APPENDIX F PAGES ARE NOT
NUMBERED SEQUENTIALLY

INITIAL _____ DATE 10/22/03

Appendix F

Alternative Equipment Lists

Compact All
(also see 3aP)

OU 7-10 Treatment Equipment List, Rev B

Equip Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
CO	2001 A-F	Conveyor	Sorting table walking floor	6	walking floor section	4'/min		20	12				40			each section include hydr drive		
	2006 A-D		tbd - box dumper or walking floor		material receiving and conveying station								10					
	2002	hopper	Sorting Deck Soils Trough Hopper	1	5' wide hopper w/ grizzly grid			75	5	4.5	SS							
	2003	crane	Sorting Deck Bridge Crane	1	underhung crane, remotely controlled, w/ multiple attachments	7.5	ton	30					25					
MAN	2004 A-C	matl handling arms	Sorting Deck Sorting Arm	3	remotely controlled hydraulic manipulator for waste sorting and handling	2	ton						10					
CO	2005	Conveyor	Sorting deck Soil Collection Conveyor	1	48" apron conveyor w/ clean-up drag conveyor, totally enclosed			120	6				7.5			totally enclosed (Zone III) w/ access gloveports - horizontal run		
CO	2007	Conveyor	Soil Screen Feed Conveyor	1	48" apron conveyor w/ clean-up drag conveyor, totally enclosed			130	6				10			totally enclosed (Zone III) w/ access gloveports - inclined run		
GB	2008	Glove Box	Soil Screen Enclosure	1	Soil Screen Glovebox enclosure			18	10	30								
SCN	2008	Screen	Soil Screen	1	Disk screen			12	6				5					
CR	2008	crane	Soil Screen Maintenance Crane	1	Crane for maintenance of soil Screen, underhung	5	ton	16					15					
CO	2010	Conveyor	Shredder Feed Conveyor	1	60" apron conveyor w/ clean-up drag conveyor, totdly enclosed			130	7				10			inclined run		
CO	2011	Conveyor	Oversize Matl Xfer Conveyor	1	slat conveyor, partially enclosed			30	4				5			horizontal run		
GB	2012	Glove Box	Oversize Matl Enclosure	1				40	20									
CO SHR	2012	Conveyor	Shear Feed Conveyor	1	slat conveyor w/ pusher discharge arm			10	4				2			horizontal run		
	2012	Shear	Oversize Mat'l Shear	1	hydr guillotine type scrap shea								20					
CR CO	2012	crane	Sizing Cell Crane	1	Crane for mat'l handling & shear maintenence, underhung	5	ton	20					5					
DO	2013	Conveyor	Shear Discharge Conveyor	1	slat conveyor			5	4				1			horizontal run		
DO	2012	Drum out	Sized Mat'l Output Station	1	Drum/SW B output station													
CO	2009	Conveyor	Intact Drum/Specl Matl Xfer Conveyor	1	apron conveyor w/ clean-up drag conveyor			10	3				1			horizontal run		
GB	2014	Glove Box	Intact Drum & Special Matl Enclosure	1				40	10									
MAN	2014 A, B	Special Equipment	Intact Drum Handler	2	drum handler w/ auto ddidding & dumping capability								1			HANDS 55 type box - talk to Bryan Spaulding about costs		
MAN	2015 A, B	Special Equipment	Intact Drum Sorting Manipulator	2	Crane mounted robot w/ end effectors								7					
CO	2014 A, B	Conveyor	Drum Contents Sorting Table	2	vibrating conveyor for drum content sorting			10	4				5					
CO DO	2020	Conveyor	Drum Contents Collecting Conveyor	1	conveyor			10	4				1			horizontal run		
	2014	Drum out	Special Mat'l Output Station	1	Drum/SW B output station								1			hydraulic lift table		
AS	2024 A,B	Assay Unit	Container Assay Unit	2	Box/drum assay machine w/ integral feed conveyor								2					
CO . CO .	2028	Conveyor	Drum Contents Xfer Conveyor	1	apron conveyor w/ clean-up drag conveyor			10	4				1					
CO CO	2029	Conveyor	Soil Screen Product Xfer conveyor	1	apron conveyor w/ clean-up drag conveyor			90	4				7.5					
CO	2030	Conveyor	Soil Screen Reiects Xfer conveyor	1	apron conveyor w/ clean-up drag conveyor			70	4				5					
GB	2032	Glove Box	Shredder Enclosure	1				22	30	32								
SHD								10	16.5	27			100					

