKERS			\$700.00	\$700.00	
18	TRANSFORMER, HEVI-DUTY # S5H15		EA	1	IT	IT-2	88	BECKERS			\$500.00	\$500.00	
19	VACUUM PUMP MOTOR CONTROLS		EA	5	IT	IT-2	88	ALL PHASE ELECT.			\$150.00	\$750.00	
20	CIRCUIT BREAKER, SQUARE D		EA	36	IT	IT-2	88	DUELLMAN ELECTRIC			\$8.00	\$288.00	
21	CIRCUIT BREAKER, SQUARE D, HIGH CAP., TYPE FC		EA	1	IT	IT-2	88	DUELLMAN ELECTRIC			\$600.00	\$600.00	
22	ELECTRONIC FILTER, DYNATECH "KLEANLINE" # MB-240-60-11		EA	2	IT	IT-2	88	UPTIME SOLUTIONS			\$2,700.00	\$5,400.00	
23			EA		IT	IT-2	88					\$0.00	
24	CONTROL ENGINEERING LEVEL SENSOR		EA	4	IT	IT-2	88	CONTROL ENGINEERING			\$80.00	\$320.00	
25	CONTROL ENGINEERING ELECTRODE		EA	4	IT	IT-2	88	CONTROL ENGINEERING			\$25.00	\$100.00	
26	CONTROL ENGINEERING BOOT		EA	4	IT	IT-2	88	CONTROL ENGINEERING			\$5.00	\$20.00	
27	CONTROL ENGINEERING PROBE		EA	4	IT	IT-2	88	CONTROL ENGINEERING			\$8.00	\$32.00	
28	CONTROL ENGINEERING RELAY SOCKET		EA	4	IT	IT-2	88	CONTROL ENGINEERING			\$5.00	\$20.00	
29	HOFFMAN BOX # A603608LP		EA	1	IT	IT-2	88	BECKERS			\$325.00	\$325.00	
30	HOFFMAN BOX PANEL# A60P36		EA	1	IT	IT-2	88	BECKERS			\$90.00	\$90.00	
31	HOFFMAN BOX # A241606LP		EA	1	IT	IT-2	88	BECKERS			\$125.00	\$125.00	
32	HOFFMAN BOX PANEL # A24P16		EA	1	ITT	IT-2	88	BECKERS			\$20.00	\$20.00	

\$9,290.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALVER

Date Requested

Page 3 of

ENGINEER L. SALVER

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE TRIT. PROCESS L-23
FILE NAME MT127103

AES #0-01271

MSR #

ILEDGER 2320

JERPERHE 4810

XJCAPITAL 2320

IEC

MAT'L
LIST
NO.

DESCRIPTION

QUANTITY

STORAGE

LOC.

MRC STOCK
NUMBER OR
PURCHASE ORDER
NUMBER

UNIT
OF
ISSUE

DOCK

ROOM

DEL.
DATE

UNIT
COST

TOTAL
COST

ADDITIONAL INFORMATION

33 IVENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLS.

IEA

1 IT

IT-2

88

IELECTRONIC COMPONENTS INC.

\$1,200.00

34 I HARDWARE, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE

ILT

1 IT

IT-2

88

IMOUND STOCK

\$1,000.00

35 I HARDWARE, PANEL CONTROLS, P.B., P.L. ECT.

ILT

1 IT

IT-2

88

IELECTRONIC COMPONENTS INC.

\$1,000.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$3,200.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 4 of

ENGINEER L. SALYER		IPLANNER		TRADE START DATE				INSTALLATION LOCATION					
PROJECT TITLE TRIT. PROCESS (L-29) FILE NAME-NT127104		AES #J-01271		MSR #		LEDGER 2320 []EXPENSE 4810		[X]CAPITAL 2320		ICC ILQ0		IEC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION					
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST		
49	ICUTLER HAMMER PROGRAMMABLE CONTROLLER# D100CRA2B		IEA	4	IT	IT-2	88	IBECKER ELECTRIC			\$400.00	\$1,600.00	
50	ICUTLER HAMMER LCD PROGRAMMER PANEL # D100P610A		IEA	1	IT	IT-2	88	IBECKER ELECTRIC			\$425.00	\$425.00	
51	ICUTLER HAMMER EPROM MEMORY MODULE # D100EE2B		IEA	4	IT	IT-2	88	IBECKER ELECTRIC			\$100.00	\$400.00	
52	IDWYER PHOTOHELIC SWITCH/GAGE # 2-0-2 (# 3304)		IEA	4	IT	IT-2	88	IDWYER			\$250.00	\$1,000.00	
53	IDWYER PHOTOHELIC SWITCH/GAGE # 5-0-5 (# 3310)		IEA	4	IT	IT-2	88	IDWYER			\$250.00	\$1,000.00	
54	IVENT-RAK CONTROL RACK W/CASTER BASE & CONTROL PNLS.		IEA	1	IT	IT-2	88	IELECTRONIC COMPONENTS INC.			\$1,200.00	\$1,200.00	
55	ISAMPLE VALVE PUSHBUTTONS (6 PER SYSTEM)		IEA	24	IT	IT-2	88	IALL-PHASE ELECTRIC			\$35.00	\$840.00	
56	IRESET PUSHBUTTON (1 PER SYSTEM)		IEA	4	IT	IT-2	88	IALL-PHASE ELECTRIC			\$35.00	\$140.00	
57	IBACKFILL/OFF/VAC SWITCH (1 PER SYSTEM)		IEA	4	IT	IT-2	88	IALL-PHASE ELECTRIC			\$35.00	\$140.00	
58	IPILOT RELAYS (3 PER SYSTEM)		IEA	12	IT	IT-2	88	IALL-PHASE ELECTRIC			\$20.00	\$240.00	
59	IPILOT LAMP (1 PER SYSTEM)		IEA	4	IT	IT-2	88	IALL-PHASE ELECTRIC			\$20.00	\$80.00	
60	INISCELLANEOUS WIRE AND HARDWARE & OTHER MATERIALS		ILT	4	IT	IT-2	88				\$200.00	\$800.00	
61												\$0.00	
62												\$0.00	
63												\$0.00	
64												\$0.00	

\$7,865.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 3 of

ENGINEER L. SALYER		IPLANNER		TRADE START DATE				INSTALLATION LOCATION					
PROJECT TITLE		TRIT. PROCESS (L-24)		AES #J-01271		MSR #		LEDGER 2320		ICC		IEC	
FILE NAME-MT127105						[]EXPENSE 4810		[X]CAPITAL 2320		IL00			
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE		LOC.		ADDITIONAL INFORMATION				
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST		
65	VENT-RAK CONTROL RACK W/CASTER BASE & FRONT PANELS		IEA	2	IT	IT-2	88	ELECTRONIC COMPONENTS INC.				\$1,200.00	\$2,400.00
66	HARDWARE, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		ILT	1	IT	IT-2	88					\$2,000.00	\$2,000.00
67	CIRCUIT BREAKER, SQUARE D		IEA	24	IT	IT-2	88	DUELLMAN ELECTRIC				\$8.00	\$192.00
68	SECURITY GRADE CONDUIT RUN (MATERIALS) T-226 TO T-38		IEA	1	ILT	IT-2	88					\$600.00	\$600.00
69													\$0.00
70													\$0.00
71													\$0.00
72													\$0.00
73													\$0.00
74													\$0.00
75													\$0.00
76													\$0.00
77													\$0.00
78													\$0.00
79													\$0.00
80													\$0.00

\$5,192.00

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01283	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-MPC-SPECIAL PREP.I			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 257	TASK No. L41	Project TEC \$350,920	Bud. Ser. No 99023
HP No. (Assignee) 9681	ENG. GRP. N4	Assignee Ph. No. 3550		Date Prepared 6/21/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering			\$22.00	\$0		FY: 1989 \$11,250
Drafting			\$16.00	\$0		FY: 1990 \$70,000
Inspection			\$18.00	\$0		FY: 1991 \$204,670
Overhd. @ 60%			60%	\$0		FY: 1992 \$55,000
Out. Eng. E/C 48		2,508	\$35.00	\$87,780	322	FY: 1993
Total Title I & II Estimate		2,508		\$87,800		Total \$340,920
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		103	\$19.00	\$1,960		Engineering \$0
Planner		102	\$19.00	\$1,940		Drafting \$0
Carpenter		60	\$16.00	\$960		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$0
Mechanic		200	\$16.00	\$3,200		Out Eng. \$11,250
Pipefitter		500	\$16.00	\$8,000		
Painter		60	\$16.00	\$960		
Welder		450	\$16.00	\$7,200		TITLE III TOT \$11,250
Mason		24	\$16.00	\$384		
Laborer		24	\$10.00	\$240		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other		60	\$16.00	\$960		Overhead \$0
Trades Labor		1,583		\$25,800	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop		24	\$18.00	\$430		Contract \$0
Total Labor		1,607		\$26,230	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$15,740	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$216,150		PROJ. MGT. CONT: _____
Warehouse Mat'ls				\$5,000		PROJ. MGR.: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$263,120		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$87,800		PROJ. ENG. <i>James E. Todd</i>
TOTAL ESTIMATE				\$350,920		AES4.wk1 2/9/89 NFMD1283

ESTIMATE DETAIL

PROJECT <i>Spec. Prep I</i>					DEPARTMENT			SHEET <i>1 of 5</i>	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DATE <i>6/9/89</i>		DRAWING NO.			
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		PROJECT NO. (RIE or MWO) <i>101283</i>		ENGINEER <i>J.E. Todd</i>		APPROVED	
CODE	DESCRIPTION	QUANTITY	UNIT	MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL	Estimate Source Mat. Lab.
1.	<i>Residual Gas Analyzer & ancillary equipment</i>	1	EA	In instrumentation estimate	150		150	150	— EST.
2	<i>Capacitance Manometer</i>	1	EA	In instrumentation estimate	150		150	150	— EST.
3	<i>Thermocouples</i>	15	EA	In instrumentation estimate	25		375	375	— EST.
4	<i>Recorder for Capacitance Manometer</i>	1	EA	In instrumentation estimate					—
5	<i>Ionization Gage</i>	1	EA	In instrumentation estimate	50		50	50	— EST.
6	<i>Ionization Gage Controller</i>	1	EA	In instrumentation estimate					—

ESTIMATE DETAIL

PROJECT				DEPARTMENT		SHEET	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DRAWING NO.		2 of 5	
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		ENGINEER		APPROVED	
PROJECT NO. (RIE or MWO)		DATE		MATERIAL		LABOR	
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL
7	Ion Pump & Controller 921:	1 EA	7000	300	7000	300	7300
8	Vacuum Pump Mechanical	2 EA	2360	150	4720	300	5020
9	Vane Pumps	1 EA	17000	150	17000	150	17150
10	U. Beds	2 EA	28500	450	57000	900	57900
11	Pressure Transducers	8 EA	in instrumentation estimate	50		400	400
12	Heating Stages	7 EA	in instrumentation estimate	50		350	350
13	Resistance Thermometers	1 EA	in instrumentation estimate	25		275	275
14	T. H. P. S.						

ESTIMATE DETAIL

PROJECT				DEPARTMENT		SHEET	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DRAWING NO.		3 of 5	
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		PROJECT NO. (RIE or MWO)		ENGINEER	
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL
15	Volume 100 L	2 EA	6000 EA	150 EA	12,000	300	12,300
16	Volume 50 L	2 EA	5000	100	10,000	200	10,200
17	Volume 25 L	1 EA	5000	100	5,000	100	5,100
18	Volume 10 L	2 EA	4500	75	9000	150	9,150
19	Volume 5 L	1 EA	3500	75	3500	75	3,575
20	Volume 1 L	2 EA	3000	75	6000	150	6,150
21	Volume 4 L	2 EA	3000	75	6000	150	6,150
22	Volume 150 L	1 EA	7000	300	7000	300	7,300

ESTIMATE DETAIL

PROJECT				DEPARTMENT		SHEET	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DRAWING NO.		4 of 5	
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		ENGINEER		APPROVED	
PROJECT NO. (RIE or MWO)		DATE		MATERIAL		LABOR	
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL
23	Molecular Sieve Trap	1 EA	750 EA	50	3000	200	3200
24	Rupture Discs	20 EA	700 EA	15 EA	14000	300	14300
25	Compound & other Bourdon tube Gauge	5 EA	350 EA	20 EA	1750	100	1850
26	Analytical Balance	1 EA	4000	75	4000	75	4075
27	Marble Table	1 EA	900 EA	75 EA	900	75	975
28	Valves, Nipples	120 EA	250 EA	15 EA	30,000	1800	31,800
29	Piping 6" / 1"	80 FL	6 FL	50 FL	480	4000	4480
	Var	100 FL	5 FL	30 FL	500	3000	3500
	Net.	71 FL	20 FL	75 FL	1000	1000	1000

Estimate Source

PLUMBING

MECHANICAL

ELECTRICAL

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

EST

ESTIMATE DETAIL

PROJECT		DEPARTMENT		SHEET						
GROSS AREA (sq. ft.)		DRAWING NO.		5 of 5						
GROSS VOLUME (cu. ft.)		PROJECT NO. (RIE or MWO)		APPROVED						
DATE		ENGINEER								
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL		UNIT LABOR	MATERIAL	LABOR	TOTAL	REVISED	
									PLUS	MINUS
31	Vacuum Pumping inside Glove Box ✓	40 FL	10 FL	50 FL	400	2000	2400	EXP	EST	
32	Val. Valves	lot	3500	1500	3500	1500	5000	EXP	EST	
33	Val. Fittings & Flanges	lot	1500	1500	1500	1500	3000	EXP	EST	
34	Misc Supply & Labor	lot	1500	1500	1500	1500	3000	EXP	EST	
	Overhead or Labor @ 60%				221,150	26,375	247,525			
						15,830	15,830			
						42,205	26,375			
						87,785	87,785			
	<u>Total</u>					129,990	351,140			

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01284	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-MPC-SPECIAL PREP.II			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 257	TASK No. L42	Project TEC \$534,210	Bud. Ser. No 99023
HP No. (Assignee) 9681	ENG. GRP. N4	Assignee Ph. No. 3550		Date Prepared 6/21/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		300	\$22.00	\$6,600	50	FY: 1989 \$28,120
Drafting			\$16.00	\$0		FY: 1990 \$186,000
Inspection			\$18.00	\$0		FY: 1991 \$235,000
Overhd. @ 60%			60%	\$3,960		FY: 1992 \$85,090
Out. Eng. E/C 48		3,514	\$35.00	\$122,990	753	FY: 1993
Total Title I & II Estimate		3,814		\$133,600		Total \$534,210
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		190	\$19.00	\$3,610		Engineering \$1,100
Planner		190	\$19.00	\$3,610		Drafting \$0
Carpenter		80	\$16.00	\$1,280		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$660
Mechanic		300	\$16.00	\$4,800		Out Eng. \$26,360
Pipefitter		1000	\$16.00	\$16,000		
Painter		80	\$16.00	\$1,280		TITLE III TOT \$28,120
Welder		909	\$16.00	\$14,544		Trades \$0
Mason		40	\$16.00	\$640		Elec-Tech \$0
Laborer		40	\$10.00	\$400		Machinists \$0
A/C Mechanic			\$16.00	\$0		Overhead \$0
H/D Operator			\$16.00	\$0		PO Mat's \$0
Other		80	\$16.00	\$1,280		Whse Mat'l \$0
Trades Labor		2,909		\$47,440	0	Contract \$0
Electronic Tech.			\$15.00	\$0		
Machine Shop		40	\$18.00	\$720		TITLE III TOT \$0
Total Labor		2,949		\$48,160	0	TOTAL \$28,120
Overhd. @ 60%			60%	\$28,900	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$315,545		PROJ. MGT. CONT: _____
Warehouse Mat'ls				\$8,000		PROJ. MGR.: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$400,610		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$133,600		PROJ. ENG. <i>James L. Tetzl</i>
TOTAL ESTIMATE				\$534,210		AES4.wk1 2/9/89 NFMD1284

PROJECT		DEPARTMENT		SHEET				
Spec. Prep II				1 of 6				
GROSS AREA (sq. ft.)	COST PER SQUARE FOOT	DATE	PROJECT NO. (RIE or MWO)	ENGINEER	APPROVED			
GROSS VOLUME (cu. ft.)	COST PER CUBIC FOOT	10/12/84	6/19/89	J. E. Todd				
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL	ESTIMATE
1	Residual Gas Analyzer & Auxiliary Equip	1 EA						
						150	150	EST
2	Localization Stage Controller	2 EA						
3	Localization Stage	2 EA						
						100	100	EST
4	Thermocouples	18 EA						
						450	450	EST
5	Resistance Thermometers	10 EA						
						250	250	EST
6	Pressure Transducers	14 EA						
						700	700	EST
7	Rupture Disc	~35 EA	700	EA	24,500	525	25,025	RPO EST

ESTIMATE DETAIL

PROJECT				DEPARTMENT		SHEET	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DRAWING NO.		2 of 6	
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		ENGINEER		APPROVED	
PROJECT NO. (RIE or MWO)		DATE		MATERIAL		LABOR	
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL
8	Structural Sages	7 EA	EA	50 EA	350	350	EST
9	Filters	2 EA	200	50 EA	400	100	500
10	Coplin 2 Cylinder	1 EA	1600	40 EA	1600	40	1640 EC EST
11	Coplin 3 Cylinder	1 EA	1900	40 EA	1900	40	1940 EC EST
12	Gas Regulators	5 EA	325	15 EA	1625	75	1700 EC EST
13	Vacuum Pumps	2 EA	17000	150	34,000	300	34,300 EXP EST
14	Vacuum Pumps Mechanical	2 EA	2360	150	4720	300	5020 CAT EST
15							

ESTIMATE DETAIL

PROJECT						DEPARTMENT			SHEET 3 of 6	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DATE		DRAWING NO.				
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		PROJECT NO. (RIE or MWO)		ENGINEER		APPROVED		
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL	REMARKS		
16	Ion Pump Controller + Cables	1 EA	7000	300	7000	300	7300	EC	EST	
17	Turbomolecular Pump	1 EA	10,200	300	10200	300	10,500	RPO	EST	
18	Compressor	2 EA	30,000	750	60,000	1500	61,500	RPO	EST	
19	Volume 300 cc	1 EA	3500	75	3500	75	3575	EXP	EST	
20	Volume 10L	1 EA	4500	75	4500	75	4575	EXP	EST	
21	Volume 100L	1 EA	6000	150	6000	150	6150	EXP	EST	
22	Volume 50L	1 EA	5000	100	5000	100	5100	EXP	EST	
23	Volume 25L	1 EA	5000	100	5000	100	5100	EXP	EST	

ESTIMATE DETAIL

PROJECT						DEPARTMENT		SHEET 4 of 6	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DATE		DRAWING NO.			
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		PROJECT NO. (RIE or MWO)		ENGINEER		APPROVED	
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL	REVISED	
								PLUS	MINUS
24	Volume 100Burge	1 EA	6000	150	6000	150	6150	EXP	EST.
25	Volume 1L	1 EA	3000	75	3000	75	3075	EXP	EST
26	Volume 2L	1 EA	3000	75	3000	75	3075	EXP	EST
27	Volume 50cc.	2 EA	1500	75	3000	150	3150	EXP	EST
28	Volume Coil Can including 4 coiled volumes	1 EA	10,000	300	10,000	300	10300	EXP	EST.
29	Pinch Winder	1 EA	20,000	750	20,000	750	20,750	RPO	EST
30	Molecular Sieve	6 EA	750	50	4500	300	4800	EC	EST.

ESTIMATE DETAIL

PROJECT		DEPARTMENT		SHEET			
GROSS AREA (sq. ft.)		DRAWING NO.		5 of 6			
GROSS VOLUME (cu. ft.)		PROJECT NO. (RIE or MWO)		ENGINEER			
COST PER SQUARE FOOT		DATE		APPROVED			
COST PER CUBIC FOOT		PROJECT NO. (RIE or MWO)		ENGINEER			
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL
31	Valves						
	(a) Nypers	115 EA	250 EA	15	28,750	1725	30,475 RPO EST
	(b) Autoclave	115 EA	160 EA	15	18,400	1725	20,125 RPO EST
32	a Compressor	100	8 FL	50	800	5000	5800 RPO EST
	b Piping for Process	1455	8 FL	50 FL	800	5000	5800 RPO EST
	c External Vac Piping	200	5 FL	30 FL	500	3000	3500 RPO EST
33	Fittings	250 EA	20	20 EA	5000	5000	10000 Avg. EC EST
		250 EA	30	30 EA	7500	7500	15,000 Avg. EC EST
34	Vac Cylinders	5	Avg. 400	10 EA	2000	50	2050 EC EST
35	Compound & other	5 EA	350	20 EA	1750	100	1850 EXP EST
	Booster tube & pipe						
36	NVAL	100	2000	2000	2000	2000	4000 EXP EST

ESTIMATE DETAIL

PROJECT				DEPARTMENT		SHEET	
GROSS AREA (sq. ft.)		COST PER SQUARE FOOT		DRAWING NO.		6 of 6	
GROSS VOLUME (cu. ft.)		COST PER CUBIC FOOT		ENGINEER		APPROVED	
PROJECT NO. (RIE or MWO)		DATE					
CODE	DESCRIPTION	QUANTITY	UNIT MATERIAL	UNIT LABOR	MATERIAL	LABOR	TOTAL
							REVISED PLUS MINUS
37	Vacuum Pumping mainline	40 FL	10 FL	50 FL	400	2000	2400 EXP EST
	Shore Work						
38	Vac. Valves	lot	3500	1500	3500	1500	5000 EXP EST
39	Vac. Fittings & Flanges	lot	1500	1500	1500	1500	3000 EXP EST
40	Misc. Supplies	lot	1500	1500	1500	1500	3000 EXP EST
41	N ₂ & O ₂ Analyzers	2 EA	1000	2500	2000	5000	7000 Analyzers in instrument estimate
	Subtotal				323,545	48,180	371,725
	Overhead on labor 60%					28,910	28,910
					323,545	77,090	400,635
	And 33% of total					133,545	133,545
	Total				323,545	210,635	534,180

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01285	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-MPC-CALORIMETRY			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 259	TASK No. L41	Project TEC \$921,680	Bud. Ser. No 99023
HP No. (Assignee) 5502	ENG. GRP. N4	Assignee Ph. No. 4127		Date Prepared 7/5/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	6,800	\$22.00	\$149,600	1,240	FY: 1989	\$44,260
Drafting	500	\$16.00	\$8,000	24	FY: 1990	\$200,000
Inspection		\$18.00	\$0		FY: 1991	\$652,420
Overhd. @ 60%		60%	\$94,560		FY: 1992	\$25,000
Out. Eng. E/C 48		\$35.00	\$0		FY: 1993	
Total Title I & II Estimate		7,300		\$252,160		Total \$921,680
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman	40	\$19.00	\$760			Engineering \$27,280
Planner	40	\$19.00	\$760			Drafting \$384
Carpenter	160	\$16.00	\$2,560			Inspection \$0
Electrician	120	\$16.00	\$1,920			Eng Overhd \$16,600
Mechanic	800	\$16.00	\$12,800			Out Eng. \$0
Pipefitter	80	\$16.00	\$1,280			
Painter		\$16.00	\$0			
Welder	80	\$16.00	\$1,280			TITLE III TOT \$44,260
Mason		\$16.00	\$0			
Laborer	160	\$10.00	\$1,600			Trades \$0
A/C Mechanic		\$16.00	\$0			Elec-Tech \$0
H/D Operator		\$16.00	\$0			Machinists \$0
Other		\$16.00	\$0			Overhead \$0
Trades Labor	1,480		\$22,960	0		PO Mat's \$0
						Whse Mat'l \$0
						Contract \$0
Electronic Tech.		\$15.00	\$0			
Machine Shop	4600	\$18.00	\$82,800			TITLE III TOT \$0
Total Labor	6,080		\$105,760	0		TOTAL \$44,260
Overhd. @ 60%		60%	\$63,460	60%		ROUTING:
PO Mat'ls & Eq. by MRC			\$495,500			PROJ. MGT. CONT: _____
Warehouse Mat'ls			\$4,800			PROJ. MGR.: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL			\$669,520			ACCOUNTING: _____
TITLE I & II SUBTOTAL			\$252,160			PROJ. ENG. <i>[Signature]</i>
TOTAL ESTIMATE			\$921,680			AES4.wk1 2/9/89 NFMD1285

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J 0 1 2 8 5	AES TITLE NFM BSN 99023	AES ASSIGNEE P. W. KASPERSKI	DATE OF ESTIMATE 7/3/89
---------------------------	----------------------------	---------------------------------	----------------------------