Alternative 1
Compact Ail
(dsosee 3aP)

Equip Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated cost	Estimated Cost Basis
CO	2032	Conveyw	Shredded Waste Xfer conveyor	1	apron conveyor w/ clean-up drag conveyor			50	4				5					
GB	2034	Glove Box	Shredded Waste Packaging Glove Box	1	Glove box													
CO	2034 A B	Conveyor	Drum Filling Conveyor	2	vibrating conveyor - from Xfer conveyor to drum fill station			5	24				2				1,300,000	
DO	2034 A B.	Drum out-	Shredded Waste Output Station	2	Drum/SWB output station								1			hydraulic lift table		
CR	2034	Crane	Shredded Waste GB Maintenance crane	1		1	T											
GB	2045	Glove Box	Sal Hopper Enclosure	1	Glovebox													
CO	2045	Conveyor	Soil Storage Feed Conveyor	1	reversing apron conveyor			10	4				1					
B	2045 A, B	Bin	Soil Storage Bin	2	Cylindrical storage bin			6	4.5									
BD	2045 A, B	Bin Activator	Soil Storage Bin Activator	2														
CO	2046 A. B	Conveyor	Soil Storage Bin Discharge Conveyor	2	belt conveyor			40	4				2					
CO	2053	Conveyor	Assay Systems feed conveyor	1	shuttle belt conveyor			8	4				7.5					
CO	2054 A, B	Conveyor	Assay Feed Spreader #1	2	vibrating feeder/spreader								2					
AS	2055 A, E	Assay unit	Soil Assay System #2	2	conveyor type assay system													
CO	2056	Conveyor	Assayed Soil Diverting Conveyor	1	reversing belt type conveyor			30	4				3					
CO	2057	Conveyor	nonTRU Soil Xfer Conveyor	1	belt type conveyor			45	4				2					
CO	2058	Conveyor	TRU Soil Xfer Conveyor	1	belt type conveyor			45	4				2					
GB	2060	GB	nonTRU Soil Packaging GB	1				10	10	15								
DO	2060	box out	nonTRU Soil Packaging GB	1	retrieval return bin packaging station													
GB	2061	GB	TRU Soil Packaging GB	1	55 gal drum packaging station enclosure			10	10	15								
DO	2061	drum out	TRU Soil Packaging GB	1	55 gal drum packaging station													
GB	2110	Glove Box	Drum Entry Airlock										1.5					
CO	2110	Conveyor	Compactor Feed Conveyor															
GB	2112	Glove Box	TRU drum compactor enclosure	1	TRU drum compactor enclosure			60	20	30								
CM	2112	Compactor	Drum Compactor	1									50				2,000,000	
CR	2112	crane	Drum Puck Handling Device	1														
GB	2114	Glove Box	Compacted Drum Pgkg Enclosure	1														
DO	2114	Drum Out	100 gal drum output	1									1.5					
			Container Handling Trucks	5	electric fork truck	1000	lb											
			TRUPACT Loading Station	1														
			TRUPACT Loading crane	1			T											
Equipment numbering / Area Designation																		
2000	Pretreatment																	
3060	Thermal Desorption																	
4000	Chemical Leach																	
5000	Melter / offgas																	
6000	Incinerator / offgas																	
7000																		
8000	Utilities																	
9000	HVAC																	

Alternative 1
Compact All
(also see 3aP)

Equip Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
	Equipment Type Legend																	
	A	auger		MAN	manipulator													
	AC	air compressor		MIX	mixer													
	AHU	air handling unit		P	pump													
	AS	TRU Assay unit		R	reactor													
	B	bin		SCN	Screen													
	BD	Bin Discharge Activator		SCR	scrubber													
	BL	blower		SCS	slag collection system													
	C	chiller		SHD	Shredder													
	CM	Drum Compactor		SIHR	Shear													
	CO	conveyer system		ST	Stack													
	CEM	continues emissions monitor		T	tank													
	CR	crane		TL	tank level sensor													
	CT	cooling towers		TO	thermal Oxidizer													
	CV	control valve		TS	temperature sensor													
	DO	Drum output station		V	valve													
	F	filter																
	GB	Glove Box																
	GS	glass sampling																
	HEPA	high efficiency particulate filter																
	HX	heat exchanger																