EQUIP. OR MATL. ITEM NO.	TYPE OF TRADE DESCRIPTION	QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	*OTHER
					310	311	312	313	314	315	316	317	318	321	322	325	326		
01	CALORIMETER JACKETS 4.750	4	9000	36,000	16								16		320				
02	CALORIMETER JACKETS 5½	3	11000	33,000	16								16		320				
03	CALORIMETER JACKET 1.08	1	6000	6,000	8								8		40				
04	CALORIMETER JACKET 6½	2	12500	25,000	16								16		240				
05	ENVIRONMENTAL BATHS	4	14000	56,000	32		64						40		480				
06	HEATER FORMS (VARIOUS)	10	1 LOT	12,000	8								8		240				
07	REF. FORMS (VARIOUS)	10	1 LOT	16,000	8								8		240				
08	BATH CONTROL HARDWARE	4	1 LOT	36,000															
09	CALORIMETER THERMELS	10	4000	40,000											1920				
10	G-11 SUPPORTS MAT'L FAB	1 LOT	1 LOT	38,000	16								16		320				
11	OVERHEAD HOISTS	4	8500	34,000	32		160						16		240				
12	INSTALLATION INTO GLOVEBOX					120	576	80			80								40/40
13	COMPUTER & ELECTRONICS EQPT.	1 LOT		139,000															
14	TEST EQPT (SLEEVES, METERS, ETC.)	1 LOT	20000	20,000	8								16		240				
15	254 ROOM EQUIPMENT	1 LOT	5000	5,000															
16	MISC. CABLING & SUPPLIES	1 LOT	4000	4,000															
	TOTALS - - -			500,300	160	120	800	80			80		160		4600				40/40

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01286	DOE/AL AUTHORIZATION # D-79		AES TITLE NFM-MPC-Characterization			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 259	TASK No. L43	Project TEC \$425,580	Bud. Ser. No 99023
HP No. (Assignee) 0541	ENG. GRP. N4	Assignee Ph. No. 3355		Date Prepared July 13, 1989	Date Required Oct. 1992	Rev. No.
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		1,442	\$22.00	\$31,720	230	FY: 1989 \$17,900
Drafting			\$16.00	\$0		FY: 1990 \$85,000
Inspection			\$18.00	\$0		FY: 1991 \$220,000
Overhd. @ 60%			60%	\$19,030		FY: 1992 \$102,680
Out. Eng. E/C 48		830	\$35.00	\$29,050	280	FY: 1993
Total Title I & II Estimate		2,272		\$79,800		Total \$425,580
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		269	\$19.00	\$5,111		Engineering \$5,060
Planner		269	\$19.00	\$5,111		Drafting \$0
Carpenter		54	\$16.00	\$864		Inspection \$0
Electrician		770	\$16.00	\$12,320		Eng Overhd \$3,040
Mechanic		1156	\$16.00	\$18,496		Out Eng. \$9,800
Pipefitter		1030	\$16.00	\$16,480		
Painter		20	\$16.00	\$320		
Welder		470	\$16.00	\$7,520		TITLE III TOTAL: \$17,900
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other		240	\$16.00	\$3,840		Overhead \$0
Trades Labor		4,278		\$70,060	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop		100	\$18.00	\$1,800		Contract \$0
Total Labor		4,378		\$71,860	0	TITLE III TOTAL \$0
Overhd. @ 60%			60%	\$43,120	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$222,000		PROJ. MGT. CONT: _____
Warehouse Mat'ls				\$8,800		PROJ. MGR.: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$345,780		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$79,800		PROJ. ENG. _____
TOTAL ESTIMATE				\$425,580		AES4.wk1 2/9/89: BB

PAGE 1 OF 9

AES NUMBER J 01286	AES TITLE NFM-MPC-CHARACTERIZATION	AES ASSIGNEE R. A. WATKINS	DATE OF ESTIMATE JULY 12, 1989
-----------------------	---------------------------------------	-------------------------------	-----------------------------------

[illegible]

AES DETAIL COST ESTIMATE (IN HOURS)

Box 61 HTR & FABR

PAGE 3 OF 9

AES NUMBER		AES TITLE		AES ASSIGNEE		DATE OF ESTIMATE	
J011286		NFM-MPC-CHARACTERIZATION		R. A. WATKINS		JULY 12, 1989	

EQIP OR MATL ITEM NO.	DESCRIPTION	UNIT	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	DRAFTING	ENGINEERING
23	2 STAGE FRIGER	1		13,500	4	40	70												
24	LID & INSULATION	LOT		400			70		40										
25	SHOULDER	2		250		30	20		40										
26	BOX WIRING	LOT		200															
27	BOX WIRING CHARGES	LOT		700		10	40	10	10		10								
28	UNION TYPING	LOT		15,000	4	80	170	10	90		10								
	SUB TOTAL BOX 61			15,000															

AES DETAIL COST ESTIMATE (IN HOURS)

Box 63 HTL E - 100K

PAGE 5 OF 9

AES NUMBER J 0 1 2 8 6	AES TITLE NFM-MPC-CHARACTERIZATION	AES ASSIGNEE R. A. WATKINS	DATE OF ESTIMATE JULY 12, 1989
---------------------------	---------------------------------------	-------------------------------	-----------------------------------

EQUIP OR MATL ITEM NO.	DESCRIPTION	TYPE OF TRADE		QTY	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM. WORKER	DRAWING	ENGINEERING
							310	311	312	313	314	315	316	317	318	321	322	325	326		
33	OVER			1		10,000 100	4	40	30		20		20								
34	SHOVELS			2		700			20		40										
35	BOX WINDING			100		100		30													
36	BOX WINDING CHAIRS			100					20												
37	BOX CHILLER			1	2,500	2,500 200	4	30	40	30			10								
38	UNIDENTIFIED			100		300		20	30		10										
	SUBTOTAL Box 63					19,100 900	8	120	140	30	70		20								

AES DETAIL COST ESTIMATE (IN HOURS)

10, 12, 8, 6, 4, 6-5, 6-6, + 6-7 15.5' x 18.0' x 16.0' 6' 04' 7

AES NUMBER J 0, 1, 2, 8, 6		AES TITLE NFH-MPC-CHARACTERIZATION		AES ASSIGNMENT R. A. WATKINS		DATE OF ESTIMATE JULY 12, 1989	
--------------------------------------	--	--	--	--	--	--	--

EQUIP OR MATL ITEM NO.	DESCRIPTION	QTY	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	DRAFTING 327	ENGINEERING 328
39	WIRE PEXOS	14		4.12		150													
40	BOX 41100' CHARACTERS	12		1,400		80													
41	CASE TARP BATH	2	1,400	2,800		20	10	20			10								
42	REPAIR UNIT	2	1,000	2,000		50	50	20											
43	BOX CHARACTERS	1	2,000	2,000		40	40	20			10								
44	VANE PUMP	1	15,000	15,000		20	20	20			20								
45	MOTOR PUMP	2	2,000	4,000		20	8	20			50								
46	VALVES	7	1,000	7,000		10	10	10											
47	WATER PUMP	1	800	800															
48	RUBBER PUMP	10	500	5,000			8	40			10								
49	HIGH PRESSURE COIL	1	2,000	2,000			20	20			10								
50	CAPACITOR COMPART TANK COIL	1	5,000	5,000			80	40			10								
51	GAS CYLINDER	5	300	1,500				20											
52	GAS REGULATORS	2	500	1,000							10								
53	FILTRERS	4	150	600															
54	MEL 5,000 TANKS	2	800	1,600															
	(TOTAL)		21,000	21,000		150	80	20			10								

AES DETAIL COST ESTIMATE (IN HOURS)

PAGE 64 OF 67 CIVILIAN 80

1984 JUL 05

AES NUMBER		AES TITLE		AES ASSIGNMENT		DATE OF ESTIMATE	
J011280		NFM-MPC - CHARACTERIZATION		R. A. WORTH'S		JULY 12, 1989	

EQUIP OR MATL ITEM NO.	DISCRIPTION	QTY	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	DRAFTING	ENGINEERING
55	ELT TEMPLS	2	525	1,050				16											
56	LABORS, 1800'S	80	325	26,000			90	160			80								
57	TEMPING & FIRMING, 1800'S	101		13,650			120	220	40		60				120				
58	UNIDENTIFIED	177		40,500		30	80	120							120				
				51,100		34	350	900	40		390				120				
				195,150															
				51,100															

SUBTOTAL BYTES 64-261
(2 PAGES)

AES NUMBER J 0112186		AES TITLE NFM-MPC-CHARACTERIZATION		AES ASSIGNMENT R. A. WATKINS		DATE OF ESTIMATE JULY 12, 1989	
--------------------------------	--	--	--	--	--	--	--

EQUIP OR MATL ITEM NO.	DESCRIPTION	TYPE OF TRAIL	QTY	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	DRAFTING 327	ESTIMATING 328
59	FUMES RE-CD W/IRING		401		700		30													
60	PROSBER HOOKUP		401		400		40	20	40			10								
61	UNIDENTIFIED		401		200		20	20	20	10										
	SUBTOTAL FH 4				200		90	40	40	10		10								

AES NUMBER J 0 1 2 8 6		AES TITLE NFH-MPC-CHARACTERIZATION		AES ASSIGNEE R. A. WATKINS		DATE OF ESTIMATE JULY 12, 1989													
EQUIP OR MATL ITEM NO.	DESCRIPTION	QTY	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	DRAFTING 327	LEVELING 328
	Substrate 11.5 G1 (5.00)			15.00	1	15.00													
	" " " " G2 (5.00)			15.00	3	45.00													
	" " " " G3 (5.00)			15.00	3	45.00													
	Substrate 11.5 G4 (5.00)			15.00	3	45.00													
	Substrate 11.5 G5 (5.00)			15.00	3	45.00													
	Substrate 11.5 G6 (5.00)			15.00	3	45.00													
	 															

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01287	DOE/AL AUTHORIZATION # D79		AES TITLE NFM HOT INERT OPERATIONS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. 301	BLDG. T	ROOM 256/257	TASK No. L44	Project TEC 541660	Bud. Ser. No 99023
HP No. (Assignee) 5218	ENG. GRP. N4	Assignee Ph. No. 4792		Date Prepared 07/12/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		2,000	\$22.00	\$44,000		FY: 1989 \$25,260
Drafting		450	\$16.00	\$7,200		FY: 1990 \$179,570
Inspection			\$18.00	\$0		FY: 1991 \$311,830
Overhd. @ 60%			60%	\$30,720		FY: 1992 \$25,000
Out. Eng. E/C 48		1,500	\$35.00	\$52,500		FY: 1993
Total Title I & II Estimate		3,950		\$134,420		Total \$541,660
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		90	\$19.00	\$1,710		Engineering \$7,040
Planner		90	\$19.00	\$1,710		Drafting \$0
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$4,220
Mechanic		588	\$16.00	\$9,408		Out Eng. \$14,000
Pipefitter		820	\$16.00	\$13,120		
Painter			\$16.00	\$0		
Welder		234	\$16.00	\$3,744		TITLE III TOT \$25,260
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		1,822		\$29,690	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		1,822		\$29,690	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$17,810	60%	TOTAL \$25,260
PO Mat'ls & Eq. by MRC				\$359,740		
Warehouse Mat'ls						ROUTING:
Out Cont'r E/C 49						PROJ. MGT. CONT: _____
TITLE III SUBTOTAL				\$407,240		PROJ. MGR.: _____
TITLE I & II SUBTOTAL				\$134,420		AES CONTROL: _____
TOTAL ESTIMATE				\$541,660		ACCOUNTING: _____
						PROJ. ENG. _____
						AES4.wk1 2/9/89: BB

Page 1

[illegible]

ESO Number

Title

Assignee

Page 2

No.	Description	Qty.	Unit	Total	CA	EL	WE	PF	SH	PA	WE	WA	LA	A/C	H/D	OTH	ET	NS
			Cost	Cost														
	PROOF/LEAK SYSTEM			\$0														
				\$0														
				\$0														
	BELL JAP	1	20000.00	\$20,000			80	160			80							
				\$0														
	VALVE - T-53	1	90.00	\$90														
				\$0														
	VALVE - T-54	4	250.00	\$1,000														
				\$0														
	VALVE - MISCELLANEOUS	10	200.00	\$2,000														
				\$0														
	TRANSDUCER - PE-2	1	B.R.	\$0														
				\$0														
	TRANSDUCER READOUT - PI-2	1	B.R.	\$0														
				\$0														
	FLEXIBLE HOSE HF-10	2	120.00	\$240														
				\$0														
	COMPRESSOR, DIAPHRAGM	1	30000.00	\$30,000														
				\$0														
	PRESSURE REGULATOR - RP-19	1	320.00	\$320														
				\$0														
	VACUUM GAUGE	2	50.00	\$100														
				\$0														
	TURBO PUMP	1	9000.00	\$9,000														
				\$0														
	MASS SPECTROMETER		B.R.	\$0														
				\$0														
	LEAK DETECTOR	1	9000.00	\$9,000														
				\$0														
	LS-1		B.R.	\$0														
				\$0														
	PT-1 AND PI-34		B.R.	\$0														
				\$0														
	TOTALS			\$71,750	0	0	80	160	0	0	80	0	0	0	0	0	0	0
	TOTAL PAGE 1,2			\$161,250	0	0	368	276	0	0	80	0	0	0	0	0	0	0

13-Jul-89 ESO DETAIL COST ESTIMATE (IN HOURS)

ESO Number

Title

Assignee

Page 3

No.	Description	Qty.	Unit	Total	CA	EL	ME	PF	SM	PA	WE	MA	LA	A/C	H/D	OTH	ET	MS
			Cost	Cost														
	REGENERATION SYSTEM			\$0														
				\$0				40	320	40	80							
	REGENERATIVE DRYERS	1	52000.00	\$52,000				40										
				\$0														
	REGENERATIVE BLOWERS	2	20000.00	\$40,000				20										
				\$0														
	OXYGEN REMOVAL/CATALYST BED	1	30000.00	\$30,000														
				\$0														
	PHOTOHELIC	2	200.00	\$400														
				\$0														
	BUBBLER	1	2000.00	\$2,000														
				\$0														
	VACUUM REGULATOR	1	550.00	\$550														
				\$0														
	TRITIUM MONITOR	1	15000.00	\$15,000														
				\$0														
	MOISTURE ANALYZER	1	3500.00	\$3,500														
				\$0														
	OXYGEN ANALYZER	1	3000.00	\$3,000														
				\$0														
	RUPTURE DISKS	4	500.00	\$2,000														
				\$0														
	GAUGES	4	50.00	\$200														
				\$0														
	CONDENSATE TANK	1	200.00	\$200														
				\$0														
	PRESSURE REGULATORS - WC	2	70.00	\$140														
				\$0														
	HEAT EXCHANGER	1	5000.00	\$5,000														
				\$0														
	CHECK VALVES	2	90.00	\$180														
				\$0														
	TOTALS			\$154,170	0	0	100	320	40	0	80	0	0	0	0	0	0	0
	TOTALS PAGE 1,2,3			\$315,420	0	0	468	596	40	0	160	0	0	0	0	0	0	0

ESO Number

Title

Assignee

Page 4

No.	Description	Qty.	Unit Cost	Total Cost	CA	EL	ME	PF	SM	PA	WE	MA	LA	A/C	H/D	OTH	ET	MS
				\$0														
				\$0														
				\$0														
	FLOW OFFICES	2	20.00	\$40			40	160	40		40							
				\$0														
	FLOWMETER - DWYER	4	40.00	\$160														
				\$0														
	BALL VALVE, 1/2"	4	40.00	\$160														
				\$0														
	AIR OP VALVE - 1/2"	2	200.00	\$400														
				\$0														
	BALL VALVE, 3"	25	300.00	\$7,500				64			34							
				\$0														
	BALL VALVE, 3" AIR OP	1	400.00	\$400														
				\$0														
	BALL VALVE, 1"	8	65.00	\$520														
				\$0														
	BALL VALVE, 3" AIR OP	1	400.00	\$400														
				\$0														
	BALL VALVE, 1/4	8	40.00	\$320														
				\$0														
	PUMP - SAMPLING SYSTEM	1	100.00	\$100														
				\$0														
	FILTER. NORGREN	1	25.00	\$25														
				\$0														
	3" COPPER TUBING	15	200.00	\$3,000														
				\$0														
	3" COPPER FITTINGS	1	5000.00	\$5,000														
				\$0														
	BLOWEP. FLEX CONNECTIONS	4	300.00	\$1,200														
				\$0														
				\$0														
				\$0														
	TOTALS			\$19,225		0	40	224	40	0	74	0	0	0	0	0	0	0
	TOTALS PAGE 1,2,3,4			\$334,645	0	0	508	820	80	0	234	0	0	0	0	0	0	0

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date: Jun-89
AES NO. J01288	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-MPC-GLOVEBOXES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 259	TASK No. L45	Project TEC \$1,194,000	Bud. Ser. No 99023
HP No. (Assignee) 9682	ENG. GRP. N4	Assignee Ph. No. 3832		Date Prepared 6/16/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		400	\$22.00	\$8,800	136	FY: 1989 \$25,800
Drafting		36	\$16.00	\$580		FY: 1990 1068200
Inspection			\$18.00	\$0		FY: 1991 \$100,000
Overhd. @ 60%			60%	\$5,630		FY: 1992
Out. Eng. E/C 48		1,100	\$35.00	\$38,500	600	FY: 1993
Total Title I & II Estimate		1,536		\$53,500		Total 1194000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		128	\$19.00	\$2,430		Engineering \$3,000
Planner		128	\$19.00	\$2,430		Drafting \$0
Carpenter		100	\$16.00	\$1,600		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$1,800
Mechanic		2800	\$16.00	\$44,790		Out Eng. \$21,000
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE VII TOT \$25,800
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		3,156		\$51,250	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		3,156		\$51,250	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$30,750	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$1,057,600		PROJ. MGT. CONT: _____
Warehouse Mat'ls				\$900		PROJ. MGR: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$1,140,500		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$53,500		PROJ. ENG. <i>W. A. C. J.</i>
TOTAL ESTIMATE				\$1,194,000		AES4.wk1 2/9/89 NFMD1288

AES DETAIL COST ESTIMATE (IN HOURS)

PAGE 2 OF 4

AES NUMBER J101121818	AES TITLE FCAP NFM MATERIALS PREP & CHARACTERIZATION-GLOVEBOXES	AES ASSIGNEE W. A. CLIFT	DATE OF ESTIMATE 6/16/89
--------------------------	---	-----------------------------	-----------------------------

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	OTHER
					310	311	312	313	314	315	316	317	318	321	322	325	326		
	<u>SPECIAL PREP. #1</u>																		
	DECON.- GLOVEBOX A1	1	19000	19,000	40		52												90
	WEIGH- GLOVEBOX A2	1	19000	19,000			52												
	PH. I PROCESS- GLOVEBOXES ^{A44A5}	2	37000	74,000			208												
	U-BEDS- GLOVEBOX A6	1	19000	19,000			52												
	FUME HOOD FH-1	1	19000	19,000			52												
	<u>SPECIAL PREP. #2</u>																		
	PH. II PROCESS- GLOVEBOXES ^{B1 & B2}	2	37000	74,000			208												
	PINCH WELD- GLOVEBOX B3	1	19000	19,000			52												
	DECON.- GLOVEBOX B5	1	19000	19,000			52												
	STORAGE- GLOVEBOX B6	1	37000	19,000			104												
	DECON- GLOVEBOX B7	1	19000	19,000			52												
	FUME HOOD FH-2	1	37000	37,000			104												
	<u>CALORIMETRY</u>																		
	GLOVEBOXES A3, B4, F6, G2	4	31500	126,000			312												
	PAGE TOTAL			481,000	40		1300												90

AES DETAIL COST ESTIMATE (IN HOURS)

PAGE 4 OF 4

AES NUMBER J191121818		AES TITLE FACAP NFM MATERIALS PREP. & CHARACTERIZATION - GLOVEBOXES		AES ASSIGNEE W. A. CLIFT		DATE OF ESTIMATE 6/16/85	
--------------------------	--	---	--	-----------------------------	--	-----------------------------	--

EQUIP. OR MTRL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	*OTHER
	CHARACTERIZATION STUDIES																			
	FREE STORAGE - GLOVEBOX G1		1	22200	22200	40		52												90
	OVEN STORAGE - GLOVEBOX G2		1	27000	27000			78												
	CHAR. STUDIES - G. B. G4 & G5		2	37000	74000			124												
	CHAR. STUDIES - GLOVEBOX G6		1	27000	27000			78												
	CHAR. STUDIES - GLOVEBOX G7		1	19000	19000			50												
	FUME HOOD FH-4		1	19000	19000			52												
	HOT INERT SYSTEM																			
	HOT LOAD - GLOVEBOX F1		1	19000	19000			52												
	BALANCE - GLOVEBOX F2		1	22200	22200			52												
	PROOF & LEAK - GLOVEBOX F3		1	27000	27000			78												
	TIG WELD - GLOVEBOX F4		1	27000	27000			78												
	LATHE - GLOVEBOX F5		1	37000	37000			104												
	FRICTION TEST - GLOVEBOX F7		1	27000	27000			78												
	STORAGE - GLOVEBOX F8		1	37000	37000			104												
	DECON - GLOVEBOX F9		1	27000	27000			78												
	PAGE TOTAL				411,400	40		1058												90

*INCLUDES - AIR COND MECH., H.D. OPER.,

DISTRIBUTION: 1 AES CLERK

AES DETAILS COST ESTIMATE (IN HOURS)

AES NUMBER: 101121818
 AES TITLE: FCHP NFM MATERIALS
 PREP. # CHARACTERIZATION - GLOVEBOXES
 AES ASSIGNEE: W. A. CLIFT
 DATE OF ESTIMATE: 6/16/85
 PAGE 4 of 4

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	OTHER
	HOT INERT SYSTEM (CONT'D)																		
	FREE STORAGE - GLOVEBOX F10	1	43200	43200	20		104												76
	OVEN STORAGE - GLOVEBOX F11	1	27000	27000			78												
	FUME HOOD FH-3	1	37000	37000			104												
	VACUUM PUMP SYSTEM																		
	GLOVEBOX E1	1	19000	19000			52												
	GLOVEBOX E2	1	27000	27000			104												
	MISCELLANEOUS PARTS	-	-	2000															
	WARE HOUSE MATERIAL	-	-	900															
				166,100	20		442											76	
	PAGE 2 TOTAL			481,000	40		1300											90	
	PAGE 3 TOTAL			411,400	40		1058											90	
				1,058,500	100		2800											256	

ML-3980 (6-88)
 17-1148
 *INCLUDES - AIR COND MECH, H D OPER.,
 LIFT TECH, & GLASS BLOWER
 DISTRIBUTION: 1 AES CLERK
 2 AES ASSIGNEE

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01289	DOE/AL AUTHORIZATION # D-79	AES TITLE M. P. & C. TRITIUM MONITORS				
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257/259	TASK No. L-46	Project TEC	Bud. Ser. No 99023
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220	Date Prepared 7/5/89	Date Required 9/30/89	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	400	\$22.00	\$8,800	80	FY: 1989	\$3,840
Drafting	200	\$16.00	\$3,200	40	FY: 1990	\$7,680
Inspection		\$18.00	\$0		FY: 1991	\$181,440
Overhd. @ 60%		60%	\$7,200		FY: 1992	\$123,040
Cut. Eng. E/C 48		\$35.00	\$0		FY: 1993	\$0
Total Title I & II Estimate		600		\$19,200	Total	\$316,000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman		\$19.00	\$0		Engineering	\$1,760
Planner		\$19.00	\$0		Drafting	\$640
Carpenter		\$16.00	\$0		Inspection	\$0
Electrician		\$16.00	\$0		Eng Overhd	\$1,440
Mechanic		\$16.00	\$0		Out Eng.	\$0
Pipefitter		\$16.00	\$0		TITLE VII TOTAL \$3,840	
Painter		\$16.00	\$0		Trades	\$0
Weider		\$16.00	\$0		Elec-Tech	\$0
Mason		\$16.00	\$0		Machinists	\$0
Laborer		\$10.00	\$0		Overhead	\$0
A/C Mechanic		\$16.00	\$0		PO Mat's	\$0
H/D Operator		\$16.00	\$0		Whse Mat'l	\$0
Other		\$16.00	\$0		Contract	\$0
Trades Labor	0		\$0	0	TITLE III TOTAL \$0	
Electronic Tech.	200	\$15.00	\$3,000		TOTAL \$3,840	
Machine Shop		\$18.00	\$0		ROUTING:	
Total Labor		200		\$3,000	0	PROJ. MGT. CONT: _____
Overhd. @ 60%		60%	\$1,800	60%	PROJ. MGR.: _____	
PO Mat'ls & Eq. by MRC			\$292,000		AES CONTROL: _____	
Warehouse Mat'ls			\$0		ACCOUNTING: _____	
Out Cont'r E/C 49					PROJ. ENG. _____	
TITLE III SUBTOTAL			\$296,800		NFMD1289.WK1	
TITLE I & II SUBTOTAL			\$19,200			
TOTAL ESTIMATE			\$316,000			

ter to instructio... on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 1 of 1

ENGINEER R.C.RANSBOTTOM		PLANNER		TRADE START DATE			INSTALLATION LOCATION				
PROJECT TITLE		AES # J-01289		MSR #		LEDGER 2320		ICC		EC	
INFN MAT'L PREP. TRITIUM MONITORS - (J-01295 L46)						EXPENSE 4810		CAPITAL 2320		L00	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
1	CHAMBER, TRITIUM MONITOR ROOM ION		EA	6						\$3,000	\$18,000
2	ENCLOSURE, TRITIUM MONITOR ROOM		EA	6						\$6,000	\$36,000
3	CHAMBER, TRITIUM MONITOR DUCT ION		EA	3						\$3,000	\$9,000
4	CHAMBER, TRITIUM MONITOR GLOVEBOX ION		EA	10						\$3,000	\$30,000
5	ANALYZER, PANAMETRICS SYSTEM 1/02 OXYGEN		EA	3						\$8,000	\$24,000
6	CABLE AND CONNECTORS		LT	1						\$10,000	\$10,000
7	TUBE, HASTINGS #DV-36 GAGE		EA	9						\$300	\$2,700
8	CONTROLLER, HASTINGS #CVT-16		EA	9						\$550	\$4,950
9	MISCELLANEOUS (10% OF TOTAL)		LT	1						\$27,000	\$27,000
10	ANALYZER, HYDROGEN/DEUTERIUM		EA	2						\$8,000	\$16,000
11	CHASSIS, MAIN READOUT		EA	19						\$6,000	\$114,000
12											\$0
13											\$0
14											\$0
15											\$0
16											\$0

\$291,650

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01290	DOE/AL AUTHORIZATION # D-79		AES TITLE MPC BOX SERVICES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257	TASK No. L47	Project TEC \$75,680	Bud. Ser. No 99023
HP No. (Assignee) 4974	ENG. GRP. N4	Assignee Ph. No. 3309		Date Prepared 15-JULY-89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	746	\$22.00	\$16,410	110	FY: 1989	\$8,770
Drafting		\$16.00	\$0		FY: 1990	\$17,750
Inspection		\$18.00	\$0		FY: 1991	\$70,912
Overhd. @ 60%		60%	\$9,850		FY: 1992	\$54,208
Out. Eng. E/C 48	702	\$35.00	\$24,570	140	FY: 1993	
Total Title I & II Estimate	1,448		\$50,830		Total	152000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman	140	\$19.00	\$2,660		Engineering	\$2,420
Planner	140	\$19.00	\$2,660		Drafting	\$0
Carpenter		\$16.00	\$0		Inspection	\$0
Electrician		\$16.00	\$0		Eng Overhd	\$1,450
Mechanic	190	\$16.00	\$3,040		Out Eng.	\$4,900
Pipefitter	1382	\$16.00	\$22,112			
Painter	472	\$16.00	\$7,552			
Welder	490	\$16.00	\$7,840		TITLE I/II TOT	\$8,770
Mason		\$16.00	\$0			
Laborer	190	\$10.00	\$1,900		Trades	\$0
A/C Mechanic		\$16.00	\$0		Elec-Tech	\$0
H/D Operator		\$16.00	\$0		Machinists	\$0
Other: Sheet metal	54	\$16.00	\$864		Overhead	\$0
Trades Labor	3,058		\$48,630	0	PO Mat's	\$0
					Whse Mat'l	\$0
					Contract	\$0
Electronic Tech.		\$15.00	\$0			
Machine Shop		\$18.00	\$0		TITLE III TOT	\$0
Total Labor	3,058		\$48,630	0	TOTAL	\$8,770
Overhd. @ 60%		60%	\$29,180	60%	ROUTING:	
PO Mat'ls & Eq. by MRC			\$23,000		PROJ. MGT. CONT: _____	
Warehouse Mat'ls					PROJ. MGR.: _____	
Out Cont'r E/C 49					AES CONTROL: _____	
TITLE III SUBTOTAL			\$100,810		ACCOUNTING: _____	
TITLE I & II SUBTOTAL			\$50,830		PROJ. ENG. _____	
TOTAL ESTIMATE			\$151,640		AES4.wk1 2/9/89: BB	

ESO DETAIL COST ESTIMATE - TRADES

Page 1 of 1

ESO NUMBER J01290	ESO TITLE MPC Box SERVICES (L-47)	ESO ASSIGNEE JIM STRONG	DATE OF ESTIMATE 7/15/89
----------------------	--------------------------------------	----------------------------	-----------------------------

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE FITTER 313	SHEET-METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	FURNACE OTHER PLANNER	**ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
I	ROOM T-258 GAS SERVICES						190	1382	54	472	490		190			280	
	IN SUPPORT OF GLOW BOX																
	OPERATIONS																
	<u>REQUIRED ITEMS</u>																
1	VALVE, CHECK 1/2"	6	120	720													
2	VALVE, WORCESTER BALL 1/2"	40	45	1800													
3	VALVE, WORCESTER BALL 1/4"	11	38	418													
4	VALVE, SOLENOID, 3/4"	6	100	600													
5	ORIFICE, FLOW RESTRICTOR	15	75	1125													
6	FILTER, SCHROEDER BELLWIS	5	100	500													
7	GAGE, PRESSURE GENCRAFT	11	150	1650													
8	REGULATOR, PRESSURE, 20 PSI INLET	6	75	450													
9	REGULATOR, PRESSURE, 300 PSI INLET	5	250	1250													
10	LUBRICATOR, AIR	9	40	360													
11	COPPER TUBING - <u>377 L.F</u>		.70/Ft	264													
12	FITTINGS @ 15% TUBING			40													
	COST																

MRC ML-3980 (11 86)
17 1148

*INCLUDES AIR COND. MECH., H.D. OPER.,
LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

DISTRIBUTION: 1. ESO COORD. & CONTROL
2. ACCOUNTING

3 ACCOUNTING
4 ESO ASSIGNEE

(9177)

ESO DETAIL COST ESTIMATE TRADES

Page 2 of

ESO NUMBER J0112910	ESO TITLE Box SERVICES (L-47)	ESO ASSIGNEE JIM STRUNG	DATE OF ESTIMATE 7/5/89
-------------------------------	---	-----------------------------------	-----------------------------------

EQUIP OR MATERIAL ITEM NO	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE FITTER 313	SHEET METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE
		QTY	UNIT COST	TOTAL COST													
II	ROOM T-258 CHILL WATER																
	SERVICES IN SUPPORT OF																
	GLOVEBOX OPERATIONS																
	REQUIRED ITEMS																
13	VALVE, BALL, PNEUMATIC 1/2"	20	250	5000													
14	VALVE, BALL, 1/2"	40	50	2000													
15	PETES PLUG	13	35	455													
16	SWITCH, WATER FLOW	13	150	1950													
17	GAUGE, PRESSURE	4	100	400													
18	THERMOMETER	4	23	92													
19	TANK, EXPANSION	13	35	455													
20	TUBING 2" DIA (3/4 250')		4.24/FT	795													
21	TUBING 1/2" DIA (150')		.70/FT	105.00													
22	TUBING 3/4" DIA (75')		1.07/FT	82.00													
23	VALVE, BALL 3/4"	6	40	240													
24	VALVE, BALL, 1"	4	60	240													
25	FITTINGS @ 15% TUBING			160													

WHC ML J980 (11 86)
7/1148

*INCLUDES AIR COND MECH H/D OPER.
LAB TECH. & GLASS BLOWER

DISTRIBUTION 1 ESO COORD & CONTROL
2 ACCOUNTING

3 ACCOUNTING
4 ESO ASSIGNEE

**SEE REVERSE SIDE FOR CODES

(11974)

TO COPY ENTER PRNTR #

HP #

MENU RETURN ENTER PF1 OR PF10

TITLE: UTILITY PIPING (C)

JOB CODE	DESCRIPTION	CUR-MTH HRS	EST HRS	LTD HRS	OVER/ UNDER
1010	ENGINEER			69	69-
2010	ENGINEER			1683	1683-
	TOTAL ENGINEERING			1752	1752-
2030	DRAFTSMAN			2033	2033-
	TOTAL DRAFTING			2033	2033-
2040	FOREMAN			275	275-
2080	PLANNER			301	301-
2100	CARPENTER			85	85-
2110	ELECTRICIAN			81	81-
2120	MECHANIC			370	370-
2130	PIPEFITTER			2698	2698-
2140	SHEETMETAL			105	105-
2150	PAINTER			921	921-
2160	WELDER			956	956-
2170	MASON			32	32-
2180	LABORER			373	373-

BASIS FOR LABOR HOURS			
<u>AES #</u>	<u>PROJECT</u>	<u>BOX LENGTH</u>	<u>LABOR HRS</u>
J00444	KYLE	330 LF	ACTUAL
J01267	TOTA	50 LF	EST
J01290	MPL	169 LF	EST
J01307	HMS	130 LF	EST.

* LABOR HRS HAVE BEEN DIVIDED BASED
ON THE OVERALL GLOVEBOX LENGTH EACH
ACTIVITY MUST SUPPORT

151 400 | Copper Pipe & Tubing

401		CREW	DAILY OUTPUT	MAN- HOURS	UNIT	BARE COSTS				TOTAL INCL O&P
						MAT	LABOR	EQUIP	TOTAL	
1300	3" diameter									
1320	3-1/2" diameter	Q-1	28	571	L F	9 56	12.25		21 31	29
1330	4" diameter		24	667		12 67	14 30		26 97	35
1340	5" diameter		22	727		15 79	15 60		31 39	40
1360	6" diameter		18	889		37 88	19 10		56 98	70
1380	8" diameter	Q-2	23	1 040		53 47	23		76 47	93
1390	For other than full hard temper, add		20	1 200		94 71	27		121 71	145
1440	For silver solder, add					25%				
1800	For medical clean, (oxygen class), add						15%			
1950	To delete cpjgs & hngs., 1/4"-3/4" pipe, subtract					3.50%				
1960	1/4"-1-1/2" pipe, subtract					27%	40%			
1970	2"-6" pipe, subtract					14%	29%			
1980	8" pipe, subtract					10%	31%			
2000	Type L tubing, couplings & hangers 10' O.C.					19%	31%			
2100	1/4" diameter									
2120	1/4" diameter	1 Plum	59	.136	L.F.	.48	3.23		3.71	5.30
2140	1/2" diameter		56	.143		.65	3.41		4.06	5.70
2160	3/4" diameter		53	.151		.75	3.60		4.35	6.10
2180	1" diameter		49	.163		1.03	3.89		4.92	6.85
2200	1-1/4" diameter		44	.182		1.11	4.34		5.45	7.60
2220	1-1/2" diameter		36	.222		1.57	5.30		6.87	9.50
2240	2" diameter		29	.276		2.11	6.60		8.71	12
2260	2-1/2" diameter		27	.296		2.65	7.05		9.70	13.30
2280	3" diameter	Q-1	23	.348		3.95	8.30		12.25	16.50
2300	3-1/2" diameter		33	.485		5.75	10.40		16.15	22
2320	4" diameter		30	.533		7.86	11.45		19.31	26
2340	5" diameter		25	.640		10.92	13.75		24.67	32
2360	6" diameter		23	.696		13.14	14.95		28.09	36
2380	8" diameter	Q-2	19	.842		33.88	18.10		51.98	64
2400	For other than full hard temper, add		24	1		41.47	22		63.47	78
2410	For silver solder, add		21	1.140		72.71	25		97.71	115
2590	For medical clean, (oxygen class), add					25%				
2900	To delete cpjgs & hngs., 1/4"-3/4" pipe, subtract					3.50%				
2940	1/4"-1" pipe, subtract					37%	43%			
2950	1-1/4"-3" pipe, subtract					22%	38%			
2960	3-1/2"-6" pipe, subtract					12%	27%			
2970	8" pipe, subtract					12%	37%			
2980	Type M tubing, couplings & hangers 10' O.C.					24%	33%			
3000	1/4" diameter									
3100	1/4" diameter	1 Plum	61	.131	L.F.	.46	3.13		3.59	5.10
3120	1/2" diameter		59	.136		.47	3.23		3.70	5.25
3140	3/4" diameter		56	.143		.59	3.41		4	5.65
3160	1" diameter		51	.157		.79	3.74		4.53	6.35
3180	1-1/4" diameter		46	.174		.86	4.15		5.01	7.05
3200	1-1/2" diameter		37	.216		1.21	5.15		6.36	8.90
3220	2" diameter		30	.267		1.73	6.35		8.08	11.25
3240	2-1/2" diameter		28	.286		2.37	6.80		9.17	12.60
3260	3" diameter	Q-1	24	.333		3.64	7.95		11.59	15.65
3280	3-1/2" diameter		35	.457		5.06	9.80		14.86	19.95
3300	4" diameter		32	.500		6.54	10.75		17.29	23
3320	5" diameter		27	.593		9.35	12.70		22.05	29
3340	6" diameter		24	.667		11.64	14.30		25.94	34
3360	8" diameter	Q-2	20	.800		29.88	17.15		47.03	58
3370	For other than full hard temper, add		25	.960		37.47	21		58.47	73
3380	For silver solder, add		22	1.090		63.71	24		87.71	105
3390	For medical clean, (oxygen class), add					3.50%	15%			

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01291	DOE/AL AUTHORIZATION # D-79		AES TITLE MPC VACUUM PUMP SYSTEM			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 259	TASK No. L47	Project TEC 220K	Bud. Ser. No 99023
HP No. (Assignee) 4848	ENG. GRP. N4	Assignee Ph. No. 4782		Date Prepared 15-JUNE-89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		1,070	\$22.00	\$23,540	180	FY: 1989 \$17,246
Drafting		160	\$16.00	\$2,560	16	FY: 1990 \$50,000
Inspection			\$18.00	\$0		FY: 1991 \$152,754
Overhd. @ 60%			60%	\$15,660		FY: 1992
Out. Eng. E/C 48		860	\$35.00	\$30,100	300	FY: 1993
Total Title I & II Estimate		2,090		\$71,860		Total \$220,000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		160	\$19.00	\$3,040		Engineering \$3,960
Planner		160	\$19.00	\$3,040		Drafting \$256
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$2,530
Mechanic			\$16.00	\$0		Out Eng. \$10,500
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		
Mason			\$16.00	\$0		TITLE I/II TOT \$17,246
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other		1000	\$16.00	\$16,000		Overhead \$0
Trades Labor		1,320		\$22,080	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		1,320		\$22,080	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$13,250	60%	TOTAL \$17,246
PO Mat'ls & Eq. by MRC				\$108,000		ROUTING:
Warehouse Mat'ls				\$4,810		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$148,140		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$71,860		ACCOUNTING: _____
TOTAL ESTIMATE				\$220,000		PROJ. ENG. _____
						AES4.wk1 2/9/89: BB

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE																	
J0111291	MPC VACUUM SYSTEM	Van Patten	7/13/89																	
EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	*OTHER
1	Vacuum Pumps		14	1800	25,200															
2	Valves		20T	-	30,000															
3	Piping		20T	-	24,000															
4	Vacuum Stand P/I		1	-	12,000			64												
5	Glovebox Cordex		1	2400	2400															
6	Oil tank in box		1	1000	1000			16	16											
7	Oil tank on box		1	800	800				16											
8	Pressure gauges		14	60	840							16								
9	Densifiers		14	100	1400															
10	Flex connections		56	30	1680															
11	Fittings		20T		8,600															
12	Installation							96	400	60	256	60								
	Total				108,000			176	432	60	256	60								60

ML-3980 (6-88)
17-1148

*INCLUDES - AIR COND. MECH., H.D. OPER.,
LAB TECH. & GLASS BLOWER

DISTRIBUTION:
1 AES CLERK
2 AES ASSIGNEE

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01292	DOE/AL AUTHORIZATION # D-79		AES TITLE M. P. & C. INSTRUMENTATION			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 257/259	TASK No. L-48	Project TEC	Bud. Ser. No 99023
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220	Date Prepared 6/26/89	Date Required 9/30/89	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		1,920	\$22.00	\$42,240	288	FY: 1989 \$20,216
Drafting		1,920	\$16.00	\$30,720	288	FY: 1990 \$52,106
Inspection			\$18.00	\$0		FY: 1991 \$312,558
Overhd. @ 60%			60%	\$43,780		FY: 1992 \$295,901
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$0
Total Title I & II Estimate		3,840		\$116,740		Total \$680,780
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$6,336
Planner			\$19.00	\$0		Drafting \$4,608
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$6,566
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE VII TOTAL \$17,510
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$2,705
Electronic Tech.		960	\$15.00	\$14,400		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		960		\$14,400	0	TITLE III TOTAL \$2,705
Overhd. @ 60%			60%	\$8,640	60%	TOTAL \$20,215
PO Mat'ls & Eq. by MRC				\$541,000		ROUTING:
Warehouse Mat'ls						PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$564,040		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$116,740		ACCOUNTING: _____
TOTAL ESTIMATE				\$680,780		PROJ. ENG. _____
						NFMD1292.WK1

Refer to instruction on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 2 of 3

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE	DESCRIPTION	AES # J-01292 MSR #	LEDGER 2320 EXPENSE 4B10	CAPITAL 2320	ICC L00	IEC	QUANTITY UNIT OF ISSUE	# OF UNITS	STORAGE BD	LOC. DOCK	ROOM	ADDITIONAL INFORMATION		
												DEL. DATE	UNIT COST	TOTAL COST
17	READOUT, HASTINGS #88-6						IEA	10					525	\$5,250
18	CONTROLLER, HASTINGS #CVT-16						IEA	3					550	\$1,650
19	THERMOCOUPLES, SINGLE K-TYPE						IEA	8					30	\$240
20	THERMOCOUPLES, DUAL K-TYPE						IEA	2					50	\$100
21	RTD, 1/8"						IEA	16					250	\$4,000
22	SWITCH, HASTINGS 5 POSITION						IEA	2					350	\$700
23	CONTROLLER, EURO THERM PID HEAT						IEA	2					800	\$1,600
24	CONTROLLER, EURO THERM SCR						IEA	2					800	\$1,600
25	INTERFACE, OPT022						IEA	1					1000	\$1,000
26	HEAD, BARATRON #390HA-SP05 SENSOR 0-10,000 TORR						IEA	1					2500	\$2,500
27	DISPLAY, MKS BARATRON #270B						IEA	1					2500	\$2,500
28	ANALYZER, UTI RESIDUAL GAS W/SCOPE & CHART						IEA	1					2500	\$2,500
29	GAGE, VARIAN MODEL 844						IEA	1					30000	\$30,000
30	TRANSDUCERS, SENSOTEC 0-100 PSIA						IEA	8					900	\$7,200
31	ANNUNCIATOR						IEA	1					2000	\$2,000
32	RECORDER, STRIPCHART						IEA	1					5000	\$5,000

er to instructio. on reverse side.

MATERIAL LIST

questor R.C. RANSBOTTOM

Date Requested

Page 3 of 3

GINEER R.C.RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

AT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST	
33	CONDITIONER, INSTRULAB RTD #4010-10		EA	1					\$3,700	\$3,700	
34	CABLE & CONNECTORS		LT	1					\$5,000	\$5,000	
35	MISCELLANEOUS (10% OF TOTAL)		LT	1					\$13,000	\$13,000	
36										\$0	
37										\$0	
38										\$0	
39										\$0	
40										\$0	
41										\$0	
42										\$0	
43										\$0	
44										\$0	
45										\$0	
46										\$0	
47										\$0	
48										\$0	

\$132,190

er to instructio. on reverse side.

MATERIAL LIST

questor R.C. RANSBOTTOM

Date Requested

Page 1 of 3

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE	INFM SPEC PREP II INSTRUMENTATION - (J-01295 L42)	AES # J-01292	MSR #	LEDGER 2320	EXPENSE 4810	CAPITAL 2320	ICC L00	EC
AT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY	STORAGE	LOC.	ADDITIONAL INFORMATION		
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM	DEL. DATE UNIT COST TOTAL COST
1	DATAPAC, DAYTRONIC 10K6		1EA	1				\$7,500 \$7,500
2	DATAPAC, DAYTRONIC 10K4T-D		1EA	1				\$3,000 \$3,000
3	BOARD, DAYTRONIC #10A11 T/C PROCESSOR		1EA	1				\$200 \$200
4	BOARD, DAYTRONIC #10A10-4 T/C CONDITIONER		1EA	3				\$450 \$1,350
5	BOARD, DAYTRONIC #10A64-8 VOLTAGE CONDITIONER		1EA	3				\$550 \$1,650
6	BOARD, DAYTRONIC #10A72-2 STRAIN GAGE CONDITIONER		1EA	4				\$500 \$2,000
7	BOARD, DAYTRONIC #10B10-16 LOGIC I/O		1EA	1				\$600 \$600
8	CARD, DAYTRONIC #10B0R64 HISTORY		1EA	1				\$1,800 \$1,800
9	CARD, DAYTRONIC #10B04 SATELLITE INTERFACE		1EA	1				\$1,800 \$1,800
10	CARD, DAYTRONIC #10B01 SATELLITE SLAVE		1EA	1				\$1,400 \$1,400
11	MONITOR, DAYTRONIC #10VCM14		1EA	1				\$1,800 \$1,800
12	CARD, DAYTRONIC #10VFO132 FORMATTED OUTPUT		1EA	1				\$700 \$700
13	PROCESSOR, DAYTRONIC #10CVIOP VIDEO I/O		1EA	1				\$500 \$500
14	COMPUTER, COMPAQ 386 W/ACCESSORIES		1EA	1				\$10,000 \$10,000
15	CONDITIONER, INSTRULAB RTD		1EA	1				\$3,800 \$3,800
16	TUBE, HASTINGS VAC GAGE #DV-36		1EA	13				\$300 \$3,900

er to instruction: on reverse side.

MATERIAL LIST

questor R.C. RANSBOTTOM

Date Requested

PLANNER

TRADE START DATE

INSTALLATION LOCATION

OBJECT : TITLE : INF SPEC PREP II INSTRUMENTATION - L42										: AES # J-01295 : MSR # : : JEPENSE 4810 (X)CAPITAL 2320 :CC :LOO :EC									
AT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE	LOC.	ADDITIONAL INFORMATION												
			UNIT OF ISSUE	#OF UNITS			DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST								
17	READOUT, HASTINGS #86-6		IEA	5								\$525	\$2,625						
18	CONTROLLER, HASTINGS #CVT-16		IEA	3								\$550	\$1,650						
19	THERMOCOUPLES, SINGLE K-TYPE		IEA	30								\$30	\$900						
20	THERMOCOUPLES, DUAL K-TYPE		IEA	2								\$50	\$100						
21	RTD, 1/8"		IEA	16								\$250	\$4,000						
22	SWITCH, HASTINGS 5 POSITION		IEA	1								\$350	\$350						
23	BOARD, DAYTRONIC #10A65-8 VOLTAGE CONDITIONER		IEA	3								\$550	\$1,650						
24	VOLTMETER, FLUKE		IEA	4								\$2,000	\$8,000						
25	INTERFACE, OPT022		IEA	1								\$1,000	\$1,000						
26	SUPPLY, POWER 10VDC LAMBDA		IEA	20								\$300	\$6,000						
27	UNIT, DAYTRONIC #AGU-2 ADVANCED GRAPHICS		IEA	1								\$4,500	\$4,500						
28	ANALYZER, UTI RESIDUAL GAS W/SCOPE & CHART		IEA	1								\$30,000	\$30,000						
29	GAGE, VARIAN MODEL 844		IEA	2								\$2,500	\$5,000						
30	TRANSDUCERS, SENSOTEC 0-100 PSIA		IEA	8								\$900	\$7,200						
31	ANNUNCIATOR		IEA	1								\$2,000	\$2,000						
32	SOFTWARE, DAYTRONIC SUPERPAC IV		IEA	1								\$2,000	\$2,000						

er to instructio. on reverse side.

MATERIAL LIST

questor R.C. RANSBOTTOM

Date Requested

GINEER R.C.RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

OBJECT TITLE		AES # J-01295		MSR #		LEDGER 2320		EXPENSE 4810		CAPITAL 2320		ICC L00		EC	
AT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION							
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST				
33	CONTROL, WELD PERTRON #TIM 4020 W/SOFTWARE		1EA	1									\$5,500	\$5,500	
34	CONTROLLER, PRESSURE DRUCK MODEL DPI-500		1EA	1									\$6,500	\$6,500	
35	COMPUTER, HEWLETT-PACKARD SYSTEM 310		1EA	1									\$50,000	\$50,000	
36	SOFTWARE		1EA	1									\$10,000	\$10,000	
37	CABLE & CONNECTORS		1LT	1									\$7,500	\$7,500	
38	MISCELLANEOUS (10% OF TOTAL)		1LT	1									\$20,000	\$20,000	
39														\$0	
40														\$0	
41														\$0	
42														\$0	
43														\$0	
44														\$0	
45														\$0	
46														\$0	
47														\$0	
48														\$0	

\$218,475

Refer to instruction on reverse side.