OU 7-10 Treatment Equipment List - Alt 2b Melt All																	$3,665K	
												Electrical						
Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Watt	HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
Melter feed System						2.0E+03	kg/hr	15	10	10							$500K	
		Shredded Solids feed																
V	V-5001,2,3	valve	Slide Isolation valve	3	Slide Isolation valve				0.5		SS				6in line			
B	B-5001	Bin	Shredded Solids storage bin	0	Transportable Tote bins filled at pretreatment	3.0E+00	m^3	4.5	4.5	6	SS					Bins are components of the retrieval process		
		Dirt Feed																
V	V-5004,5,6	valve	Slide Isolation valve	3	Slide Isolation valve				0.5		SS				6 in line			
B	B-5002	Bin	Dirt storage bin	0	Transportable Tote bins filled with dirt at pretreatment	3.0E+00	m^3	4.5	4.5	6	SS					Bins are components of the retrieval process		
P	P-5001	Pump	Spray Pump	1	Pump to Spray blowdown on Dirt feed	1.0E+02	l/hr	2	2	2	SS							
		mechanical	Sprayer	1	Sprayer into dirt													
		Additive Feed																
V	V-5007,8	valve	Slide Isolation valve	2	Slide Isolation valve	2.0E+00	inch				SS				2 in line			
B	B-5003	Bin	Additive storage bin	0	Supper Sack feed of additives if required.	3.0E+00	m^3	4.5	4.5	6	SS							
A	A-5003	mechanical	Metering Auger feed	1	Loss- of weight auger feeder	1.0E+02	kg/hr											
		Liquid feed																
T	T-5001	Tank	Liquid feed tank	1	Liquid feed tank for other liquid feeds from process or scrubber blowdown	1.9E+03	l		4	6	SS							
P	P-5002	Pump	Liquid feed pump	1	Liquid feed pump	2.0E+03	l/hr	2	2	2	SS	200	0.25					
V	V-5009	Valve	Metering Valve	1	Control liquid feed to melter	1.0E+00	inch								1 in line			
V	V-5026, 27	Valve	Isolation Valve	2	Optional feeds from T-5001	1.0E+00	inch								1 in line			
Melter System																		
		mechanical	Primary Chamber	1	Arc melter	1.0E+03	kg/hr	10	10	15							$750K	
		Electrical	Power supple	1	AC Power supple for melter	1.0E+03	kW					1300KW					$150K	
		Electrical	Electrodes	4	Graphic electrode, continuous feed												$240K	$80 K/year
AC	AC-5002	mechanical	Air compressor	1	Air compressor for possible air feed into the melter			4	3	3		15KW	20					
AC	AC-5001	mechanical	Air compressor	1	Air compressor for possible air feed into the melter			4	3	3		15KW	20					
V	V-5010	valve	Metering Valves	1	o2 and propane metering value	1.0E+00	inch				SS				1 in line			
V	V-5011	valve	Metering Valves	1	o2 and propane metering value	1.0E+00	inch				SS				1 in line			
			Oxygen injection System	1	For O2 injection into the melter for oxidation of metals											various piping components and nozzles		
T	T-5002	Tank	Oxygen tank	1	Oxygen tank for met injection	4.0E+03	l		5	8	CS							
P	P-5003	Pump	melter cooling pump	1	Pumps for water jacket around melter	2.0E+03	l/hr	3	2	2		200	0.25			Standby power required		