Requestor R.C. RANSBOTTOM

MATERIAL LIST

Date Requested

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT

TITLE: NFM CHARACTERIZATION INSTRUMENTATION - (J-01295 L43) ; AES # J-01292 ; MSR # ; LEDGER 2320 ; XCAPITAL 2320 ; ICC ; L00 ; EC

MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE	LOC.	ADDITIONAL INFORMATION		DEL. DATE	UNIT COST	TOTAL COST
			UNIT OF ISSUE	# OF UNITS			DOCK	ROOM			
1	DATAPAC, DAYTRONIC 10K6		EA	1						\$7,500	\$7,500
2	DATAPAC, DAYTRONIC 10K4T-D		EA	1						\$3,000	\$3,000
3	BOARD, DAYTRONIC #10A11 T/C PROCESSOR		EA	1						\$200	\$200
4	BOARD, DAYTRONIC #10A10-4 T/C CONDITIONER		EA	2						\$450	\$900
5	BOARD, DAYTRONIC #10A64-8 VOLTAGE CONDITIONER		EA	2						\$550	\$1,100
6	BOARD, DAYTRONIC #10A72-2 STRAIN GAGE CONDITIONER		EA	4						\$500	\$2,000
7	BOARD, DAYTRONIC #10B10-16 LOGIC I/O		EA	1						\$600	\$600
8	CARD, DAYTRONIC #10B0R64 HISTORY		EA	1						\$1,800	\$1,800
9	CARD, DAYTRONIC #10B04 SATELLITE INTERFACE		EA	1						\$1,800	\$1,800
10	CARD, DAYTRONIC #10B01 SATELLITE SLAVE		EA	1						\$1,400	\$1,400
11	MONITOR, DAYTRONIC #10VCH14		EA	1						\$1,800	\$1,800
12	CARD, DAYTRONIC #10VFO132 FORMATTED OUTPUT		EA	1						\$700	\$700
13	PROCESSOR, DAYTRONIC #10CVTOP VIDEO I/O		EA	1						\$500	\$500
14	COMPUTER, COMPAG 386 W/ACCESSORIES		EA	1						\$10,000	\$10,000
15	CONDITIONER, INSTRULAB RTD		EA	1						\$0	\$0
16	TUBE, HASTINGS VAC GAGE #DV-36		EA	4						\$300	\$1,200

er to instructions on reverse side.

MATERIAL LIST

questor R.C. RANSBOTTOM

Date Requested

Page 2 of 3

GINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

AT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION		
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST
17	READOUT, HASTINGS #88-6		IEA	3					\$525	\$1,575
18	CONTROLLER, HASTINGS #CVT-16		IEA	1					\$550	\$550
19	THERMOCOUPLES, SINGLE K-TYPE		IEA	3					\$30	\$90
20	THERMOCOUPLES, DUAL K-TYPE		IEA	4					\$50	\$200
21	RTD, 1/8"		IEA	8					\$250	\$2,000
22	DISPLAY, BARATRON #270C-5		IEA	2					\$2,500	\$5,000
23	BOARD, DAYTRONIC #10A60-4 VOLTAGE CONDITIONER		IEA	1					\$450	\$450
24	VOLTMETER, FLUKE		IEA	3					\$2,000	\$6,000
25	INTERFACE, OPT022		IEA	1					\$1,000	\$1,000
26	SUPPLY, POWER 10VDC LAMBDA		IEA	4					\$0	\$0
27	UNIT, DAYTRONIC #AGU-2 ADVANCED GRAPHICS		IEA	1					\$4,500	\$4,500
28	SENSOR, BARATRON #390H-SP02 PRESSURE 0-1000 TORR		IEA	1					\$2,500	\$2,500
29	SENSOR, BARATRON #390H-SP02 PRESSURE 0-10000 TORR		IEA	1					\$2,500	\$2,500
30	TRANSDUCERS, SENSOTEC 0-100 PSIA		IEA	6					\$900	\$5,400
31	ANNUNCIATOR		IEA	1					\$2,000	\$2,000
32	SOFTWARE, DAYTRONIC SUPERPAC IV		IEA	1					\$2,000	\$2,000

Refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 3 of 3

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE	DESCRIPTION	AES #	MSR #	LEDGER	EXPENSE	CAPITAL	CC	EC
33	CONTROLLER, PID HEAT	J-01292		2320	4810	2320	L00	
34	CONTROLLER, SCR							
35	MISCELLANEOUS (10% OF TOTAL)							
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								

\$82,565

er to instructions on reverse side.

MATERIAL LIST

questor R.C. RANSBOTTOM

Date Requested

Page 1 of 3

GINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

OBJECT : AES # J-01292 MSR # LEDGER 2320 ICC EC
 TITLE : INFM HOT INERT INSTRUMENTATION - (J-01295 L44) [] EXPENSE 4810 [] CAPITAL 2320 IL00

AT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST	
1	1 DATAPAC, DAYTRONIC 10K6		1EA	1					\$7,500	\$7,500	
2	1 DATAPAC, DAYTRONIC 10K4T-D		1EA	1					\$3,000	\$3,000	
3	1 BOARD, DAYTRONIC #10A11 T/C PROCESSOR		1EA	1					\$200	\$200	
4	1 BOARD, DAYTRONIC #10A10-4 T/C CONDITIONER		1EA	2					\$450	\$900	
5	1 MONITOR, DAYTRONIC #10VCM19A		1EA	1					\$2,800	\$2,800	
6	1 BOARD, DAYTRONIC #10A72-2 STRAIN GAGE CONDITIONER		1EA	3					\$500	\$1,500	
7	1 BOARD, DAYTRONIC #10B10-16 LOGIC I/O		1EA	2					\$600	\$1,200	
8	1 CARD, DAYTRONIC #10BDR64 HISTORY		1EA	1					\$1,800	\$1,800	
9	1 CARD, DAYTRONIC #10BD4 SATELLITE INTERFACE		1EA	1					\$1,800	\$1,800	
10	1 CARD, DAYTRONIC #10BD1 SATELLITE SLAVE		1EA	1					\$1,400	\$1,400	
11	1 MONITOR, DAYTRONIC #10VCM14		1EA	1					\$1,800	\$1,800	
12	1 CARD, DAYTRONIC #10VFD132 FORMATTED OUTPUT		1EA	1					\$700	\$700	
13	1 PROCESSOR, DAYTRONIC #10CVIOP VIDEO I/O		1EA	1					\$500	\$500	
14	1 COMPUTER, COMPAQ 386 W/ACCESSORIES		1EA	1					\$10,000	\$10,000	
15	1 DETECTOR, LEYBOLD HELIUM LEAK		1EA	1					\$25,000	\$25,000	
16	1 TUBE, HASTINGS VAC GAGE #DV-36		1EA	4					\$300	\$1,200	

er to instructio. on reverse side.

questor R.C. RANSBOTTOM

ENGINEER R.C. RANSBOTTOM

MATERIAL LIST

Date Requested

Page 2 of 3

PLANNER

TRADE START DATE

INSTALLATION LOCATION

OBJECT TITLE	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE	LOC.	ADDITIONAL INFORMATION		DEL. DATE	UNIT COST	TOTAL COST
			UNIT OF ISSUE	#OF UNITS			DOCK	ROOM			
17	READOUT, HASTINGS #86-6		IEA	2						\$525	\$1,050
18	CONTROLLER, HASTINGS #CVT-16		IEA	2						\$550	\$1,100
19	THERMOCOUPLES, SINGLE K-TYPE		IEA	4						\$30	\$120
20	THERMOCOUPLES, DUAL K-TYPE		IEA	3						\$50	\$150
21	PYROMETER, INFRARED		IEA	1						\$10,000	\$10,000
22	BOARD, DAYTRONIC 10A41-2 FREQUENCY		IEA	1						\$550	\$550
23	BOARD, DAYTRONIC #10A60-4 VOLTAGE CONDITIONER		IEA	1						\$450	\$450
24	CARD, DAYTRONIC #10VBH500 VIDEO GRAPHICS MEMORY		IEA	1						\$1,700	\$1,700
25	INTERFACE, OPT022		IEA	1						\$1,000	\$1,000
26	TRANSducers, SENSOTEC 0-100 PSIA		IEA	4						\$1,000	\$4,000
27	ANNUNCIATOR		IEA	1						\$2,000	\$2,000
28	SOFTWARE, DAYTRONIC SUPERCAP IV		IEA	1						\$2,000	\$2,000
29	CONTROLLER, GE PLC SERIES 1+		IEA	1						\$5,000	\$5,000
30	CABLE & CONNECTORS		ILT	1						\$5,000	\$5,000
31	MISCELLANEOUS (10% OF TOTAL)		ILT	1						\$8,500	\$8,500
32			IEA	1						\$2,000	\$2,000

\$105,920

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01293	DOE/AL AUTHORIZATION # D - 79		AES TITLE NFM - MPC Box Purge			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. 301	BLDG. T	ROOM 257	TASK No. L49	Project TEC \$287,440	Bud. Ser. No 99023
HP No. (Assignee) 5376	ENG. GRP. N4	Assignee Ph. No. 3449		Date Prepared 7/12/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		1,352	\$22.00	\$29,740	200	FY: 1989 \$19,160
Drafting		300	\$16.00	\$4,800	40	FY: 1990 \$83,940
Inspection			\$18.00	\$0		FY: 1991 \$154,340
Overhd. @ 60%			60%	\$20,720		FY: 1992 \$30,000
Out. Eng. E/C 48		2,240	\$35.00	\$78,400	317	FY: 1993
Total Title I & II Estimate		3,892		\$133,660		Total \$287,440
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL
Foreman		224	\$19.00	\$4,256		Engineering \$4,400
Planner		224	\$19.00	\$4,256		Drafting \$640
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$3,020
Mechanic		300	\$16.00	\$4,800		Out Eng. \$11,095
Pipefitter		1200	\$16.00	\$19,200		
Painter		300	\$16.00	\$4,800		
Welder		1200	\$16.00	\$19,200		TITLE III TOT \$19,160
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		3,448		\$56,510	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		3,448		\$56,510	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$33,910	60%	TOTAL \$19,160
PO Mat'ls & Eq. by MRC				\$63,360		ROUTING:
Warehouse Mat'ls						PROJ. MGT. CONT:
Out Cont'r E/C 49						PROJ. MGR.:
TITLE III SUBTOTAL				\$153,780		AES CONTROL:
TITLE I & II SUBTOTAL				\$133,660		ACCOUNTING:
TOTAL ESTIMATE				\$287,440		PROJ. ENG.
AES4.wk1 2/9/ NFMD1293						

ML-7093A (2/89)

AES DETAIL COST ESTIMATE (IN HOURS)			
AES NUMBER	AES TITLE	AES ASSIGNED	DATE OF ESTIMATE
J101121913	MPC Box Purge	S.A. RAISOR	6/89

AES NUMBER	AES TITLE	AES ASSIGNED	DATE OF ESTIMATE
J0112913	MPC Box Purge	S.A. RAISOR	6/89

[illegible]

THE UNIVERSITY OF CHICAGO

Single Purge System Material Requirements

Material Description/Fitting List	Unit	Price/Unit	Vendor/Stock #	Stock Price	Quantity	Total
Tubing, Copper, 3" nom., type L, cleaned	ft.	\$8.34			50	\$417.00
Tubing, Copper, 2" nom., type L, cleaned	ft.	\$4.24	MRC #07-5989-4 20ft	\$79.18	100	\$424.00
Tubing, Copper, 1" nom., type L, cleaned	ft.	\$1.60	MRC #07-5986-4 20ft	\$30.70	50	\$80.00
Tubing, Copper, 3/4" nom., type L, cleaned	ft.	\$1.09	MRC #07-5985-4 20ft	\$21.17	150	\$163.50
Tubing, Copper, 3/8" nom., type L, cleaned	ft.	\$0.55	MRC #07-5982-4 20ft	\$10.94	100	\$55.00
Tubing, Copper, 1/4" nom., type L, cleaned	ft.	\$0.37	MRC #07-5981-4 20ft	\$7.41	150	\$55.50
Elbow, Copper, 90 degree, 2" nom.	ea.	\$3.39	MRC #07-2556-S	\$3.39	10	\$33.90
Elbow, Copper, 90 degree, 1" nom.	ea.	\$0.74	MRC #07-2551-S	\$0.74	10	\$7.40
Elbow, Copper, 90 degree, 3/4" nom.	ea.	\$0.32	MRC #07-2550-S	\$0.32	10	\$3.20
Elbow, Copper, 90 degree, 3/8" nom.	ea.	\$0.37	MRC #07-2547-S	\$0.37	10	\$3.70
Elbow, Copper, 90 degree, 1/4" nom.	ea.	\$0.40	MRC #07-2546-S	\$0.40	10	\$4.00
Elbow, Copper, 45 degree, 1" nom.	ea.	\$1.31	MRC #07-2011-S	\$1.31	10	\$13.10
Tee, Copper, 2" nom.	ea.	\$6.78	MRC #07-5716-0	\$6.78	10	\$67.80
Tee, Copper, 1" nom.	ea.	\$2.10	MRC #07-5711-0	\$2.10	10	\$21.00
Tee, Copper, 3/4" nom.	ea.	\$0.55	MRC #07-5694-S	\$0.55	10	\$5.50
Tee, Copper, 3/8" nom.	ea.	\$0.91	MRC #07-5672-S	\$0.91	10	\$9.10
Tee, Copper, 1/4" nom.	ea.	\$0.85	MRC #07-5644-S	\$0.85	10	\$8.50
Reducer Coupling, Copper, 2" x 1"	ea.	\$3.01	MRC #07-5024-0	\$3.01	6	\$18.06
Reducer Coupling, Copper, 3/4" x 3/8"	ea.	\$0.50	MRC #07-4991-S	\$0.50	6	\$3.00
Reducer Coupling, Copper, 3/4" x 1/4"	ea.	\$0.42	MRC #07-5028-4	\$0.42	6	\$2.52
Adapter, Straight, Male 1/4" x 1/4" NPT	ea.	\$1.70	MRC #07-0022-SMRC #	\$1.70	12	\$10.00
Adapter, Straight, Male 3/8" x 1/4" NPT	ea.	\$1.07	MRC #07-0053-S	\$1.07	12	\$12.84
Adapter, Straight, Male 3/4" x 3/4" NPT	ea.	\$0.78	MRC #07-0063-S	\$0.78	12	\$9.36
Adapter, Straight, Male 2" x 2" NPT	ea.	\$4.29	MRC #07-0045-S	\$4.29	12	\$51.48
Adapter, Straight, Male 3/8" x 1/2" NPT	ea.	\$0.52	MRC #07-0026-S	\$0.52	15	\$7.80
Connector, Male, Brass, 1/2" x 1/4" NPT	ea.		Swagelok #B-810-1-4		12	\$0.00
Connector, Brass, Male, 7/8" tube x 3/4" NPT	ea.		Swagelok #B-1410-1-12		12	\$0.00
Connector, Male, Brass, 3/8" OD x 1/8" NPT	ea.		Swagelok #B-600-1-2		12	\$0.00
						\$1,487.25

Single Purge System Material Requirements

Material Description/Equipment List	Unit	Price/Unit	Stock #	Stock Price	Quantity	Total
Regulator, Pressure, Fisher #S-100, with 3/16" orifice, 3/4" female NPT, Range 3-5" H2O	ea.	\$70.00	Fisher #S-100		1	\$70.00
Regulator, Vacuum, Fisher #V612P-21, with 5/8" Orifice, 2" female NPT, Range 1-3" H2O Vacuum	ea.	\$539.00	Fisher #612P-21		1	\$539.00
Filter, Mupro #SS-4FW-VCR-2 with 1/4" Male VCR connections	ea.	\$40.00	Mupro #SS-4FW-VCR-2		1	\$40.00
Bubbler, Left Unit, with 2" pipes. See MRC Drawing#FSC-18310	ea.	\$1,000.00			1	\$1,000.00
Bubbler, Right Unit with 2" pipes. See MRC Drawing#FSC-18310	ea.	\$1,000.00			1	\$1,000.00
Chamber, Ion with 1/4" female VCR connections, MRC #FSE-20228-1 thru 4, & AYE-B50027	ea.		Ransbottom		1	\$0.00
Pump, vacuum, Thomas Industries Inc., Model #107CA18TFE	ea.	\$122.00	Thomas #107CA18TFE		1	\$122.00
Regulator, Pressure, Schrader, 1/2" NPT.	ea.	\$40.21	MRC #07-5033-7	\$40.21	1	\$40.21
						\$0.00

2811.21

Single Purge System Material Requirements

Material Description/Valve List	Unit	Price/Unit	Vendor/Stock #	Stock Price	Quantity	Total
Valve, Ball, 2" Sch. 10SST Pipe, full port. Worcester Miser #2-5966RTBW1ends for 2-1/8" o.d. tube	ea.	\$550.00	Worcester #2"-5966RTBW1		1	\$550.00
Valve, Ball, 3/4" Worcester, #411TTE. Brass, with tube socket ends for 7/8" o.d. tube	ea.	\$80.00	Worcester #3/4"-411TTE		1	\$80.00
Valve, Ball, Hoke #712266B with Teflon seats and 3/8" Gyrolok connections both ends	ea.	\$40.00	Hoke #3/8"-712266B		2	\$80.00
Valve, Ball, 3/8" Worcester, #411TTE, Brass with tube socket end for 1/2" o.d. tube	ea.	\$60.00	Worcester #3/8"-411TTE		2	\$120.00
Valve, Check, 3/4", Brass Circle Seal #25986PP, with 3/4" FPT connections, cracking pressure 0.5-1 psi.	ea.	\$130.00	Circle Seal #3/4"-25986PP		1	\$130.00
Valve, Ball, 3/8" Worcester #411TTE, Brass, with #A-34S actuator and tube socket ends	ea.	\$280.00	Worcester #3/8"-411TTE, #A-34S		5	\$1,400.00
Valve, Ball, 1" Worcester, #1"-A466RTBWM1 w/series 39 pneumatic actuator #1039SNMZ, MC	ea.	\$550.00	Worcester #1"-A466RTBWM1 #1039SNMZ		1	\$550.00
Valve, Ball, Hoke, #712264Y, SS with Teflon seats and 1/4" gyrolok connections both ends	ea.	\$65.00	Hoke #1/4"-712264Y SS		5	\$325.00
Valve, Ball, 1" Worcester, #411TTE, Brass, with tube socket ends for 1-1/8" o.d. tube	ea.	\$150.00	Worcester #1"-411TTE		1	\$150.00
						\$3,385.00

Single Purge System Material Requirements

Material Description/Instrument List	Unit	Price/Unit	Vendor/Stock #	Stock Price	Quantity	Total
Flowmeter, Dwyer, Ratemaster RMB-50 with 1/4" female NPT connections & valve for flow control. Range 1-10 SCFH	ea.	\$30.00	Dwyer Ratemaster RMB-50		1	\$30.00
Flowmeter, Dwyer Ratemaster #RMB-57 with 1/4" female NPT connections & valve for flow control, Range 60-600 SCFH		\$30.00	Dwyer Ratemaster RMB-57		1	\$30.00
Flowmeter, Dwyer Ratemaster RMB-52-TMV. with 1/4" female NPT connections & valve for flow control, Range 2-20 SCFH		\$30.00	Dwyer Ratemaster RMB-52		1	\$30.00
Tritium Monitor, Chassis, MRC #FSC22434, FSE-22433, & AYE-B50027			Ransbottom			Ransbottom
Gage, Pressure, Range 0-15" H2O with 1/4" male NPT bottom connection Ashcroft #1190-02L	ea.	\$30.00	Ashcroft #1190-02L		1	\$30.00
Switch, Differential Pressure, Dwyer Photohelic, with remote mounted relay and relays de-energized until limit reached, range 2-0-2" H2O	ea.	Salyer	Dwyer Photohelic		2	Salyer
Switch, Differential Pressure, Dwyer Photohelic, with remote mounted relay and relays de-energized until limit reached, range 5-0-5" H2O	ea.	Salyer	Dwyer Photohelic		2	Salyer
Oxygen Analyzer	ea.	Ransbottom				Ransbottom
			Misc.			\$120.00
						\$240.00

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jun-89
AES NO. J01294	DOE/AL AUTHORIZATION # D-79		AES TITLE NFM - M. P. & C. (Electrical)			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM	TASK No. L-50	Project TEC 246,550	Bud. Ser. No 99023
HP No. (Assignee) 0665	ENG. GRP. G-2	Assignee Ph. No. 3129		Date Prepared 6-15-89	Date Required 7-1-92	Rev. No.
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		650	\$22.00	\$14,300	162	FY: 1989 \$9,794
Drafting		650	\$16.00	\$10,400	160	FY: 1990 \$30,000
Inspection			\$18.00	\$0		FY: 1991 \$104,365
Overhd. @ 60%			60%	\$14,820		FY: 1992 \$102,395
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		1,300		\$39,520		Total \$246,550
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	1
Foreman		200	\$19.00	\$3,800		Engineering \$3,564
Planner		400	\$19.00	\$7,600		Drafting \$2,560
Carpenter			\$16.00	\$0		Inspection \$0
Electrician		4000	\$16.00	\$64,000		Eng Overhd \$3,670
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder		16	\$16.00	\$256		TITLE III TOTAL \$9,794
Mason			\$16.00	\$0		Trades \$0
Laborer			\$10.00	\$0		Elec-Tech \$0
A/C Mechanic			\$16.00	\$0		Machinists \$0
H/D Operator			\$16.00	\$0		Overhead \$0
Other			\$16.00	\$0		PO Mat's \$0
Trades Labor		4,616		\$75,660	0	Whse Mat'l \$0
Electronic Tech.			\$15.00	\$0		Contract \$0
Machine Shop			\$18.00	\$32		TITLE III TOTAL \$0
Total Labor		4,616		\$75,690	0	TOTAL \$9,794
Overhd. @ 60%			60%	\$45,410	60%	ROUTING:
PO Mat'ls & Eq. by MRC				\$80,000		PROJ. MGT. CONT: _____
Warehouse Mat'ls				\$5,930		PROJ. MGR.: _____
Out Cont'r E/C 49						AES CONTROL: _____
TITLE III SUBTOTAL				\$207,030		ACCOUNTING: _____
TITLE I & II SUBTOTAL				\$39,520		PROJ. ENG. <i>L. Salys</i>
TOTAL ESTIMATE				\$246,550		NFMD1294.WK1

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 1 of

ENGINEER L. SALYER		PLANNER		TRADE START DATE				INSTALLATION LOCATION					
PROJECT TITLE		MAT'L. PREP. (L-41/L-42)		AES 0J-01294		MGR #		LEDGER 2320		ICC		IEC	
FILE NAME-MT129401								[] EXPENSE 4810		[X] CAPITAL 2320		IL00	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE		LOC.		ADDITIONAL INFORMATION				
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST		
1	CIRCUIT BREAKER, SQUARE D		IEA	36	IT	IT-2	88	DUCELLMAN ELECTRIC				\$8.00	\$288.00
2	HARDWARE, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		ILT	1	IT	IT-2	88					\$2,000.00	\$2,000.00
3	HARDWARE, MOTOR STARTERS, CONTACTORS, PNL. P.B. & ECT		ILT	1	IT	IT-2	88					\$1,000.00	\$1,000.00
4	VENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLS.		IEA	8	IT	IT-2	88	ELECTRONICS COMPONENTS INC				\$1,200.00	\$9,600.00
5	COMPRESSOR (LOCAL) COMBINATION CONTROLLER		IEA	1	IT	IT-2	88	ALL-PHASE ELECTRIC				\$550.00	\$550.00
6	COMPRESSOR (REMOTE) COMBINATION CONTROLLER		IEA	1	IT	IT-2	88	ALL-PHASE ELECTRIC				\$550.00	\$550.00
7	PINCH WELDER CABLE, 4/0		ILT	1	IT	IT-2	88	BECKER ELECTRIC				\$100.00	\$100.00
8	PINCH WELDER JUMPER CABLE HARDWARE KIT		ILT	1	IT	IT-2	88	BECKER ELECTRIC				\$100.00	\$100.00
9	TRANSFORMER(FORGE), KIRKHOF, 75KVA, #64475MS6486X		IEA	1	IT	IT-2	88	KIRKHOF				\$2,100.00	\$2,100.00
10	SHUNT, CURRENT, 15000 AMPERE		IEA	1	IT	IT-2	88	HOLD IND., DIV./CPD ENG,				\$2,550.00	\$2,550.00
11													\$0.00
12													\$0.00
13													\$0.00
14													\$0.00
15													\$0.00
16													\$0.00

\$18,838.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALTER

Date Requested

Page 2 of

ENGINEER L. SALTER

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE MAT'L. PREP. (L-49) I AES #J-01294 I HSR # I LEDGER 2320 I ICC I EC
FILE NAME-MT129402 I JEPENSE 4810 I XJCAPITAL 2320 I IL00

MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY	STORAGE	LOC.	UNIT OF ISSUE	DOCK	ROOM	ADDITIONAL INFORMATION		
									DEL. DATE	UNIT COST	TOTAL COST
17	VENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLs.		2	IT	IT-2	IEA		88 ELECTRONIC COMPONENTS INC.		\$1,200.00	\$2,400.00
18	CUTLER HAMMER PROGRAMMABLE CONTROLLER # D100CRA28		8	IT	IT-2	IEA		88 BECKER ELECTRIC		\$400.00	\$3,200.00
19	CUTLER HAMMER EPROM MEMORY MODULE # D100EE28		8	IT	IT-2	IEA		88 BECKER ELECTRIC		\$100.00	\$800.00
20	DNWER PHOTOHELIC SWITCH/GAGE # 2-0-2 (3304)		8	IT	IT-2	IEA		88 DNWER		\$250.00	\$2,000.00
21	DNWER PHOTOHELIC SWITCH/GAGE # 5-0-5 (3310)		8	IT	IT-2	IEA		88 DNWER		\$250.00	\$2,000.00
22	SAMPLE VALVE PUSHBUTTON (6 PER SYSTEM)		48	IT	IT-2	IEA		88 IALL-PHASE ELECTRIC		\$35.00	\$1,680.00
23	RESET PUSHBUTTON (1 PER SYSTEM)		8	IT	IT-2	IEA		88 IALL-PHASE ELECTRIC		\$35.00	\$280.00
24	PILOT RELAYS (3 PER SYSTEM)		24	IT	IT-2	IEA		88 IALL-PHASE ELECTRIC		\$20.00	\$480.00
25	PILOT LAMP (1 PER SYSTEM)		8	IT	IT-2	IEA		88 IALL-PHASE ELECTRIC		\$20.00	\$160.00
26	MISCELLANEOUS WIRE, HARDWARE & OTHER MATERIALS		8	IT	IT-2	ILT		88		\$200.00	\$1,600.00
27											\$0.00
28											\$0.00
29											\$0.00
30											\$0.00
31											\$0.00
32											\$0.00

\$14,600.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALVER

Date Requested

Page 3 of

ENGINEER L. SALVER

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE MAT'L. PREP. (L-50)
FILE NAME-MT29403

AES #0-01294

MSR #

LEDGER 2320

JEPENSE 4810

XJCAPITAL 2320

ICC

IEC

MAT'L
LIST
NO.

DESCRIPTION

MRC STOCK
NUMBER OR
PURCHASE ORDER
NUMBER

UNIT
OF
ISSUE

QUANTITY

STORAGE

LOC.

DOCK

ROOM

ADDITIONAL INFORMATION

DEL.
DATE

UNIT
COST

TOTAL
COST

33	LIBRRT POWER CONDITIONER # CAASOC W/VCHP OPTION	IEA	1	IT	IT-2	88	DUPTIME SOLUTIONS	15000.00	\$15,000.00
34	CIRCUIT BREAKER, SQUARE D, HIGH CAP., FC TYPE	IEA	1	IT	IT-2	88	DUPELLMAN ELECTRIC	600.00	\$600.00
35	BREAKER PANEL, TYPE SQUARE D NQOD, W/BREAKERS	IEA	1	IT	IT-2	88	DUPELLMAN ELECTRIC	1000.00	\$1,000.00
36									\$0.00
37									\$0.00
38									\$0.00
39									\$0.00
40									\$0.00
41									\$0.00
42									\$0.00
43									\$0.00
44									\$0.00
45									\$0.00
46									\$0.00
47									\$0.00
48									\$0.00

\$16,600.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 4 of

ENGINEER L. SALYER		PLANNER		TRADE START DATE				INSTALLATION LOCATION			
PROJECT TITLE MAT'L. PREP. (L-43) FILE NAME-MT129404		AES #J-01294		MSR #		LEDGER 2320 []EXPENSE 4810 [X]CAPITAL 2320		ICC IL00		IEC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
49	ICUTLER HAMMER PROGRAMMABLE CONTROLLER # D100CRA28		IEA	2	IT	IT-2	88	BECKER ELECTRIC		\$400.00	\$800.00
50	ICUTLER HAMMER EEPROM MOULE # D100EE28		IEA	2	IT	IT-2	88	BECKER ELECTRIC		\$100.00	\$200.00
51	ICUTLER HAMMER PROGRAMMER PANEL # D100DG10A		IEA	1	IT	IT-2	88	BECKER ELECTRIC		\$425.00	\$425.00
52	IVENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLS.		IEA	6	IT	IT-2	88	ELECTRONIC COMPONENTS INC.		\$1,200.00	\$7,200.00
53	IMOTOR STARTERS, ALLEN BRADLEY # 509-TAXD		IEA	4	IT	IT-2	88	ALL-PHASE ELECTRIC		\$125.00	\$500.00
54	IMOTOR CONTROLLER HEATER ELEMENTS(ALLEN BRADLEY)		IEA	4	IT	IT-2	88	ALL-PHASE ELECTRIC		\$6.00	\$24.00
55	IAC CONTACTOR (OVFN), ALLEN BRADLEY # 500AAD92		IEA	1	IT	IT-2	88	ALL-PHASE ELECTRIC		\$125.00	\$125.00
56	IHEAT LIMITERS, BUSS # WKH		IEA	6	IT	IT-2	88	BECKER ELECTRIC		\$5.00	\$30.00
57	IREEPTACLE, 250 VOLT, DUPLES LOCKING, HUBBELL # 4553		IEA	5	IT	IT-2	88	BECKER ELECTRIC		\$20.00	\$100.00
58	IPLUG, LOCKING, 250 VOLT, HUBBELL # 4570C		IEA	5	IT	IT-2	88	BECKER ELECTRIC		\$7.00	\$35.00
59	IREEPTACLE, SINGLE, LOCKING 125 VOLT, HUBBELL # 4710		IEA	2	IT	IT-2	88	BECKER ELECTRIC		\$10.00	\$20.00
60	IPLUG, LOCKING, 125 VOLT, HUBBELL # 4720C		IEA	2	IT	IT-2	88	BECKER ELECTRIC		\$7.00	\$14.00
61	IHardware, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		ILT	1	IT	IT-2	88	-----		\$2,000.00	\$2,000.00
62	ICIRCUIT BREAKERS, SQUARE D (1-POLE)		IEA	36	IT	IT-2	88	DUELLMAN ELECTRIC		\$6.00	\$216.00
63	ICIRCUIT BREAKERS, SQUARE D (2 POLE)		IEA	6	IT	IT-2	88	DUELLMAN ELECTRIC		\$16.00	\$96.00
64	IMOTOR CONTROL, MANUAL, ALLEN BRADLEY # 600-TQX109		IEA	6	IT	IT-2	88	ALL-PHASE ELECTRIC		\$40.00	\$240.00

\$12,025.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALVER

Date Requested

Page 5 of

ENGINEER L. SALVER		IPLANNER		TRADE START DATE				INSTALLATION LOCATION					
PROJECT TITLE MAT'L PREP. (L-44) FILE NAME-MT129405		AES #J-01294		MSR #		LEDGER 2320 [] EXPENSE 4810		[X] CAPITAL 2320		ICC IL00		IEC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE		LOC.		ADDITIONAL INFORMATION				
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST		
65	ICUTLER HAMMER PRPGRAMMABLE CONTROLLER # D100CRA28		IEA	1	IT	IT-2	88	BECKER ELECTRIC			\$400.00	\$400.00	
66	ICUTLER HAMMER EEPROM MODULE # D100EE28		IEA	1	IT	IT-2	88	BECKER ELECTRIC			\$100.00	\$100.00	
67	ICUTLER HAMMER PROGRAM PANEL # D100DG10A		IEA	1	IT	IT-2	88	BECKER ELECTRIC			\$425.00	\$425.00	
68	IVENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLS.		IEA	6	IT	IT-2	88	ELECTRONIC COMPONENTS INC.			\$1,200.00	\$7,200.00	
69	IDWYER PHOTOHELIC SWITCH/GAGE # 2-0-2 (3304)		IEA	1	IT	IT-2	88	IDWYER			\$250.00	\$250.00	
70	IDWYER PHOTOHELIC SWITCH/GAGE # 5-0-5 (3310)		IEA	1	IT	IT-2	88	IDWYER			\$250.00	\$250.00	
71	IMOTOR STARTERS, ALLEN BRADLEY # 509-TAXD		IEA	18	IT	IT-2	88	ALL-PHASE ELECTRIC			\$125.00	\$2,250.00	
72	IMOTOR CONTROLLER HEATER ELEMENTS (ALLEN BRADLEY)		IEA	8	IT	IT-2	88	ALL-PHASE ELECTRIC			\$6.00	\$48.00	
73	IAC CONTACTOR (OVEN), ALLEN BRADLEY # 500AAD92		IEA	1	IT	IT-2	88	ALL-PHASE ELECTRIC			\$125.00	\$125.00	
74	IMOTOR CONTROLLER, ALLEN BRADLEY # 512-CAB24		IEA	4	IT	IT-2	88	ALL-PHASE ELECTRIC			\$600.00	\$2,400.00	
75	IHEAT LIMITER, BUSS # WKH]		IEA	6	IT	IT-2	88	BECKER ELECTRIC			\$10.00	\$60.00	
76	IRECEPTACLE, DUPLEX, LOCKING 250V, HUBBELL # 4553		IEA	3	IT	IT-2	88	BECKER ELECTRIC			\$20.00	\$60.00	
77	IPLUG, LOCKING, 250V HUBBELL # 4570-C		IEA	5	IT	IT-2	88	BECKER ELECTRIC			\$7.00	\$35.00	
78	IRECEPTACLE, LOCKING, 125V, HUBBELL # 4710		IEA	2	IT	IT-2	88	BECKER ELECTRIC			\$10.00	\$20.00	
79	IPLUG, LOCKING, 125V, HUBBELL # 4720-C		IEA	2	IT	IT-2	88	BECKER ELECTRIC			\$7.00	\$14.00	
80	ICIRCUIT BREAKER, SQUARE D, (2-POLE		IEA	6	IT	IT-2	88	BECKER ELECTRIC			\$16.00	\$96.00	

\$13,733.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALVER

Date Requested

Page 6 of

ENGINEER L. SALVER		PLANNER		TRADE START DATE				INSTALLATION LOCATION			
PROJECT TITLE MAT'L. PREP. (L-44)		AES NJ-01294		MSR #		LEDGER 2320		ICC		IEC	
FILE NAME-MT129406						[]EXPENSE 4810		[X]CAPITAL 2320		IL00	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.		ADDITIONAL INFORMATION				
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
81	CIRCUIT BREAKER, SQUARE D, (1-POLE)		IEA	36	IT	IT-2	88	DUCELLMAN ELECTRIC		\$8.00	\$288.00
82	MOTOR CONTROL, MANUAL, ALLEN BRADLEY # 600-TQX109		IEA	4	IT	IT-2	88	ALL-PHASE ELECTRIC		\$40.00	\$160.00
83	HARDWARE, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		ILT	1	IT	IT-2	88	-----		\$3,000.00	\$3,000.00
84	COMPRESSOR CONTROLLER (2-STAGE), ALLEN BRADLEY		IEA	1	IT	IT-2	88	ALL-PHASE ELECTRIC		\$1,200.00	\$1,200.00
85	SAFETY SWITCH (LATHE), CUTLER HAMMER # DH361F6K		IEA	1	IT	IT-2	88	BECKER ELECTRIC		\$200.00	\$200.00
86	FUSES, SAFETY SWITCH, COMB. STARTERS & SWITCHES		IEA	18	IT	IT-2	88	BECKER ELECTRIC		\$6.00	\$108.00
87	CIRCUIT BREAKER, SQUARE D, HIGH CAP., TYPE FC		IEA	7	IT	IT-2	88	DUCELLMAN ELECTRIC		\$600.00	\$4,200.00
88											\$0.00
89											\$0.00
90											\$0.00
91											\$0.00
92											\$0.00
93											\$0.00
94											\$0.00
95											\$0.00
96											\$0.00

\$9,156.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALTER

ENGINEER L. SALTER

Date Requested

PLANNER

Page 7 of

PROJECT TITLE MAT'L. PREP. (L-50 CALDRIMETER) AES #J-01294										MSR #		LEDGER 2320		JEXPENSE 4810		XCAPITAL 2320		ICC		IEC	
FILE NAME-MT129407																					
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE		LOC.		ADDITIONAL INFORMATION		DEL. DATE	UNIT COST	TOTAL COST								
			UNIT OF ISSUE	#OF UNITS	IBD	DOCK	ROOM														
97	CONDUIT, CONDUIT FITTINGS, WIRE & MISC. FOR CAL. INST.		1	1	1	1	1	1	1	1	1	1	1								
98			1	1	1	1	1	1	1	1	1	1	1								
99			1	1	1	1	1	1	1	1	1	1	1								
100			1	1	1	1	1	1	1	1	1	1	1								
101			1	1	1	1	1	1	1	1	1	1	1								
102			1	1	1	1	1	1	1	1	1	1	1								
103			1	1	1	1	1	1	1	1	1	1	1								
104			1	1	1	1	1	1	1	1	1	1	1								
105			1	1	1	1	1	1	1	1	1	1	1								
106			1	1	1	1	1	1	1	1	1	1	1								
107			1	1	1	1	1	1	1	1	1	1	1								
108			1	1	1	1	1	1	1	1	1	1	1								
109			1	1	1	1	1	1	1	1	1	1	1								
110			1	1	1	1	1	1	1	1	1	1	1								
111			1	1	1	1	1	1	1	1	1	1	1								
112			1	1	1	1	1	1	1	1	1	1	1								

\$1,000.00

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01302	DOE/AL AUTHORIZATION # D - 79		AES TITLE: NFM - HMSS HISTORICAL MAT'L STORAGE & SAMPLING			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 246	TASK No. L61	Project TEC \$664,300	Bud. Ser. No 99024
HP No. (Assignee) 4974/9139	ENG. GRP. N4	Assignee Ph. No. 4874		Date Prepared 7/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		2,960	\$22.00	\$65,120	660	FY: 1989 \$36,800
Drafting		4,240	\$16.00	\$67,840	530	FY: 1990 \$95,500
Inspection		2,880	\$18.00	\$51,840		FY: 1991 \$414,000
Overhd. @ 60%			60%	\$110,880		FY: 1992 \$118,000
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		10,080		\$295,680		Total \$664,300
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		320	\$19.00	\$6,080		Engineering \$14,520
Planner		320	\$19.00	\$6,080		Drafting \$8,480
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$13,800
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		
Mason			\$16.00	\$0		TITLE I/II TOT \$36,800
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other		4280	\$16.00	\$68,480		Overhead \$0
Trades Labor		4,920		\$80,640	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		4,920		\$80,640	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$48,380	60%	TOTAL \$36,800
PO Mat'ls & Eq. by MRC				\$224,600		ROUTING:
Warehouse Mat'ls				\$15,000		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$368,620		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$295,680		ACCOUNTING: _____
TOTAL ESTIMATE				\$664,300		PROJ. ENG. _____
						AES4.wk1 2/9/89 NFME1302

PROJECT COST ESTIMATE SUMMARY

U.S. DEPARTMENT OF ENERGY MOUND FACILITY				BUDGET YEAR 89-93	SHEET OF
BASIS OF ESTIMATE Check One (w/date):		☐ Conceptual Design ☐ Budget Data Sheet ☐ Des. Crit. ☐ Req./Dir	☐ Prel. Prop. ☐ EWO (Outside) ☐ Spec. Eng. Study	ENGINEER 9139	CONST. YEAR
PROJECT TITLE NFM-HMSS				ESTIMATOR	CHECKED BY / DATE THIS EST.
DESCRIPTION	ENG HR/\$	DRAFT HRS/\$	TRADES HRS/\$	SUB-TOTAL	TOTAL
FIXTURING DESIGN + FABRICATION					
1. G PARTITION DESIGNS	40	240	540		
2. RACKS / FREEZER	40	160	320		
3. HISTORICAL / MATL HANDLING	80	240	600		
4. SHELVES / FREEZER	40	240	240		
5. SLIDING TABLES	40	160	240		
6. MISC. FIXTURING	80	320	640		
7. STORAGE / ROOM TEMP	80	240	320		
8. TRANSP, SYST / PASSOVER	40	120	200		
SUBTOTAL	440/10,000	1720/28K	3100/50K	5260/86,800	
OH @ 60%					
DESIGN (~1920 hr/yr.)					
1. FREEZER SPEC, DEV. (3 DWGS)	100	300			
2. PROCESS DESIGN	100	300			
a) DETAILED PIPING LAYOUT (5')	125	400			
b) HP Analysis / Tritium Safety /	200	200			
c) LOGIC / Op.	100				
3. Racking	250	200			
4. Special Vision Syst.	250	300			
5. Tagging Design	250	225			
6. Project Coordination	250				
7. Paper Work 200 pg. 15 hr	300				
8. HVAC 1/2 % 30% F4 40 70% F4 91	600	600			
SUBTOTAL	2520/55,550	2525/55,550	1180/18880		
FIELD ENG + INSP (1 ENG, 75% for 2 yrs)					
	2880/63360				
TOTAL	5845/128,540	4240/67,410	4280/68,480		14,370 HRS

13-Jul-89

Material List

NFM-HMSS

Requestor

Phone

Date Requested 05-Mar-85

Page 1 of

2

Engr.		MOTZ,DR		Planner *		Trades start date		YMD TRD S		Location *			
Pro. Title		NFM-HMSS		ESO*		MSR *		Ledg *		CC*		EC*	
No.	Description			QUANTITY		BASIS/REFERENCE						Unit Cost	Total Cost
				Unit	No.								
1	PUMP,VANE MRC DWG. FSD-18889			ea	1	EXP						\$15,000.00	\$15,000
													\$0
2	PUMP,MOLECULAR DRAG ALCATEL #MDP5010				2	VENDOR						\$2,800.00	\$5,600
													\$0
3	VOLUME,SAMPLE,SINGLE ENDED, 10ML WHITEY, SSS-4CS-TW-10-EP				2	VENDOR						\$100.00	\$200
													\$0
4	VOLUME,CALIBRATED STANDARD,25ML WHITEY #SS-4CS-TW-25-EP				3	VENDOR						\$100.00	\$300
													\$0
5	VOLUME,TANK,2ML				1	EST						\$100.00	\$100
													\$0
6	VOLUME,TANK,5ML				1	EST						\$100.00	\$100
													\$0
7	VOLUME,TANK,50ML				1	EST						\$100.00	\$100
													\$0
8	VOLUME,TANK,150ML				1	EST						\$100.00	\$100
													\$0
9	VOLUME,TANK,250ML				1	EST						\$100.00	\$100
													\$0
10	VOLUME,TANK,4 GAL				2	90MH FAB 75% \$ OF 40L TANK						\$2,250.00	\$4,500
													\$0
11	VOLUME,TANK,40L				1	120 MH FAB (WUSTNER,SCHMIT) @60%OH						\$3,000.00	\$3,000
													\$0
12													\$0
													\$0
13													\$0
													\$0
													\$0

Sum page 1

\$29,100

Material List

Requestor *

Phone *

Date Requested *

Page 2 of

2

Engr. MOTZDR		Planner *		Trades start date *		Location *	
Pro. Title NFM-HMSS		ESO*	MSR *	Ledg *	CC*	EC	*
No.	Description	QUANTITY				Unit Cost	Total Cost
		Unit	No.				
14	DISC, RUPTURE, 50PSIA	EA	3	WURSTNER		\$700.00	\$2,100
							\$0
15	DISC, RUPTURE, 225PSIA		3			\$700.00	\$2,100
							\$0
16	DISC, RUPTURE, 1000PSIA		1			\$700.00	\$700
							\$0
17	DISC, RUPTURE, 3000PSIA		1			\$700.00	\$700
							\$0
18	FITTINGS AND TUBING		1	SIMILAR EXP JOB TERF SUBPROJ		\$12,000.00	\$12,000
							\$0
19	OVEN, 65-225 C, EXT. 30" W X 24" D X 32" H, GRAITY		7	PRECISION QUOTE, 3 MONTH DEL		\$700.00	\$4,900
	INT. 25X19X19, PRECISION#STG145, MODIFIED						\$0
	DOOR, LIGHT, SHELVES						\$0
20	OVEN, 60-225C, EXT. 24" W X 18" D X 32" H, GRAVIT		2	PRECISION QUOTE, 3 MONTH DEL			\$0
	INT. 19X14X19, PRECISION#STG80, MODIFIED						\$0
	DOOR, LIGHT, SHELVES						\$0
21	FREEZER, CUSTOM DESIGN, 26X50X11		10	CINCINNATI SUBZERO APPROX.			\$100,000
				\$10,000 DOUBLE STAGE-5			\$0
				\$8K SINGLE STAGE-5			\$0
22	SAMPLE CHILLER, VARIABLE TEMP CONTROL, 0-(-50) C		1	ASSUMPT: FREEZER 10K ; SETS ENVIRON. CHAMBER 25K. 90% WORST CASE=23K		\$23,000.00	\$23,000
							\$0
23	VISION/TAGGING SYSTEM		1	VISION/TAGGING PRODUCT INFO SEE PROJ FILE		\$40,000.00	\$40,000
							\$0
24	VALVES, BELLOWS, HP, BALL			72 VALVES ON PROCESS DIAGRAMS		\$27,000.00	\$0
				75% NUPRO, 20% HP, 5% OTHER			\$0
				ASSUMED 72 (\$380/VALVE)			\$0
25							\$0
							\$0
26							\$0
							\$0

Sum page 2 \$185,500

Sum page 1,2 \$214,600

Material List

Requestor

Phone**Date Requested**

Page 1 of

1

Engr.		MOTZ,DR		Planner *		Trades start date		YMD TRD S		Location *	
Pro. Title		NFM-HMSS		ESO*		MSR *		Ledg *		CC*	
(FIXTURING MATERIALS)										EC*	
No.	Description	QUANTITY		BASIS/REFERENCE							
	FIXTURING MATERIALS	Unit	No.							Unit Cost	Total Cost
1	6 PARTITION DESIGNS	ea	1	DOBBINS						\$2,000.00	\$2,000.00
2	RACKS/FREEZERS		1	"						\$2,000.00	\$2,000.00
3	HISTORICAL MATL HANDLING		1							\$5,000.00	\$5,000.00
4	SHELVES,FREEZER		1							\$2,000.00	\$2,000.00
5	SLIDING TABLES		1							\$2,000.00	\$2,000.00
6	MISC. FIXTURING		1							\$5,000.00	\$5,000.00
7	STORAGE/ROOM TEMPERATURE RACKING		1							\$5,000.00	\$5,000.00
8	TRANSPORTATION SYSTEM/PASSOVER		1							\$2,000.00	\$2,000.00

Sum page 1	\$25,000
------------	----------

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date: Jul-89
AES NO. J01303	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-HMS-CALORIMETRY			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 259	TASK No. L21	Project TEC \$282,760	Bud. Ser. No 99024
HP No. (Assignee) 5502	ENG. GRP. N4	Assignee Ph. No. 4127		Date Prepared 7/5/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		2,800	\$22.00	\$61,600	400	FY: 1989 \$14,290
Drafting		400	\$16.00	\$6,400	8	FY: 1990 \$90,000
Inspection			\$18.00	\$0		FY: 1991 \$167,470
Overhd. @ 60%			60%	\$40,800		FY: 1992 \$11,000
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		3,200		\$108,800		Total \$282,760
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		24	\$19.00	\$460		Engineering \$8,800
Planner		24	\$19.00	\$460		Drafting \$128
Carpenter		80	\$16.00	\$1,280		Inspection \$0
Electrician		32	\$16.00	\$512		Eng Overhd \$5,360
Mechanic		320	\$16.00	\$5,120		Out Eng. \$0
Pipefitter		40	\$16.00	\$640		
Painter			\$16.00	\$0		
Welder		40	\$16.00	\$640		TITLE III TOT \$14,290
Mason			\$16.00	\$0		
Laborer		160	\$10.00	\$1,600		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		720		\$10,710	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop		2400	\$18.00	\$43,200		Contract \$0
Total Labor		3,120		\$53,910	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$32,350	60%	TOTAL \$14,290
PO Mat'ls & Eq. by MRC				\$86,500		
Warehouse Mat'ls				\$1,200		
Out Cont'r E/C 49						
TITLE III SUBTOTAL				\$173,960		ROUTING:
TITLE I & II SUBTOTAL				\$108,800		PROJ. MGT. CONT: _____
TOTAL ESTIMATE				\$282,760		PROJ. MGR.: _____
						AES CONTROL: _____
						ACCOUNTING: _____
						PROJ. ENG. <i>BNK</i>
						AES4.wk1 2/9/89 NFME1303

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J01303	AES TITLE NFM BSN 99024 (Historical Only)	AES ASSIGNEE P. W. KASPERSKI	DATE OF ESTIMATE 7/3/89
----------------------	--	---------------------------------	----------------------------

[illegible]

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date: Jul-89
AES NO. J01304	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-HMSS-ENVIRONMENTAL CHAMBERS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 253	TASK No. L62	Project TEC \$40,500	Bud. Ser. No 99024
HP No. (Assignee) 5352	ENG. GRP. N4	Assignee Ph. No. 5505		Date Prepared 27-Jun-89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		400	\$22.00	\$8,800	104	FY: 1989 \$4,074
Drafting		40	\$16.00	\$640	16	FY: 1990 \$11,146
Inspection			\$18.00	\$0		FY: 1991 \$25,330
Overhd. @ 60%			60%	\$5,660		FY: 1992
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		440		\$15,100		Total \$40,550
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		40	\$19.00	\$760		Engineering \$2,288
Planner		40	\$19.00	\$760		Drafting \$256
Carpenter			\$16.00	\$0		Inspection \$0
Electrician		80	\$16.00	\$1,280		Eng Overhd \$1,530
Mechanic		136	\$16.00	\$2,176		Out Eng. \$0
Pipefitter		144	\$16.00	\$2,304		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE III TOT \$4,074
Mason		80	\$16.00	\$1,280		Trades \$0
Laborer		64	\$10.00	\$640		Elec-Tech \$0
A/C Mechanic			\$16.00	\$0		Machinists \$0
H/D Operator			\$16.00	\$0		Overhead \$0
Other		24	\$16.00	\$384		PO Mat's \$0
Trades Labor		608		\$9,580	0	Whse Mat'l \$0
Electronic Tech.			\$15.00	\$0		Contract \$0
Machine Shop			\$18.00	\$0		
Total Labor		608		\$9,580	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$5,750	60%	TOTAL \$4,074
PO Mat'ls & Eq. by EG&G				\$5,450		ROUTING:
Warehouse Mat'ls				\$4,670		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$25,450		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$15,100		ACCOUNTING: _____
TOTAL ESTIMATE				\$40,550		PROJ. ENG. <i>J. Seay</i>
						AES4.wk1 2/9/89: NFME1304