P	P-5004	Pump	melter cooling pump	1	Pumps for water jacket around melter	2.0E+03	l/hr	3	2	2		200	0.25			Standby power required		
V	V-5012	valve	Flow Control Valves	1	Water flow control valve to adjust cooling of melter	1.0E+00	inch				SS				1 in line			
V	V-5013	valve	Flow Control Valves	1	Water flow control valve to adjust cooling of melter	1.0E+00	inch				SS				1 in line			
C	C-5001	Chiller	Chiller	1	Chiller for melter cooling water													
			Melter drain	1	Heated and cooled drain to remove glass from melter													
P	P-5005	Pump	Drain cooling pump	1	Pump for melter tap	1.0E+02	l/hr	2	2	2						part of the melter?		
H	H-5001	Heater	Melter tap heater	1	Keep melter tap at temperature							15KW				part of the melter?		
GS	GS-5001	glass sampling	Glass sampler system	1	Manuela glass sample system to collect sample while melter in pouring	1.3E+02	g/sample										$50K	
SCS	SCS-5001	mechanical	Slag collection system	1		3.0E-01	m^3/hr	9	9	5							$700K	
Off-gas System																		
TO	TO-5001	Thermal Oxidizer	Thermal Oxidizer/Secondary combustion Chamber	1	Thermal Oxidizer/Secondary combustion Chamber	2.4E+00	m^3	20.83	2		SS/Refractory						$200K	
H	H-5002	heater	O2/Fuel Train burner	1	Propane burner	4.6E-01	MMBTU/hr										$58K	
		Controller	O2/Fuel Train control		Control system			3	2	5								
V	V-5014,15	Valve	metering value	2		5.0E-01	inch				SS							
T	T-5003	Tank	Propane tank	1		4.0E+03	l		5	8	CS							
T	T-5004	Tank	DIW Reservoir Tank	1	DIW water injection to maintain temperature control in Thermal oxidizer	1.0E+03	liters	2	6		SS						$1K	
V	V-5016	Valve	DIW Temp control Valve	1		1.0E+00	inch				SS							
V	V-5017	Valve	DIW Flow Control Valve	1		1.0E+00	inch				SS							
P	P-5006	Pump	DIW Temp control Pump	2		2.5E+01	liter/hr	2	2	2		26	0.032			Standby power required	$14K	2@ 7K
F	F-5001	Filter	DIW Filter	2	Replaceable canister filters													
T	T-5010	Tank	Quench Tank	1	Quench Tank	8.5E+02	btu/hr	9.25	2									
P	P-5007	Pump	Quench Pump	1		3.6E+02	liter/hr	2	2	2		50	0.063			Standby power required		
V	V-5018	Valve	Quench Metering value	1		1.0E+00	inch											
SCR	SCR-5001	Scrubber	Scrubber	1	Offgas Scrubber	5.9E+02	scfm	4.33	1.5									
P	P-5008,9	Pump	Scrub Pump	2		3.9E+02	liter/hr	2	2	2		50	0.063			Standby power required		
T.	T-5005	Tank	Scrubber Tank	1		1.5E+03	liters		4	5	SS							
V	V-5026	Valve	Control Valve	1	Scrubber Control Valve	1.0E+00	inch								1 inch line			
T	T-5006	Tank	NaOH Tank	1		1.0E+03	liters		3	5								
P	P-5010	Pump	Caustic Pump	1		1.0E+03	liter/hr	2	2	2		200	0.25					
P	P-5011	Pump	Blowdown Pump	1		5.0E+02	liter/hr	2	2	2		100	0.125					
T	T-5007	Tank	Blowdown Tank	1		1.0E+03	liters		3	5	SS							
T	T-5008	Tank	Blowdown Solidification Tank	1		5.0E+02	liters											
T	T-5011	Tank	Solidifcation Agent Tank	1		1.0E+03	liters											