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J10113104		AES TITLE NFM- HMSS- ENVIRONMENTAL CHAMBERS		AES ASSIGNEE SLAY		DATE OF ESTIMATE 7/10/89	
-------------------------	--	--	--	----------------------	--	-----------------------------	--

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	*OTHER
1	Run 1/2" CHILLED WATER LINES HANGERS, ETC				\$ 2750				48											
2	Run 1/2" NITROGEN LINES, HANGERS, VALVES, ETC.				\$ 1920				48											
3	DISASSEMBLE THERMOTRONS FOR MOVE						16	32	16				40							
4	MOVE THERMOTRONS FROM SW to T-BLDG. REASSEMBLE						56	80					40	64						
5	INSULATE PIPING				\$ 2,250				16											
6	INSTALL ZERO PRESSURE DEVICE				\$ 2,000			24	16											
7	MISC. ASSOCIATED ACTIVITIES (TEMP PROBE, HEALTH PHYSICS, ETC)				\$ 1,200			8											24	
	TOTALS				\$ 10,120		80	136	144				80	64					24	

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jun-89
AES NO. J01305	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-HMSS-GLOVEBOXES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 246	TASK No. L65	Project TEC \$907,000	Bud. Ser. No 99024
HP No. (Assignee) 9682	ENG. GRP. N4	Assignee Ph. No. 3832		Date Prepared 6/16/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		400	\$22.00	\$8,800		FY: 1989 \$0
Drafting		36	\$16.00	\$580		FY: 1990 \$830,000
Inspection			\$18.00	\$0		FY: 1991 \$77,000
Overhd. @ 60%			60%	\$5,630		FY: 1992
Out. Eng. E/C 48		1,100	\$35.00	\$38,500		FY: 1993
Total Title I & II Estimate		1,536		\$53,500		Total \$907,000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		196	\$19.00	\$3,720		Engineering \$0
Planner		196	\$19.00	\$3,720		Drafting \$0
Carpenter		100	\$16.00	\$1,600		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$0
Mechanic		1900	\$16.00	\$30,400		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE III TOT \$0
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		2,392		\$39,440	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		2,392		\$39,440	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$23,660	60%	TOTAL \$0
PO Mat'ls & Eq. by MRC				\$789,400		ROUTING:
Warehouse Mat'ls				\$1,000		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$853,500		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$53,500		ACCOUNTING: _____
TOTAL ESTIMATE				\$907,000		PROJ. ENG. <i>M. A. Clift</i>
						AES4.wk1 2/9/89 NFME1305

AES DETAIL COST ESTIMATE (IN HOURS)

PAGE 2 OF 3

AES NUMBER		AES TITLE		AES ASSIGNEE		DATE OF ESTIMATE	
J101131015		FACILITIES - GLOVEBOXES		W. A. CLIFT		6/19/89	

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	OTHER
	<u>HISTORICAL MATERIAL</u>																			
	<u>OVEN STORAGE</u>																			
	GLOVEBOXES H1, H2, H3, H4, H5		5	41000	205,000	100		500												392
	<u>COLD STORAGE</u>																			
	GLOVEBOXES J3-J5, J7-J14		11	36000	396,000			924												
	<u>CALORIMETRY</u>																			
	GLOVEBOXES J6 & J15		2	22200	44,400			100												
	PASS BOX		1	6000	6,000			20												
	<u>PROCESS SAMPLE & FILL</u>																			
	SAMPLING - GLOVEBOX H6		1	41000	41,000			100												
	FILL - GLOVEBOX J1		1	45000	45,000			110												
	TRANSIENT - GLOVEBOX J2		1	18000	18,000			50												
	FUME HOOD FH-1		1	24000	24,000			60												
	PASS BOX		1	8000	8,000			30												
	<u>PAGE TOTAL</u>				787,400	100		1400												392

AES DET. ... COST ESTIMATE (IN HOURS)

Page 3 of 3

AES NUMBER J10131015	AES TITLE RCAP NFM SPECIAL FACILITIES - GLOVES/BOXES	AES ASSIGNEE W. A. CLIFT	PAGE 3 OF 3 DATE OF ESTIMATE 6/19/89
-------------------------	--	-----------------------------	--

[illegible]

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01306	DOE/AL AUTHORIZATION # D-79		AES TITLE H. M. S. TRITIUM MONITORS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 246	TASK No. L-66	Project TEC	Bud. Ser. No 99024
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220	Date Prepared 7/5/89	Date Required 9/30/89	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		160	\$22.00	\$3,520	32	FY: 1989 \$1,946
Drafting		160	\$16.00	\$2,560	32	FY: 1990 \$3,892
Inspection			\$18.00	\$0		FY: 1991 \$60,866
Overhd. @ 60%			60%	\$3,650		FY: 1992 \$41,866
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$0
Total Title I & II Estimate		320		\$9,730		Total \$108,570
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$704
Planner			\$19.00	\$0		Drafting \$512
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$730
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE III TOTAL \$1,946
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$0
Electronic Tech.		160	\$15.00	\$2,400		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		160		\$2,400	0	TITLE III TOTAL \$0
Overhd. @ 60%			60%	\$1,440	60%	TOTAL \$1,946
PO Mat'ls & Eq. by MRC				\$95,000		ROUTING:
Warehouse Mat'ls				\$0		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$98,840		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$9,730		ACCOUNTING: _____
TOTAL ESTIMATE				\$108,570		PROJ. ENG. _____
						NFME1306.WK1

fer to instruct. on reverse side.

MATERIAL LIST

equestor R.C. RANSBOTTOM

Date Requested

Page 1 of 1

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE	AES # J-01306 INFH HISTORICAL STUDIES TRITIUM MONITORS - (J-01301 L66	MSR #	LEDGER 2320 [EXPENSE 4810	CAPITAL 2320	CC L00	EC					
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
1	CHAMBER, TRITIUM MONITOR ROOM ION		EA	2						\$3,000	\$6,000
2	ENCLOSURE, TRITIUM MONITOR ROOM		EA	2						\$6,000	\$12,000
3	CHAMBER, TRITIUM MONITOR DUCT ION		EA	2						\$3,000	\$6,000
4	CHAMBER, TRITIUM MONITOR GLOVEBOX ION		EA	2						\$3,000	\$6,000
5	ANALYZER, PANAMETRICS SYSTEM 1/02 OXYGEN		EA	1						\$15,000	\$15,000
6	CABLE AND CONNECTORS		LT	1						\$3,000	\$3,000
7	TUBE, HASTINGS DV-36 GAGE		EA	2						\$300	\$600
8	CONTROLLER, HASTINGS CVT-16		EA	2						\$550	\$1,100
9	MISCELLANEOUS (10% OF TOTAL)		LT	1						\$9,000	\$9,000
10	CHASSIS, MAIN READOUT		EA	6						\$6,000	\$36,000
11											\$0
12											\$0
13											\$0
14											\$0
15											\$0
16											\$0

\$94,700

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01307	DOE/AL AUTHORIZATION # D-79		AES TITLE HMSS BOX SERVICES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 246	TASK No. L67	Project TEC \$75,580	Bud. Ser. No 99024
HP No. (Assignee) 4974	ENG. GRP. N4	Assignee Ph. No. 3309		Date Prepared 15-JULY-89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		568	\$22.00	\$12,500	80	FY: 1989 \$7,020
Drafting			\$16.00	\$0		FY: 1990 \$14,452
Inspection			\$18.00	\$0		FY: 1991 \$59,246
Overhd. @ 60%			60%	\$7,500		FY: 1992 \$42,082
Out. Eng. E/C 48		572	\$35.00	\$20,020	120	FY: 1993
Total Title I & II Estimate		1,140		\$40,020		Total 123000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		107	\$19.00	\$2,033		Engineering \$1,760
Planner		107	\$19.00	\$2,033		Drafting \$0
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$1,060
Mechanic		146	\$16.00	\$2,336		Out Eng. \$4,200
Pipefitter		1062	\$16.00	\$16,992		
Painter		363	\$16.00	\$5,808		
Welder		377	\$16.00	\$6,032		TITLE III TOT \$7,020
Mason			\$16.00	\$0		
Laborer		147	\$10.00	\$1,470		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other: Sheet Metal		42	\$16.00	\$672		Overhead \$0
Trades Labor		2,351		\$37,380	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		2,351		\$37,380	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$22,430	60%	TOTAL \$7,020
PO Mat'ls & Eq. by MRC				\$23,000		
Warehouse Mat'ls						
Out Cont'r E/C 49						
TITLE III SUBTOTAL				\$82,810		ROUTING:
TITLE I & II SUBTOTAL				\$40,020		PROJ. MGT. CONT: _____
TOTAL ESTIMATE				\$122,830		PROJ. MGR.: _____
						AES CONTROL: _____
						ACCOUNTING: _____
						PROJ. ENG. _____
						AES4.wk1 2/9/89: BB

ESO DETAIL COST ESTIMATE - TRADES

Page 1 of

ESO NUMBER <u>J011307</u>	ESO TITLE <u>HMS Box SERVICES (L-67)</u>	ESO ASSIGNEE <u>JIM STRONG</u>	DATE OF ESTIMATE <u>7/15/87</u>
------------------------------	---	-----------------------------------	------------------------------------

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	MATERIAL			CARPEN- TER 310	ELECTRI- CIAN 311	MECHANIC 312	PIPE- FITTER 313	SHEET- METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRON- IC TECH. 321	MACHINE SHOP 322	• OTHER	•• ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
<u>1</u>	<u>ROOM T-246 GAS SERVICES</u>																
	<u>IN SUPPORT OF GLOW BOX</u>																
	<u>OPERATIONS</u>																
	<u>REQUIRED ITEMS</u>																
	<u>VALVE, CHECK 1/2"</u>	<u>2</u>	<u>120</u>	<u>240</u>													
<u>2</u>	<u>VALVE, WORCESTER BALL 1/2"</u>	<u>19</u>	<u>45</u>	<u>855</u>													
<u>3</u>	<u>VALVE, WORCESTER BALL 1/4"</u>	<u>4</u>	<u>38</u>	<u>152</u>													
<u>4</u>	<u>VALVE, SOLENOID, 3/4"</u>	<u>2</u>	<u>100</u>	<u>200</u>													
<u>5</u>	<u>ORIFICE, FLOW RESTRICTOR</u>	<u>7</u>	<u>75</u>	<u>525</u>													
<u>6</u>	<u>FILTER, SCHRAEDER BELLWIS</u>	<u>2</u>	<u>100</u>	<u>200</u>													
<u>7</u>	<u>GAGE, PRESSURE INCHROFT</u>	<u>4</u>	<u>150</u>	<u>600</u>													
<u>8</u>	<u>REGULATOR, PRESSURE, 20 PSI INLET</u>	<u>2</u>	<u>75</u>	<u>150</u>													
<u>9</u>	<u>REGULATOR, PRESSURE, 300 PSI INLET</u>	<u>2</u>	<u>250</u>	<u>500</u>													
<u>10</u>	<u>LUBRICATOR, AIR</u>	<u>5</u>	<u>40</u>	<u>200</u>													
<u>11</u>	<u>COPPER TUBING - 250 L.F</u>		<u>.70/Ft</u>	<u>175</u>													
<u>12</u>	<u>FITINGS @ 15% TUBING</u>																
	<u>COST</u>																

MAC ML-3980 (11 86)
17 1148*INCLUDES AIR COND. MECH. H.D. OPER.,
LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

DISTRIBUTION. 1. ESO COORD. & CONTROL
2 ACCOUNTING3 ACCOUNTING
4 ESO ASSIGNEE

-707

ESO DETAIL COST ESTIMATE TRADES

Page 2 of 7

ESO NUMBER J1011307	ESO TITLE NASS BOX SERVICES (L-67)	ESO ASSIGNEE JIM STRONG	DATE OF ESTIMATE 7/5/69
------------------------	---------------------------------------	----------------------------	----------------------------

EQUIP OR MATERIAL ITEM NO	DESCRIPTION	MATERIAL			CARPEN-TER 310	ELECTRI-CIAN 311	MECHANIC 312	PIPE-FITTER 313	SHEET-METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRON-IC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
II	ROOM T-246 CHILL WATER																
	SERVICES INSUPPLY WATER																
	GROUNDWATER SPEAKERS L-67																
	REPAIRS ITEMS																
13	VALVE, BALL, PNEUMATIC 1/2"	34	250	8500.00													
14	VALVE, 1/2"	68	50	3400.00													
15	PETES PLUG	19	35	665.00													
16	SWITCH, WATER FLOW	17	150	2550.00													
17	GAUGE, PRESSURE	2	100	200.00													
18	THERMISTERS	2	23	46.00													
19	TANK, EXHAUSTION	17	35	595.00													
20	TUBING 1 1/2" DIA (175')		3.5'/FT	612.50													
21	TUBING 1/2" DIA (575')		.70'/FT	402.50													
22	TUBING 3/4" DIA (50')		1.00'/FT	50.00													
23	VALVE, BALL 3/4"		40														
24	VALVE, GLOBE 1"		60														
25	FITTINGS @ 15% TUBING			160.00													

ESO NUMBER 101131017 ESO TITLE NMSS BOX SERVICES (L-67) ESO ASSIGNEE JIM STRONG DATE OF ESTIMATE 7/15/89

EQUIP OR MATERIAL ITEM NO	DESCRIPTION	MATERIAL			CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPE-FITTER 313	SHEET-METAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECH. 321	MACHINE SHOP 322	OTHER	ESTIMATE SOURCE
		QTY.	UNIT COST	TOTAL COST													
II	Room T-246 CHILL WATER SERVICES (CONT.)																
	REQUIRED ITEMS																
	INSULATION FUEL																
	VALVES	68	1.70	10.20													
	SWITCHES	17	1.70	28.90													
	EXPOSITION TABLES	37	1.70	57.80													
	TUBING (800')	1.10		880													
	ADHESIVE			150.00													
	MATERIAL TOTAL			23,000													

WIC ML 3980-1186
11/148

*INCLUDES AIR COND MECH. H.D. OPER., LAB TECH., & GLASS BLOWER

**SEE REVERSE SIDE FOR CODES

DISTRIBUTION 1 ESO COORD. & CONTROL 2 ACCOUNTING

3 ACCOUNTING 4 ESO ASSIGNEE

1126.90

51 | Pipe and Fittings

151 400 | Copper Pipe & Tubing

401	1300	3" diameter	CREW	DAILY OUTPUT	MAN- HOURS	UNIT	BARE COSTS				TOTAL INCL O&P
							MAT.	LABOR	EQUIP.	TOTAL	
	1320	3-1/4" diameter	Q-1	28	571	L.F.	9.56	12.25		21.81	29
	1330	4" diameter		24	667		12.67	14.30		26.97	35
	1340	5" diameter		22	727		15.79	15.60		31.39	40
	1360	6" diameter		18	889		37.88	19.10		56.98	70
	1380	8" diameter	Q-2	23	1,040		53.47	23		76.47	93
	1390	For other than full hard temper, add		20	1,200		94.71	27		121.71	145
	1440	For silver solder, add					25%				
	1800	For medical clean, (oxygen class), add						15%			
	1950	To delete cplgs. & hngs., 1/4"-3/4" pipe, subtract					3.50%				
	1960	1/4"-1-1/4" pipe, subtract					27%	40%			
	1970	2"-6" pipe, subtract					14%	29%			
	1980	8" pipe, subtract					10%	31%			
	2000	Type L tubing, couplings & hangers 10' O.C.					19%	31%			
	2100	1/4" diameter	1 Plum	59	.136	L.F.	.48	3.23		3.71	5.30
	2120	3/8" diameter		56	.143		.65	3.41		4.06	5.70
	2140	1/2" diameter		53	.151		.75	3.60		4.35	6.10
	2160	5/8" diameter		49	.163		1.03	3.89		4.92	6.85
	2180	3/4" diameter		44	.182		1.11	4.34		5.45	7.60
	2200	1" diameter		36	.222		1.57	5.30		6.87	9.50
	2220	1-1/4" diameter		29	.276		2.11	6.60		8.71	12
	2240	1-1/2" diameter		27	.296		2.65	7.05		9.70	13.30
	2260	2" diameter		23	.348		3.95	8.30		12.25	16.50
	2280	2-1/2" diameter	Q-1	33	.485		5.75	10.40		16.15	22
	2300	3" diameter		30	.533		7.86	11.45		19.31	25
	2320	3-1/2" diameter		25	.640		10.92	13.75		24.67	32
	2340	4" diameter		23	.696		13.14	14.95		28.09	36
	2360	5" diameter		19	.842		33.88	18.10		51.98	64
	2380	6" diameter	Q-2	24	.1		41.47	22		63.47	78
	2400	8" diameter		21	1.140		72.71	25		97.71	115
	2410	For other than full hard temper, add					25%				
	2590	For silver solder, add						15%			
	2900	For medical clean, (oxygen class), add					3.50%				
	2940	To delete cplgs. & hngs., 1/4"-3/4" pipe, subtract					37%	43%			
	2950	1/4"-1" pipe, subtract					22%	39%			
	2960	1-1/4"-3" pipe, subtract					12%	27%			
	2970	3-1/2"-6" pipe, subtract					12%	37%			
	2980	8" pipe, subtract					24%	33%			
	3000	Type M tubing, couplings & hangers 10' O.C.									
	3100	1/4" diameter	1 Plum	61	.131	L.F.	.46	3.13		3.59	5.10
	3120	3/8" diameter		59	.135		.47	3.23		3.70	5.25
	3140	1/2" diameter		56	.143		.59	3.41		4	5.65
	3160	5/8" diameter		51	.157		.79	3.74		4.53	6.35
	3180	3/4" diameter		46	.174		.86	4.15		5.01	7.05
	3200	1" diameter		37	.216		1.21	5.15		6.36	8.90
	3220	1-1/4" diameter		30	.267		1.73	6.35		8.08	11.25
	3240	1-1/2" diameter		28	.286		2.37	6.80		9.17	12.60
	3260	2" diameter		24	.333		3.64	7.95		11.59	15.65
	3280	2-1/2" diameter	Q-1	35	.457		5.06	9.80		14.86	19.95
	3300	3" diameter		32	.500		6.54	10.75		17.29	23
	3320	3-1/2" diameter		27	.593		9.35	12.70		22.05	29
	3340	4" diameter		24	.667		11.64	14.30		25.94	34
	3360	5" diameter		20	.800		29.88	17.15		47.03	58
	3370	6" diameter	Q-2	25	.960		37.47	21		58.47	73
	3380	8" diameter		22	1.090		63.71	24		87.71	105
	3390	For other than full hard temper, add					25%				
	3440	For silver solder, add						15%			
	3950	For medical clean, (oxygen class), add					3.50%				

LABOR HOURS CHARGED TO ESO J00444
 TO COPY ENTER PRNTR # HP #
 TITLE: UTILITY PIPING (C)

DATE 07/17/89 TIME 09=33 PAGE 01
 MENU RETURN ENTER PF1 OR PF13

JOB CODE	DESCRIPTION	CUR-MTH HRS	EST HRS	LTD HRS	OVER/ UNDER
1010	ENGINEER			69	69-
2010	ENGINEER			1683	1683-
	TOTAL ENGINEERING			1752	1752-
2030	DRAFTSMAN			2033	2033-
	TOTAL DRAFTING			2033	2033-
2040	FOREMAN			275	275-
2080	PLANNER			301	301-
2100	CARPENTER			85	85-
2110	ELECTRICIAN			81	81-
2120	MECHANIC			370	370-
2130	PIPEFITTER			2698	2698-
2140	SHEETMETAL			105	105-
2150	PAINTER			921	921-
2160	WELDER			956	956-
2170	MASON			32	32-
2180	LABORER			373	373-

BASIS FOR LABOR HOURS

<u>AES #</u>	<u>PROJECT</u>	<u>BOX LENGTH</u>	<u>LABOR HRS</u>
J00444	KYLE	330 LF	ACTUAL
J01267	TOTA	50 LF	EST
J01290	MPL	169 LF	EST
J01307	HMS	130 LF	EST.

* LABOR HRS HAVE BEEN DIVIDED BASED
 ON THE OVERALL GLOVEBOX LENGTH EACH
 ACTIVITY MUST SUPPORT

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01308	DOE/AL AUTHORIZATION # D-79		AES TITLE H. M. S. INSTRUMENTATION			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 246	TASK No. L-68	Project TEC	Bud. Ser. No 99024
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220	Date Prepared 6/26/89	Date Required 9/30/89	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		1,920	\$22.00	\$42,240	288	FY: 1989 \$14,959
Drafting		960	\$16.00	\$15,360	144	FY: 1990 \$39,134
Inspection			\$18.00	\$0		FY: 1991 \$148,628
Overhd. @ 60%			60%	\$34,560		FY: 1992 \$139,480
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$0
Total Title I & II Estimate		2,880		\$92,160		Total \$342,200
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$6,336
Planner			\$19.00	\$0		Drafting \$2,304
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$5,184
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE VII TOTAL \$13,824
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$1,135
Electronic Tech.		960	\$15.00	\$14,400		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		960		\$14,400	0	TITLE III TOTAL \$1,135
Overhd. @ 60%			60%	\$8,640	60%	TOTAL \$14,959
PO Mat'ls & Eq. by MRC				\$227,000		ROUTING:
Warehouse Mat'ls						PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$250,040		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$92,160		ACCOUNTING: _____
TOTAL ESTIMATE				\$342,200		PROJ. ENG. _____
						NFME1308.WK1

ML-7093A (2/89)

Refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 1 of 3

ENGINEER R.C.RANSBOTTOM				PLANNER		TRADE START DATE		INSTALLATION LOCATION			
PROJECT TITLE		AES # J-01308 (J-01301 L61)		MSR #		LEDGER 2320 (EXPENSE 4810 [X]CAPITAL 2320		CC L00		EC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	UNIT OF ISSUE	QUANTITY	STORAGE	LOC.	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST
1	DATAPAC, DAYTRONIC 10K6		EA	2						\$7,500	\$15,000
2	DATAPAC, DAYTRONIC 10K4T-D		EA	4						\$3,000	\$12,000
3	BOARD, DAYTRONIC #10A11 I/C PROCESSOR		EA	6						\$200	\$1,200
4	BOARD, DAYTRONIC #10A9-8 I/C CONDITIONER		EA	3						\$600	\$1,800
5	MONITOR, DAYTRONIC #10VCH19A		EA	2						\$2,800	\$5,600
6	BOARD, DAYTRONIC #10A72-2 STRAIN GAGE CONDITIONER		EA	5						\$500	\$2,500
7	BOARD, DAYTRONIC #10B10-16 LOGIC I/O		EA	4						\$600	\$2,400
8	CARD, DAYTRONIC #10BDR64 HISTORY		EA	2						\$1,800	\$3,600
9	CARD, DAYTRONIC #10BDA SATELLITE INTERFACE		EA	2						\$1,800	\$3,600
10	CARD, DAYTRONIC #10BD1 SATELLITE SLAVE		EA	4						\$1,400	\$5,600
11	MONITOR, DAYTRONIC #10VCH14		EA	3						\$1,800	\$5,400
12	CARD, DAYTRONIC #10VFO132 FORMATTED OUTPUT		EA	2						\$700	\$1,400
13	PROCESSOR, DAYTRONIC #10CVIOP VIDEO I/O		EA	2						\$500	\$1,000
14	COMPUTER, COMPAQ 386 W/ACCESSORIES		EA	1						\$10,000	\$10,000
15	CARD, DAYTRONIC #10BHM128/256/384 HISTORY MEMORY		EA	3						\$1,200	\$3,600
16	TUBE, HASTINGS VAC GAGE #DV-36		EA	6						\$300	\$1,800

refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 2 of 3

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE										AES # J-01308										MSR #										LEDGER 2320										CC										EC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
NFM HISTORICAL STUDIES INSTRUMENTATION - (J-01301 L61)										(J-01301 L61)																				[JEXPENSE 4810										[X]CAPITAL 2320										L00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
MAT'L LIST NO.										DESCRIPTION										MRC STOCK NUMBER OR PURCHASE ORDER NUMBER										QUANTITY										STORAGE LOC.										ADDITIONAL INFORMATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
																														UNIT OF ISSUE										#OF UNITS										BD										ROOM										DEL. DATE										UNIT COST										TOTAL COST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
17										READOUT, HASTINGS #86-6																				EA										3																																																												\$525										\$1,575																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
18										CONTROLLER, HASTINGS #CVT-16																				EA										3																																																																																\$550										\$1,650																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
19										THERMOCOUPLES, SINGLE K-TYPE																				EA										12																																																																																																				\$30										\$360																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
20										THERMOCOUPLES, DUAL K-TYPE																				EA										24																																																																																																														\$50										\$1,200																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
21										BOARD, DAYTRONIC #10A16-4 RTD CONDITIONER																				EA										3																																																																																																																																												\$500										\$1,500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
22										SENSOR, BARATRON #390H-S002 PRESSURE 0-1000 TORR																				EA										2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 3 of 3

ENGINEER R.C.RANSBOTTOM			PLANNER			TRADE START DATE			INSTALLATION LOCATION			
PROJECT TITLE	AES # J-01308		MSR #	LEDGER 2320		[]EXPENSE 4810		[X]CAPITAL 2320		CC L00	EC	
NFM HISTORICAL STUDIES INSTRUMENTATION - (J-01301 L61)												
MAT'L LIST NO.	DESCRIPTION		MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.		ADDITIONAL INFORMATION				
				UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
33	CONTROLLER, GE PLC SERIES 1+			EA	1						\$5,000	\$5,000
34	SOFTWARE, ARCHIVING			EA	1						\$10,000	\$10,000
35	VOLTMETER, KEITHLEY 195A			EA	1						\$2,000	\$2,000
36	CONTROL, PID TEMPERATURE			EA	11						\$900	\$9,900
37	SUPPLY, POWER LAMBDA 10V			EA	3						\$300	\$900
38	CABLE & CONNECTORS			LT	1						\$9,000	\$9,000
39	MISCELLANEOUS (10% OF TOTAL)			LT	1						\$15,000	\$15,000
40												\$0
41												\$0
42												\$0
43												\$0
44												\$0
45												\$0
46												\$0
47												\$0
48												\$0

\$165,585

fer to instructions on reverse side.

MATERIAL LIST

requestor R.C. RANSBOTTOM

Date Requested

Page 1 of 2

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE	AES # J-01308 (J-01301 L62)		MSR #	LEDGER 2320 [] EXPENSE 4810		[X] CAPITAL 2320		ICC ILOO	IEC		
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
1	1 DATAPAC, DAYTRONIC 10K6		1EA	1						\$7,500	\$7,500
2	1 DATAPAC, DAYTRONIC 10K4T-D		1EA	1						\$3,000	\$3,000
3	1 BOARD, DAYTRONIC #10A11 T/C PROCESSOR		1EA	1						\$200	\$200
4	1 BOARD, DAYTRONIC #10A9-8 T/C CONDITIONER		1EA	4						\$600	\$2,400
5	1 MONITOR, DAYTRONIC #10VCM14		1EA	2						\$1,800	\$3,600
6			1EA	0						\$0	\$0
7	1 BOARD, DAYTRONIC #10B10-16 LOGIC I/O		1EA	2						\$600	\$1,200
8	1 CARD, DAYTRONIC #10B0R64 HISTORY		1EA	1						\$1,800	\$1,800
9	1 CARD, DAYTRONIC #10BD4 SATELLITE INTERFACE		1EA	1						\$1,800	\$1,800
10	1 CARD, DAYTRONIC #10BD1 SATELLITE SLAVE		1EA	1						\$1,400	\$1,400
11			1EA	0						\$0	\$0
12	1 CARD, DAYTRONIC #10VFO132 FORMATTED OUTPUT		1EA	1						\$700	\$700
13	1 PROCESSOR, DAYTRONIC #10CVIOP VIDEO I/O		1EA	1						\$500	\$500
14	1 COMPUTER, COMPAQ 386 W/ACCESSORIES		1EA	1						\$10,000	\$10,000
15	1 CARD, DAYTRONIC #10BHM128/256/384 HISTORY MEMORY		1EA	1						\$1,200	\$1,200
16			1EA	0						\$0	\$0

Refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 2 of 2

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE : NFM ENVIRONMENTAL CHAMBERS INSTRUMENTATION - LG2
 : AES # J-01301 : MSR # : LEDGER 2320 : CC : EC
 : : : : : JEPENSE 4810 : XJCAPITAL 2320 : IL00

MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY			STORAGE		LOC.	ADDITIONAL INFORMATION		
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
17			IEA	0						\$0	\$0
18			IEA	0						\$0	\$0
19	THERMOCOUPLES, SINGLE K-TYPE		IEA	10						\$30	\$300
20	THERMOCOUPLES, DUAL K-TYPE		IEA	10						\$50	\$500
21	BOARD, DAYTRONIC #10A16-4 RTD CONDITIONER		IEA	3						\$500	\$1,500
22			IEA	0						\$0	\$0
23			IEA	0						\$0	\$0
24	CARD, DAYTRONIC #10VGM500 VIDEO GRAPHICS MEMORY		IEA	1						\$1,700	\$1,700
25	INTERFACE, OPT022		IEA	3						\$1,000	\$3,000
26	BOARD, DAYTRONIC #10A60-4 VOLTAGE CONDITIONER		IEA	2						\$450	\$900
27	ANNUNCIATOR		IEA	1						\$2,000	\$2,000
28	SOFTWARE, DAYTRONIC SUPERPAC IV		IEA	1						\$2,000	\$2,000
29	CONTROLLER, GE PLC SERIES 1+		IEA	1						\$5,000	\$5,000
30	CABLES & CONNECTORS		ILT	1						\$2,000	\$2,000
31	MISCELLANEOUS (10% OF TOTAL)		ILT	1						\$6,000	\$6,000
32										\$0	\$0

\$60,200

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01309		DOE/AL AUTHORIZATION # D79		AES TITLE NFM - HMSS Box Purge		
H.P.No. (Proj. Mgr.) 4421	PROJECT No. 301	BLDG. T	ROOM 246	TASK No. L69	Project TEC \$107,780	Bud. Ser. No 99024
HP No. (Assignee) 5376	ENG. GRP. N4	Assignee Ph. No. 3449		Date Prepared 7/12/89	Date Required 10/92	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		507	\$22.00	\$11,150	80	FY: 1989 \$7,180
Drafting		113	\$16.00	\$1,800	16	FY: 1990 \$31,500
Inspection			\$18.00	\$0		FY: 1991 \$58,100
Overhd. @ 60%			60%	\$7,770		FY: 1992 \$11,000
Out. Eng. E/C 48		840	\$35.00	\$29,400	113	FY: 1993
Total Title I & II Estimate		1,460		\$50,120		Total \$107,780
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL
Foreman		84	\$19.00	\$1,596		Engineering \$1,760
Planner		84	\$19.00	\$1,596		Drafting \$256
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$1,210
Mechanic		112.5	\$16.00	\$1,800		Out Eng. \$3,955
Pipefitter		450	\$16.00	\$7,200		
Painter		113	\$16.00	\$1,800		
Welder		450	\$16.00	\$7,200		TITLE III TOT \$7,180
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		1,293		\$21,190	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		1,293		\$21,190	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$12,710	60%	TOTAL \$7,180
PO Mat'ls & Eq. by MRC				\$23,760		
Warehouse Mat'ls						ROUTING:
Out Cont'r E/C 49						PROJ. MGT. CONT:
TITLE III SUBTOTAL				\$57,660		PROJ. MGR.:
TITLE I & II SUBTOTAL				\$50,120		AES CONTROL:
TOTAL ESTIMATE				\$107,780		ACCOUNTING:
						PROJ. ENG.
						AES4.wk1 2/9/ NFME1309

ML-7093A (2/89)

AES NUMBER J1011309	AES TITLE HMISS Box PURGE	AES ASSIGNEE S.A. RAISOR	DATE OF ESTIMATE 6/89
------------------------	------------------------------	-----------------------------	--------------------------

№ 2380 (6 кб)
17.1.44

* "HAPPY" AIR (COND) MATH PROBLEMS
... THE "SILVER" COAST

100. 100. 100. 100.

1 AESCIEK
2 AESAS'U,i i

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jun-89
AES NO. J01310	DOE/AL AUTHORIZATION # D-79		AES TITLE NFM - H. M. S. (Electrical)			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM	TASK No. L-70	Project TEC 173,030	Bud. Ser. No 99024
HP No. (Assignee) 0665	ENG. GRP. G-2	Assignee Ph. No. 3129		Date Prepared 6-15-89	Date Required 7-01-92	Rev. No.
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	580	\$22.00	\$12,760	145	FY: 1989	\$8,690
Drafting	560	\$16.00	\$8,960	140	FY: 1990	\$26,000
Inspection		\$18.00	\$0		FY: 1991	\$70,040
Overhd. @ 60%		60%	\$13,030		FY: 1992	\$68,300
Out. Eng. E/C 48		\$35.00	\$0		FY: 1993	
Total Title I & II Estimate		1,140		\$34,750		Total \$173,030
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	1
Foreman	150	\$19.00	\$2,850		Engineering	\$3,190
Planner	300	\$19.00	\$5,700		Drafting	\$2,240
Carpenter		\$16.00	\$0		Inspection	\$0
Electrician	3800	\$16.00	\$60,800		Eng Overhd	\$3,260
Mechanic		\$16.00	\$0		Out Eng.	\$0
Pipefitter		\$16.00	\$0			
Painter		\$16.00	\$0		TITLE III TOTAL \$8,690	
Welder	16	\$16.00	\$256		Trades	\$0
Mason		\$16.00	\$0		Elec-Tech	\$0
Laborer		\$10.00	\$0		Machinists	\$0
A/C Mechanic		\$16.00	\$0		Overhead	\$0
H/D Operator		\$16.00	\$0		PO Mat's	\$0
Other		\$16.00	\$0		Whse Mat'l	\$0
Trades Labor	4,266		\$69,610	0	Contract	\$0
Electronic Tech.		\$15.00	\$0		TITLE III TOTAL \$0	
Machine Shop		\$18.00	\$0		TOTAL \$8,690	
Total Labor	4,266		\$69,610	0		
Overhd. @ 60%		60%	\$41,770	60%	ROUTING:	
PO Mat'ls & Eq. by MRC			\$25,000		PROJ. MGT. CONT: _____	
Warehouse Mat'ls			\$1,900		PROJ. MGR.: _____	
Out Cont'r E/C 49					AES CONTROL: _____	
TITLE III SUBTOTAL			\$138,280		ACCOUNTING: _____	
TITLE I & II SUBTOTAL			\$34,750		PROJ. ENG. <i>P. Salzer</i>	
TOTAL ESTIMATE			\$173,030		NFME1310	

ML-7093A (2/89)

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALVER

Date Requested

Page 1 of

ENGINEER L. SALVER		IPLANNER		TRADE START DATE		INSTALLATION LOCATION	
PROJECT TITLE HIST. MAT. STUDIES (L-69) FILE NAME-HT131001		AES 8J-01310		LEDGER 2320 EXPENSE 4810		XCAPITAL 2320	
MATERIAL LIST NO.		DESCRIPTION		QUANTITY		ADDITIONAL INFORMATION	
		MRC STOCK NUMBER OR PURCHASE ORDER NUMBER		UNIT OF ISSUE		LOC. DOCK ROOM	
1	CUTLER HAMMER PROGRAMMABLE CONTROLLER # D100CRA28		IEA	2	IT IT-2	88	BECKER ELECTRIC
2	CUTLER HAMMER EPROM MEMORY MODULE # D100EE28		IEA	2	IT IT-2	88	BECKER ELECTRIC
3	DWMYER PHOTOHELIC SWITCH/GAGE # 2-0-2 (#3304)		IEA	2	IT IT-2	88	DWMYER
4	DWMYER PHOTOHELIC SWITCH/GAGE # 5-0-5 (#3310)		IEA	2	IT IT-2	88	DWMYER
5	VENT-RAK CONTROL RACK W/CASTER BASE & CONTROL PHLS.		IEA	1	IT IT-2	88	ELECTRONIC COMPONENTS INC.
6	SAMPLE VALVE PUSHBUTTONS (6 PER SYSTEM)		IEA	12	IT IT-2	88	ALL-PHASE ELECTRIC
7	RESET PUSHBUTTON (1 PER SYSTEM)		IEA	2	IT IT-2	88	ALL-PHASE ELECTRIC
8	BACKFILL/OFF/VAC SWITCH (1 PER SYSTEM)		IEA	2	IT IT-2	88	ALL-PHASE ELECTRIC
9	PILOT LAMP (1 PER SYSTEM)		IEA	2	IT IT-2	88	ALL-PHASE ELECTRIC
10	MISCELLANEOUS WIRE, HARDWARE & OTHER MATERIAL		ILT	2	IT IT-2	88	
11							
12							
13							
14							
15							
16							

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 2 of

ENGINEER L. SALYER			PLANNER			TRADE START DATE			INSTALLATION LOCATION			
PROJECT TITLE HISTORICAL MATERIAL STUDIES(L-61) AEB #J-01310 FILE NAME-HT131002			MSR #	LEDGER 2320 []EXPENSE 4810 [X]CAPITAL 2320			ICC IL00	IEC				
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE		LOC.	ADDITIONAL INFORMATION				
			UNIT OF ISSUE	#OF UNITS	BD	DOCK		ROOM		DEL. DATE	UNIT COST	TOTAL COST
17	ICUTLER HAMMER PROGRAMMABLE CONTROLLER # D100CRA28		IEA	12	IT	IT-2	88	IBECKER ELECTRIC			\$400.00	\$4,800.00
18	ICUTLER HAMMER EEPROM MEMORY MODULE # D100EE28		IEA	12	IT	IT-2	88	IBECKER ELECTRIC			\$100.00	\$1,200.00
19	ICUTLER HAMMER PROGRAM PANEL # D100PB10A		IEA	2	IT	IT-2	88	IBECKER ELECTRIC			\$425.00	\$850.00
20	IVENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLS.		IEA	4	IT	IT-2	88	IELECTRONIC COMPONENTS INC			\$1,200.00	\$4,800.00
21	IMOTOR STARTERS, ALLEN BRADLEY # 509-TAXD		IEA	23	IT	IT-2	88	IALL-PHASE ELECTRIC			\$125.00	\$2,875.00
22	IMOTOR CONTROLLER HEATER ELEMENTS (ALLEN BRADLEY)		IEA	25	IT	IT-2	88	IALL-PHASE ELECTRIC			\$6.00	\$150.00
23	IAC CONTACTORS (OVENS) ALLEN BRADLEY # 500AAD92		IEA	11	IT	IT-2	88	IALL-PHASE ELECTRIC			\$125.00	\$1,375.00
24	IHEAT-LIMITERS, BUSS # WKH		IEA	18	IT	IT-2	88	IBECKER ELECTRIC			\$5.00	\$90.00
25	IRECEPTACLE, 250V DUPLEX LOCKING, HUBBELL # 4553		IEA	12	IT	IT-2	88	IBECKER ELECTRIC			\$20.00	\$240.00
26	IPLUG, LOCKING, 250V, HUBBELL # 4570-C		IEA	24	IT	IT-2	88	IBECKER ELECTRIC			\$7.00	\$168.00
27	IRECEPTACLE, SINGLE LOCKING 125V, HUBBELL # 4710		IEA	12	IT	IT-2	88	IBECKER ELECTRIC			\$10.00	\$120.00
28	IPLUG, LOCKING, 125V, HUBBELL # 4720-C		IEA	12	IT	IT-2	88	IBECKER ELECTRIC			\$7.00	\$84.00
29	IHardware, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		ILT	1	IT	IT-2	88	I-----			\$2,000.00	\$2,000.00
30	ICIRCUIT BREAKERS		IEA	36	IT	IT-2	88	I-----			\$8.00	\$288.00
31												\$0.00
32												\$0.00

\$19,040.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALTER

Date Requested

Page 3 of

ENGINEER L. SALTER

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE: HISTORICAL MATERIAL STUDIES(L-62) AES 83-01310
FILE NAME-MT131003

MSR #
LEDGER 2320
JEPENSE 4810 XJCAPITAL 2320

ICC
ILOO

ADDITIONAL INFORMATION

MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	UNIT OF ISSUE	QUANTITY	STORAGE	LOC.	DOCK	ROOM	DEL. DATE	UNIT COST	TOTAL COST
33	CIRCUIT BREAKERS, SQUARE D, 2 POLE		IEA	5	IT	IT-2		88	DUELLMAN ELECTRIC	\$16.00	\$80.00
34	CIRCUIT BREAKERS, SQUARE D, 1 POLE		IEA	10	IT	IT-2		88	DUELLMAN ELECTRIC	\$8.00	\$80.00
35	MISC. WIRE, HARDWARE AND OTHER MATERIAL		ILT	1	IT	IT-2		88		\$1,000.00	\$1,000.00
36	CUTLER HAMMER PROGRAMMABLE CONTROLLER # D100CRA28		IEA	1	IT	IT-2		88	BECKER ELECTRIC	\$400.00	\$400.00
37	CUTLER HAMMER EEPROM MEMORY MODULE # D100EE28		IEA	1	IT	IT-2		88	BECKER ELECTRIC	\$100.00	\$100.00
38	CONTACTOR, ALLEN BRADLEY # 500L-CAD92		IEA	4	IT	IT-2		88	ALL-PHASE ELECTRIC	\$300.00	\$1,200.00
39	SAFETY SWITCH, NON-FUSIBLE, CUTLER HAMMER # DH362UGK		IEA	4	IT	IT-2		88	BECKER ELECTRIC	\$200.00	\$800.00
40											\$0.00
41											\$0.00
42											\$0.00
43											\$0.00
44											\$0.00
45											\$0.00
46											\$0.00
47											\$0.00
48											\$0.00

\$3,660.00

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date: Jul-89
AES NO. J01313	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-CF-COLD PROCESS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 218 & 229	TASK No. L81	Project TEC \$769,090	Bud. Ser. No 99025
HP No. (Assignee) 4740	ENG. GRP. N4	Assignee Ph. No. 4358	Date Prepared 6/5/89	Date Required 4/93	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		2,500	\$22.00	\$55,000	800	FY: 1989 \$56,180
Drafting			\$16.00	\$0		FY: 1990 \$100,000
Inspection			\$18.00	\$0		FY: 1991 \$418,000
Overhd. @ 60%			60%	\$33,000		FY: 1992 \$194,910
Out. Eng. E/C 48		2,500	\$35.00	\$87,500	800	FY: 1993
Total Title I & II Estimate		5,000		\$175,500		Total \$769,090
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		275	\$19.00	\$5,230		Engineering \$17,600
Planner		275	\$19.00	\$5,230		Drafting \$0
Carpenter		80	\$16.00	\$1,280		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$10,560
Mechanic		900	\$16.00	\$14,400		Out Eng. \$28,000
Pipefitter		2338	\$16.00	\$37,408		
Painter		580	\$16.00	\$9,280		
Welder		1206	\$16.00	\$19,296		TITLE III TOT \$56,160
Mason			\$16.00	\$0		
Laborer		320	\$10.00	\$3,200		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other		120	\$16.00	\$1,920		Overhead \$0
Trades Labor		6,094		\$97,240	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		6,094		\$97,240	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$58,340	60%	TOTAL \$56,160
PO Mat'ls & Eq. by MRC				\$397,210		ROUTING:
Warehouse Mat'ls				\$40,800		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$593,590		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$175,500		ACCOUNTING: _____
TOTAL ESTIMATE				\$769,090		PROJ. ENG. _____
						AES4.wk1 2/9/89 NFMF1315

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J101131211		AES TITLE Cold Process (UFM)		AES ASSIGNEE Mark J. Schmidt		DATE OF ESTIMATE 6/8/89	
--------------------------	--	---------------------------------	--	---------------------------------	--	----------------------------	--

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	OTHER
	Ref: FSD-890540 SMT 4																			
	Service Distribution In T-229																			
1.	1/2" Check Valves		3 EA	\$60	\$180															
2.	1/2" Ball Valves		10 EA	\$50	\$500															
3.	1/2" Line Filters		3 EA	\$55	\$165															
4.	1/2" Pressure Regulators		6 EA	\$40	\$240				10			10								
5.	0-160 PSI & Press Gages		3 EA	\$20	\$60															
6.	Omit																			
7.	Tubing, Copper, 1/2" nom		30 LG	\$15	\$450				120			120								
8.	Tubing, Copper, 3/4" nom		5 LG	\$180	\$900				60			60								
9.	Tubing, Copper, 1" nom		10 LG	\$30	\$300				60			60								
10.	Tubing, Copper, 2" nom		5 LG	\$100	\$500				30			30								
11.	Omit								120			100								
12.	Painting & Labeling		1 Lot	\$100	\$100						200									
13.	Insulation Chilled Water Lines		160 FL	\$1.00	\$160				80											
14.	Unistrut Tube Support For Header		4 LG	\$25	\$100			80												
15.	Misc Fittings (15%)		1 Lot	\$600	\$600															
	Totals				\$4325			80	480		200									

AES DETAIL COST ESTIMATE (IN HOURS)

Page 1 of 2

AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE
J10113124	Cold Process (NFM)	Mark J. Schmidt	6/8/89

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE		QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	OTHER
							310	311	312	313	314	315	316	317	318	321	322	325	326		
	Ref: FSD-890540 SHT 5.																				
	Regulating Argon Atmospheric																				
1	1/2 Dr. Train Unit 40 SCFM	2	EA	18,000	\$36,000		8		8												
2	1/2 Dr. Train Filters	2	PR	460	\$920				2	2											
3	Bubblers	4	EA	210	\$840		40		60		40		40								
4	Fisher S-100 Regulators	3	EA	76	\$225					4											
5	Flowmeters (Dwyer)	3	EA	70	\$210					4											
6	Flowmeter (Fisher)	2	EA	140	\$280					2											
7	Valves, Ball, 1", Brass	7	EA	70	\$490					6			4								
8	Value, Ball, 3/4", Brass	5	EA	60	\$300					4			2								
9	Value, Ball, 1/2", Brass	15	EA	50	\$750					6			6								
10	Value, Ball, 1 1/2", SST	6	EA	220	\$1320					10			8								
11	Value, Ball, 3/8"	12	EA	45	\$550					4											
12	Vacuum Gages	2	EA	10	\$20					1											
13	Foreline Trap	2	EA	200	\$400					2											
14	Exhaust Filter For Vac Pumps	2	EA	120	\$240				8				4								
15	Passbar Relief Valves	2	EA	50	\$100				2												
16	Pete's Plug Assembly	4	EA	20	\$80					4											
17	1/2" Filter	1	EA	55	\$55					1											

Page 2 of 2

[illegible]

AES DETAIL COST ESTIMATE (IN HOURS)

Page 1 of 1

AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE
J1011321	Cold Process (NFM)	Mark Schmidt	6/8/87

EQUIP. OR MATL. ITEM NO.	DESCRIPTION REF: FSD-890540 SNTL	TYPE OF TRADE		QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	OTHER
							310	311	312	313	314	315	316	317	318	321	322	325	326		
	Inert G.B. Sampling System																				
1	1/2" Sample Filters (10 ea/Bar)			1 BX	\$125	\$125				2											
2	1/2" 1/4" Nupro Valves			21 EA	\$150	\$3150				8											
3	1/2" 1/8" Capillary Tubing			1000 FL	\$4	\$4000				80											
5	1/2" 1/4" OD Tubing			80 FL	\$150	\$120				16			16								
6	1/2" Cylinder Regulator			1 EA	\$150	\$150															
7	1/2" Rel. of & Check Valves			4 EA	\$50	\$200				4											
8	1/2" Flow indicators			2 EA	\$25	\$50				2											
9	Paint & Labeling			1 Lot	\$20	\$20						40									
10	Misc Fittings			1 Lot	\$1200	\$1200							40								
	Totals					\$9015				112		40	56								

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J1011321	AES TITLE Cold Process (NFM)	AES ASSIGNEE Mark J. Schmidt	DATE OF ESTIMATE 6/8/89
------------------------	---------------------------------	---------------------------------	----------------------------

EQUIP. OR MATL. ITEM NO.	DESCRIPTION REF: FSD890540 SMT 7	TYPE OF TRADE		QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	OTHER
							310	311	312	313	314	315	316	317	318	321	322	325	326		
	Forge Welder																				
1	P/E Forge Welder			1 EA	\$122,000	\$22,000	8		40												
2	P/E Pressure Regulator, 1/2"			1 EA	\$40	\$40				2											
3	P/E Valves, 1/2, 1/4"			8 EA	\$50	\$400				8			4								
4	P/E Gage Pressure			1 EA	20	\$20				2											
5	P/E Tubing, 1/4" copper			20 FL	0.50	\$10				8			8								
6	Misc Fitting			1 Lot	100	\$100				8			8								
7	Labeling & Painting			1 Lot	\$30	\$30						20									
	Totals					\$22,600	8		40	28		20	20								

AES DETAIL COST ESTIMATE (IN HOURS)

Page 1 of 1

AES NUMBER J101131211	AES TITLE Cold Process (NEM)	AES ASSIGNEE Mark J. S. L. d/t	DATE OF ESTIMATE 6/5/87
--------------------------	---------------------------------	-----------------------------------	----------------------------

EQUIP. OR MATERIAL ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST															
						310	311	312	313	314	315	316	317	318	321	322	325	326	SECURITY	*OTHER
	REF: F30890540 SHT 8																			
	"A" G.B. Atmospher																			
1	Plastic dross 5 Hrs		4 EA	\$200	\$800				4											
2	Plastic 1/2" Ball Valves		15 EA	\$50	\$750				6											
3	Plastic 5-100 Regulator		1 EA	\$75	\$75				4											
4	Plastic Flowmeters		2 EA	\$75	\$150				4											
5	Plastic Tubing 1/2" copper		29 Lg	\$15	\$430				8											
6	Misc Fittings		1 Lot	\$300	\$300				8											
7	Painting & Labeling		1 Lot	\$25	\$25															

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER J10113121	AES TITLE Cohd Prrrns (NFM)	AES ASSIGNEE M.A. J. Schmidt	DATE OF ESTIMATE 6/9/87
-------------------------	--------------------------------	---------------------------------	----------------------------

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	QTY.	UNIT COST	TOTAL COST	TYPE OF TRADE																
					CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	*OTHER		
	REF: FSD890540 SHT 9																				
	Hydrogen Blowdown System																				
1	Disconnect Equipment Located In R-169 Fumehood and Move To T-229	1 Lot	\$100	\$100			40	100					60								
2	Re-connect H2 Blowdown Equip ment In T-229 Fumehood	1 Lot	\$1000	\$1000			60	280			120										
3	Misc Fittings	1 Lot	\$1000	\$1000																	
4	Labeling & Painting	1 Lot	\$100	\$100						80											
	Totals			\$2200			100	380		80	120		60								

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE
J01013121	Cold Process (NFM)	Mark Schmidt	6/9/89

[illegible]

MI 3981.15.88)
1/11/

*INCLUDES - AIR COND MECH, H D OPER, LAB TECH, & GLASS BLOWER

DISTRIBUTION 1 AES CLERK
2 AFS ASSIGNEE

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER			AES TITLE		AES ASSIGNEE		DATE OF ESTIMATE													
51011321			Co/d Process (NFM)		Mark Schmidt		6/9/89													
AES DETAIL COST ESTIMATE (IN THOUSANDS)																				
EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE	QTY.	UNIT COST	TOTAL COST	CARPENTER 310	ELECTRICIAN 311	MECHANIC 312	PIPEFITTER 313	SHEETMETAL 314	PAINTER 315	WELDER 316	MASON 317	LABORER 318	ELECTRONIC TECHNICIAN 321	MACHINE SHOP 322	HEALTH SURVEYOR 325	DECONTAM WORKER 326	SECURITY	OTHER
	REF: 890510 SHT 12																			
	Proof & Leak																			
1	P/I Diaphragm Compressor		2 EA	\$8000	\$16,000			40												
2	P/I Bellows		2 EA	\$40,000	\$80,000			120												
3	P/I H.P. Valves (1/4")		15 EA	\$150	\$2250				80											
4	P/I 1/4" Nipo Valves		10 EA	\$150	\$1,500				80			80								
5	P/I 1 1/2 Pneumatic Valves		3 EA	\$400	\$1,200				20			20								
6	P/I Exhaust Filter		2 EA	\$400	\$800				20			20								
7	P/I 1/2" Ball Valves		3 EA	\$50	\$150				20											
8	P/I 1" Ball Valves		2 EA	\$70	\$140				20											
9	P/I Relief Valves		4 EA	\$100	\$400				40			20								
10	P/I Regulator		2 EA	\$200	\$400				10											
11	P/I Rupture Disk		2 EA	\$50	\$100				10											
12	P/I 1 1/2" Vacuum Valves		4 EA	\$350	\$1400				40			40								
13	P/I Safety Probe		2 EA	\$1500	\$3000				20			20								
14	Misc Fittings		1 Lot	\$2000	\$2000				120			80								
15	Labeling & Painting		1 Lot	\$200	\$200						100									
	Totals				\$109,540			160	480		100	280								

AES DET. COST ESTIMATE (IN HOURS)

AES NUMBER	AES TITLE	AES ASSIGNEE	DATE OF ESTIMATE
J 0 1 3 2 1	Cold Process (NFM)	Mark Schmidt	6/9/89

[illegible]

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jun-89
AES NO. J01315	DOE/AL AUTHORIZATION # D79		AES TITLE NFM-CF-GLOVEBOXES			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 229	TASK No. L85	Project TEC \$433,000	Bud. Ser. No 99025
HP No. (Assignee) 9682	ENG. GRP. N4	Assignee Ph. No. 3832		Date Prepared 6/19/89	Date Required 4/93	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		400	\$22.00	\$8,800		FY: 1989 \$0
Drafting		36	\$16.00	\$580		FY: 1990 \$360,000
Inspection			\$18.00	\$0		FY: 1991 \$73,000
Overhd. @ 60%			60%	\$5,630		FY: 1992
Out. Eng. E/C 48		1,100	\$35.00	\$38,500		FY: 1993
Total Title I & II Estimate		1,536		\$53,500		Total \$433,000
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		56	\$19.00	\$1,060		Engineering \$0
Planner		56	\$19.00	\$1,060		Drafting \$0
Carpenter		40	\$16.00	\$640		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$0
Mechanic		960	\$16.00	\$15,360		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		
Mason			\$16.00	\$0		TITLE III TOT \$0
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		1,112		\$18,120	0	PO Mat's \$0
Electronic Tech.			\$15.00	\$0		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		1,112		\$18,120	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$10,870	60%	TOTAL \$0
PO Mat'ls & Eq. by MRC				\$350,000		ROUTING:
Warehouse Mat'ls				\$510		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$379,500		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$53,500		ACCOUNTING: _____
TOTAL ESTIMATE				\$433,000		PROJ. ENG. <i>M. A. Clift</i>
						AES4.wk1 2/9/89 NFMF1315

AES DETAIL COST ESTIMATE (IN HOURS)

PAGE 2 OF 2

AES NUMBER J 01315	AES TITLE FCAP NFM GOLD PROCESS & DEUT. OPER.-GLOVEBOXES	AES ASSIGNEE W. A. CLIFT	DATE OF ESTIMATE 6/19/89
-----------------------	--	-----------------------------	-----------------------------

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE			QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	OTHER
								310	311	312	313	314	315	316	317	318	321	322	325	326		
	<u>COLD PROCESS</u>																					
	MICROBALANCE-GLOVEBOX M1	1	37000	37000	40					94												112
	GLOVEBOX M2	1	24000	24000						70												
	GLOVEBOX M3	1	24000	24000						70												
	FORGE WELD-GLOVEBOX M4	1	28000	28000						70												
	BELL JAR-GLOVEBOX M5	1	27000	27000						70												
	SHAKER TABLE-GLOVEBOX M6	1	24000	24000						70												
	BALANCE - GLOVEBOX M7	1	37000	37000						94												
	BALANCE - GLOVEBOX M8	1	37000	37000						94												
	TEE PASS BOX	1	20,000	20,000						70												
	MISCELLANEOUS MATES	-	-	1,000																		
	<u>DEUTERIUM OPERATIONS</u>																					
	GLOVEBOX N1	1	37000	37000						94												
	GLOVEBOX N2	1	24000	24000						70												
	GLOVEBOX N3	1	24000	24000						70												
	PASS BOX	1	6000	6000						24												
				350,000	40					960												112

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01316	DOE/AL AUTHORIZATION # D-79		AES TITLE C. F. MONITORS			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM	TASK No. L-86	Project TEC	Bud. Ser. No 99025
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220		Date Prepared 7/5/89	Date Required 9/30/89	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		120	\$22.00	\$2,640	24	FY: 1989 \$1,460
Drafting		120	\$16.00	\$1,920	24	FY: 1990 \$2,920
Inspection			\$18.00	\$0		FY: 1991 \$16,100
Overhd. @ 60%			60%	\$2,740		FY: 1992 \$11,700
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$0
Total Title I & II Estimate		240		\$7,300		Total \$32,180
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$528
Planner			\$19.00	\$0		Drafting \$384
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$550
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE III TOTAL \$1,462
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$0
Electronic Tech.		120	\$15.00	\$1,800		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		120		\$1,800	0	TITLE III TOTAL \$0
Overhd. @ 60%			60%	\$1,080	60%	TOTAL \$1,462
PO Mat'ls & Eq. by MRC				\$22,000		ROUTING:
Warehouse Mat'ls				\$0		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR.: _____
TITLE III SUBTOTAL				\$24,880		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$7,300		ACCOUNTING: _____
TOTAL ESTIMATE				\$32,180		PROJ. ENG. _____
						NFMF1316.WK1

Refer to instrul .15 on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 1 of 1

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT

TITLE : NFM COMPONENT FABRICATION MONITORS - (J-01312 LB6) : AES # J-01316 : MSR # : LEDGER 2320 : JCAPITAL 2320 : ICC : EC

MAT'L
LIST
NO.

DESCRIPTION

QUANTITY

STORAGE

LOC.

ADDITIONAL INFORMATION

UNIT
OF
ISSUE

#OF
UNITS

BD

DOCK

ROOM

DEL.
DATE

UNIT
COST

TOTAL
COST

1 ANALYZER, PANAMETRICS SYSTEM 1/02 OXYGEN

2 ICABLE AND CONNECTORS

3 MISCELLANEOUS (10% OF TOTAL)

4 ANALYZER, HYDROGEN/DEUTERIUM

5

6

7

8

9

10

11

12

13

14

15

16

\$21,500

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jul-89
AES NO. J01322	DOE/AL AUTHORIZATION # D-79		AES TITLE C. F. INSTRUMENTATION			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301	BLDG. T	ROOM 229	TASK No. L-88	Project TEC	Bud. Ser. No 99025
HP No. (Assignee) 4924	ENG. GRP. D-5	Assignee Ph. No. 4220		Date Prepared 6/26/89	Date Required 9/30/89	Rev. No. 0
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		1,440	\$22.00	\$31,680	216	FY: 1989 \$9,962
Drafting		320	\$16.00	\$5,120	48	FY: 1990 \$25,812
Inspection			\$18.00	\$0		FY: 1991 \$126,581
Overhd. @ 60%			60%	\$22,080		FY: 1992 \$126,581
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993 \$7,464
Total Title I & II Estimate		1,760		\$58,880		Total \$296,400
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	
Foreman			\$19.00	\$0		Engineering \$4,752
Planner			\$19.00	\$0		Drafting \$768
Carpenter			\$16.00	\$0		Inspection \$0
Electrician			\$16.00	\$0		Eng Overhd \$3,312
Mechanic			\$16.00	\$0		Out Eng. \$0
Pipefitter			\$16.00	\$0		
Painter			\$16.00	\$0		
Welder			\$16.00	\$0		TITLE VII TOTAL \$8,832.
Mason			\$16.00	\$0		
Laborer			\$10.00	\$0		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other			\$16.00	\$0		Overhead \$0
Trades Labor		0		\$0	0	PO Mat's \$1,130
Electronic Tech.		480	\$15.00	\$7,200		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		480		\$7,200	0	TITLE III TOTAL \$1,130
Overhd. @ 60%			60%	\$4,320	60%	TOTAL \$9,962
PO Mat'ls & Eq. by MRC				\$226,000		ROUTING:
Warehouse Mat'ls						PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR: _____
TITLE III SUBTOTAL				\$237,520		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$58,880		ACCOUNTING: _____
TOTAL ESTIMATE				\$296,400		PROJ. ENG. _____
						NFME1322.WK1

refer to instructions on reverse side.

MATERIAL LIST

Requestor R.C. RANSBOTTOM

Date Requested

Page 3 of 3

ENGINEER R.C. RANSBOTTOM

PLANNER

TRADE START DATE

INSTALLATION LOCATION

PROJECT TITLE INFM COLD PROCESS INSTRUMENTATION - (J-01312 L81)

AES # J-01322

MSR #

LEDGER 2320

[] EXPENSE 4810

[X] CAPITAL 2320

[] CC
[] L00

[] EC

MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION			
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST
33	MISCELLANEOUS (10% OF TOTAL)		LT	1						\$21,000	\$21,000
34											\$0
35											\$0
36											\$0
37											\$0
38											\$0
39											\$0
40											\$0
41											\$0
42											\$0
43											\$0
44											\$0
45											\$0
46											\$0
47											\$0
48											\$0

\$225,300

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date Jun-89
AES NO. J01323	DOE/AL AUTHORIZATION # D-79		AES TITLE NFM C. F. (Electrical)			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P-301 P-301	BLDG.	ROOM	TASK No. L-90	Project TEC 192,130	Bud. Ser. No 99025
HP No. (Assignee) 0665	ENG. GRP. G-2	Assignee Ph. No. 3129		Date Prepared 6/15/89	Date Required 2/1/93	Rev. No.
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering	600	\$22.00	\$13,200	150	FY: 1989	\$8,990
Drafting	580	\$16.00	\$9,280	145	FY: 1990	\$28,000
Inspection		\$18.00	\$0		FY: 1991	\$78,475
Overhd. @ 60%		60%	\$13,490		FY: 1992	\$59,255
Out. Eng. E/C 48		\$35.00	\$0		FY: 1993	\$17,414
Total Title I & II Estimate		1,180		\$35,970		Total \$192,130
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	1
Foreman	150	\$19.00	\$2,850		Engineering	\$3,300
Planner	300	\$19.00	\$5,700		Drafting	\$2,320
Carpenter		\$16.00	\$0		Inspection	\$0
Electrician	4000	\$16.00	\$64,000		Eng Overhd	\$3,370
Mechanic		\$16.00	\$0		Out Eng.	\$0
Pipefitter		\$16.00	\$0			
Painter		\$16.00	\$0			
Welder	16	\$16.00	\$256		TITLE III TOTAL \$8,990	
Mason		\$16.00	\$0		Trades	\$0
Laborer		\$10.00	\$0		Elec-Tech	\$0
A/C Mechanic		\$16.00	\$0		Machinists	\$0
H/D Operator		\$16.00	\$0		Overhead	\$0
Other		\$16.00	\$0		PO Mat's	\$0
Trades Labor	4,466		\$72,810	0	Whse Mat'l	\$0
Electronic Tech.		\$15.00	\$0		Contract	\$0
Machine Shop	32	\$18.00	\$580		TITLE III TOTAL \$0	
Total Labor	4,498		\$73,390	0	TOTAL \$8,990	
Overhd. @ 60%		60%	\$44,030	60%	ROUTING:	
PO Mat'ls & Eq. by MRC			\$35,000		PROJ. MGT. CONT: _____	
Warehouse Mat'ls			\$3,735		PROJ. MGR.: _____	
Out Cont'r E/C 49					AES CONTROL: _____	
TITLE III SUBTOTAL			\$156,160		ACCOUNTING: _____	
TITLE I & II SUBTOTAL			\$35,970		PROJ. ENG. <i>J. Salys</i>	
TOTAL ESTIMATE			\$192,130		NFMF1323	

ML-7093A (2/89)

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALYER

Date Requested

Page 1 of

ENGINEER L. SALYER		IPLANNER		TRADE START DATE				INSTALLATION LOCATION					
PROJECT TITLE COLD PROCESS (L-81) FILE NAME-MT132301		AES #J-01323		MSR #		LEDGER 2320 []EXPENSE 4810		[X]CAPITAL 2320		ICC IL00		IEC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	QUANTITY		STORAGE LOC.			ADDITIONAL INFORMATION					
			UNIT OF ISSUE	#OF UNITS	BD	DOCK	ROOM		DEL. DATE	UNIT COST	TOTAL COST		
1	MODICON PRPGRAMMABLE CONTROLLER # M84A-002 (2K)		IEA	2	IT	IT-2	88	BECKER ELECTRIC			\$600.00	\$1,200.00	
2	MODICON INPUT MODULE # B351-001		IEA	10	IT	IT-2	88	BECKER ELECTRIC			\$150.00	\$1,500.00	
3	MODICON OUTPUT MODULE # P350-001		IEA	10	IT	IT-2	88	BECKER ELECTRIC			\$200.00	\$2,000.00	
4	MODICON PROGRAMMING PANEL # P-370		IEA	1	IT	IT-2	88	BECKER ELECTRIC			\$450.00	\$450.00	
5	MODICON EEPROM MODULE # P371-002		IEA	2	IT	IT-2	88	BECKER ELECTRIC			\$150.00	\$300.00	
6	CIRCUIT BREAKERS, SQUARE D 80 TYPE		IEA	36	IT	IT-2	88	DUELLMAN ELECTRIC			\$8.00	\$288.00	
7	PHOTO SENSORS(GLOVE PORT INTERLOCKS)GE # CR215PE203A11		IEA	8	IT	IT-2	88	SUMMITT INDUSTRIES			\$100.00	\$800.00	
8	MOTOR CONTROL(BELL JAR LIFT)ALLENBRADLEY#505AAXD-105		IEA	2	IT	IT-2	88	ALL-PHASE ELECTRIC			\$400.00	\$800.00	
9	SAFETROL UNIT (VACUUM ATMOSPHERES # ST-110)		IEA	2	IT	IT-2	88	VACUUM ATMOSPHERES			\$900.00	\$1,800.00	
10	ALCATEL VACUUM PUMP # AV-2H-2012AC		IEA	2	IT	IT-2	88	KURT J. LESTER			\$2,700.00	\$5,400.00	
11	SAMPLING PUMP # 107CA050		IEA	2	IT	IT-2	88	THOMAS INDUSTRIES(MOSIER)			\$135.00	\$270.00	
12	AIR PUMP # 107CA14		IEA	2	IT	IT-2	88	THOMAS INDUSTRIES(MOSIER)			\$135.00	\$270.00	
13	SOLENOID VALVE, ASCO # B215B50		IEA	2	IT	IT-2	88	ALL-PHASE ELECTRIC			\$140.00	\$280.00	
14	SOLENOID VALVE, ASCO # B210A15		IEA	3	IT	IT-2	88	ALL-PHASE ELECTRIC			\$70.00	\$210.00	
15	SOLENOID VALVE, ASCO # B300D58F		IEA	1	IT	IT-2	88	ALL-PHASE ELECTRIC			\$250.00	\$250.00	
16	SOLENOID VALVE, ASCO # B030A16		IEA	3	IT	IT-2	88	ALL-PHASE ELECTRIC			\$60.00	\$180.00	

\$15,998.00

Refer to instructions on reverse side.

MATERIAL LIST

Requestor L. SALVER

Date Requested

Page 2 of

ENGINEER L. SALVER		PLANNER		TRADE START DATE		INSTALLATION LOCATION	
PROJECT TITLE COLD PROCESS (L-81)		AES #J-01323		ILEDGER 2320		ICC	
FILE NAME-WT13202				JEPENSE 4810		XJCAPITAL 2320	
						IL00	
						IEC	
MAT'L LIST NO.	DESCRIPTION	MRC STOCK NUMBER OR PURCHASE ORDER NUMBER	UNIT OF ISSUE	QUANTITY	STORAGE LOC.	ADDITIONAL INFORMATION	TOTAL COST
17	SOLENOID VALVE, ASCO # 8262C90VH		IEA	2 IT	IT-2	88 IALL-PHASE ELECTRIC	\$75.00
18	SOLENOID VALVE, ASCO # 83491		IEA	1 IT	IT-2	88 IALL-PHASE ELECTRIC	\$135.00
19	IDWYER PHOTOHELIC SWITCH/GABE # 2-0-2 (3304)		IEA	1 IT	IT-2	88 IDWYER	\$250.00
20	IDWYER PHOTOHELIC SWITCH/GABE # 3-0-5 (3310)		IEA	1 IT	IT-2	88 IDWYER	\$250.00
21	IVENT-RAK CONTROL RACK W/CASTER BASE & FRONT PNLS.		IEA	10 IT	IT-2	88 IELECTRONIC COMPONENTS INC	\$1,200.00
22	ITRANSFORMER, 150KVA, KIRKHOF # 644150LS63SX		IEA	1 IT	IT-2	88 KIRKHOF	\$2,400.00
23	ISHUNT, 30000 AMP, CURRENT STRAIGHT CONFIG.		IEA	1 IT	IT-2	88 IHOLD INST. DIV/CPD ENG. INC	\$2,550.00
24	IFORGE WELDER BUSS HARDWARE		ILT	1 IT	IT-2	88	\$500.00
25	IHWARE, CONDUIT, CONDUIT FITTINGS, WIRE & CABLE		ILT	1 IT	IT-2	88	\$2,000.00
26	IHWARE, MOTOR STARTERS, RELAYS, PANEL P. B. ECT.		ILT	1 IT	IT-2	88	\$2,000.00
27	IINTERLOCK MAT, TAPE SWITCH CORP. OF AMERICANKP-36X72I		IEA	1 IT	IT-2	88 IC & E SALES INC.	\$500.00
28							\$0.00
29							\$0.00
30							\$0.00
31							\$0.00
32							\$0.00

\$22,735.00

LINE ITEM/GPP AES ENGINEERING ESTIMATE						Date: Jul-89
AES NO. J01324	DOE/AL AUTHORIZATION # D - 79		AES TITLE NFM-CF-MISC.TESTING & ACCEPT. EQUIP			
H.P.No. (Proj. Mgr.) 4421	PROJECT No. P301	BLDG. T	ROOM 229,259,24	TASK No. L87	Project TEC \$130,460	Bud. Ser. No 99025
HP No. (Assignee) 0787	ENG. GRP. N4	Assignee Ph. No. 3830	Date Prepared 7/15/89	Date Required 4/93	Rev. No. 0	
ESTIMATE - TITLE I & II		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	Fiscal Year Funding
Engineering		130	\$22.00	\$2,860		FY: 1989 \$0
Drafting		60	\$16.00	\$960		FY: 1990 \$55,000
Inspection			\$18.00	\$0		FY: 1991 \$73,000
Overhd. @ 60%			60%	\$2,290		FY: 1992 \$2,460
Out. Eng. E/C 48			\$35.00	\$0		FY: 1993
Total Title I & II Estimate		190		\$6,100		Total \$130,460
ESTIMATE - TITLE III		Est. Hrs.	Std. Rt.	Extend \$	BTD Manhrs.	SUMMARY APRVD FISCAL YRS
Foreman		30	\$19.00	\$570		Engineering \$0
Planner		30	\$19.00	\$570		Drafting \$0
Carpenter		30	\$16.00	\$480		Inspection \$0
Electrician		140	\$16.00	\$2,240		Eng Overhd \$0
Mechanic		50	\$16.00	\$800		Out Eng. \$0
Pipefitter		40	\$16.00	\$640		
Painter		30	\$16.00	\$480		
Welder		50	\$16.00	\$800		TITLE III TOT \$0
Mason			\$16.00	\$0		
Laborer		108	\$10.00	\$1,080		Trades \$0
A/C Mechanic			\$16.00	\$0		Elec-Tech \$0
H/D Operator			\$16.00	\$0		Machinists \$0
Other		60	\$16.00	\$960		Overhead \$0
Trades Labor		568		\$8,620	0	PO Mat's \$0
Electronic Tech.		82	\$15.00	\$1,230		Whse Mat'l \$0
Machine Shop			\$18.00	\$0		Contract \$0
Total Labor		650		\$9,850	0	TITLE III TOT \$0
Overhd. @ 60%			60%	\$5,910	60%	TOTAL \$0
PO Mat'ls & Eq. by MRC				\$103,600		ROUTING:
Warehouse Mat'ls			5% P.O.	\$5,000		PROJ. MGT. CONT: _____
Out Cont'r E/C 49						PROJ. MGR: _____
TITLE III SUBTOTAL				\$124,360		AES CONTROL: _____
TITLE I & II SUBTOTAL				\$6,100		ACCOUNTING: _____
TOTAL ESTIMATE				\$130,460		PROJ. ENG. _____
						AES4.wk1 2/9/89 NFMF1324

AES DETAIL COST ESTIMATE (IN HOURS)

AES NUMBER 10113124	AES TITLE MISC. TESTING & ACCEPTANCE	AES ASSIGNEE BOWSEIL	DATE OF ESTIMATE 7/15/89
------------------------	---	-------------------------	-----------------------------

EQUIP. OR MATL. ITEM NO.	DESCRIPTION	TYPE OF TRADE		QTY.	UNIT COST	TOTAL COST	CARPENTER	ELECTRICIAN	MECHANIC	PIPEFITTER	SHEETMETAL	PAINTER	WELDER	MASON	LABORER	ELECTRONIC TECHNICIAN	MACHINE SHOP	HEALTH SURVEYOR	DECONTAM WORKER	SECURITY	OTHER
							310	311	312	313	314	315	316	317	318	321	322	325	326		
1	WELDER, HELIARC, LOW NOISE ^{RF}			2	5,000	10,000		40							20	10					
2	LEAK DETECTORS & ACCESS.			2	20,000	40,000		40							20	30					
3	STACKER, ELECTRIC			1	—	10,000									10	—					
4	CLEANER, ULTRASONIC			1	—	2500									2	2					
5	CART, T ₂ MONITOR, PORTABLE			1	—	15,000		40	30	20	20	20	30			20					40
6	BENDER, CONDUIT - 4" & PUNCH SET			1	—	10,200									6	—					
7	CRIMPER, HYDRAULIC & TOOLS			1	—	2,300									2	—					
8	CUTTER, PIPE, SET DIES			1	—	1300									2						
9	GRINDER, DISK			2	150	300									1						
10	SAWSALL			2	150	300									1						
11	DRILLS, HAMMER			2	250	500									1						
12	BRUSHES, STAINLESS STEEL			Lot	—	1200									1						
13	PUMP, HYDROSTATIC			1	—	600				20					2						
14	TOOLS, MISC. ALLOW			Lot	10%	9,400	—	20	20	—	10	10	20	—	40	20					20
						103,600	—	140	50	40	30	30	50	—	108	82					60

NUCLEAR FACILITIES MODERNIZATION