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
M	M-5001	Mixer	Blowdown Mixer	1														
P	P-5012	Pump	Return pump	1		2.5E+01	liter/hr	1	2	1		4	0.005					
V	V-5019,20	Valve	Slide Valve	2		6.0E+00	inch								6 inch line			
V	V-5021	Valve	Metering Valve	1		6.0E+00	inch								6 inch line			
HEME	HEME-5001		HEME	3		6.1E+02	scfm		2	12								
H	H-5001	Heater	Electric Reheater		Preheat dilution air used to reheat saturated offgas	3.3E+04	BTU/hr	4	2	5		230				Standby power required	$30K	
R	R-5001	Reactor	Nox Removal Reactor (SCR)	1				4	4	4							$75K	
T	T-5009	Tank	Ammonia Storage	1		1.0E+03	l											
V	V-5022	Valve	Metering Valve	1		5.0E-01	inch											
C	C-5002	Chiller	SCR cooler	1														
P	P-5013	Pump	SCR cooling pump	1														
V	V-5023	Valve	Control Valve	1		1.0E+00	inch								1 inch line			
V	V-5024	Valve	Control Valve	1		1.0E+00	inch								1 inch line			
GAC	GAC-5001	Carbon Bed	GAC Bed	1		6.1E+02	scfm	6	4									
T	T-5010	Tank	Tank	1	Nitrogen Tank	1.0E+03	l											
V	V-5025	Valve	Control Valve	1	Nitrogen control valve	1.0E+00	inch								1 inch line			
HEPA	HEPA-5001	Filter	HEPA	2	offgas filtration	6.1E+02	scfm											
BL	BL-5001	Blower	Offgas Blower	1	Stack offgas blower	1.9E+03	scfm	9	5	5		75				Standby power required	$32K	2 @ 15.9K
CEM	CEM-5001	Monitor	Continuous Emissions Monitor	3	Monitor emissions going up the stack			4	3	5							$122K	
S	S-5001	Stack	Exhaust Stack	1	Facility stack	2.0E+03	scfm											
Drum Handling																		
CO	CO-5001, 2	mechanical	Conveyer system	2	Transport empty and filled drums			12	3	2		15KW						
RDH	RDH-5001, 2	mechanical	Remote drum handling equipment	2	Handling drums containing slag from the melter			8	3	3			2					
RDH	RDH-5003	mechanical	Remote drum lid installation equip.	1	Install drum lids													
S	S-5001	mechanical	Weight		Drum weight			10	10	10								
BC																		
CA	CA-5001,2	camera	Melter lid cameras	2	Camera monitoring of melter in-feeds												$6K	2 @ 3K
CR	CR-5001	electrical	Control Room Equipment	1	Control room monitoring equipment			7.6	6.1							Standby power required	$100K	
CA	CA-5003	camera	Slag collection camera	3	Camera monitoring of melter tap											Standby power required		
TL	TL-5001,	sensor	Tank level sensors		Monitor tank levels for pumpdown													
TS	TS-5001,	sensor	Temperature sensors		Monitor temperature for contolling valves													
Ventilation Systems																		
HEPA	9301	HEPA filter	Melter facility Zone III HEPA	1	2 high x 1 wide HEPA filter housing	1500	cfm	16	3	4								
HEPA	9201	HEPA filter	Melter facility Zone II HEPA	5	4 high x 4 wide HEPA filter housing	80000	cfm	16	10	10								
HEPA	9101	HEPA filter	Melter facility Zone I HEPA	2	4 high x 4 wide HEPA filter housing	32000	cfm	16	10	10								
BL	9301 A	Exhaust Fan	Melter Facility Zone III exhaust fan	1	centrifugal fan	750 / 15	cfm / in wc						5			standby power req'd 2 of 3 operating		
BL	9301 B	Exhaust Fan	Melter Facility Zone III exhaust fan	1	centrifugal fan	750 / 15	cfm / in wc						5			standby power req'd 2 of 3 operating		
BL	9301 C	Exhaust Fan	Melter Facility Zone III exhaust fan	1	centrifugal fan	750 / 15	cfm / in wc						5			standby power req'd 2 of 3 operating		
BL	9201 A	Exhaust Fan	Melter Facility Zone II exhaust fan	1	centrifugal fan	40,000 / 15	cfm / in wc						160			standby power req'd 2 of 3 operating		
BL	9201 B	Exhaust Fan	Melter Facility Zone II exhaust fan	1	centrifugal fan	40,000 / 15	cfm / in wc						160			standby power req'd 2 of 3 operating		
BL	9201 C	Exhaust Fan	Melter Facility Zone II exhaust fan	1	centrifugal fan	40,000 / 15	cfm / in wc						160			standby power req'd 2 of 3 operating		
BL	9101 A	Exhaust Fan	Melter Facility Zone I exhaust fan	1	centrifugal fan	16,000 / 15	cfm / in wc						75			standby power req'd 2 of 3 operating		
BL	9101 B	Exhaust Fan	Melter Facility Zone I exhaust fan	1	centrifugal fan	16,000 / 15	cfm / in wc						75			standby power req'd 2 of 3 operating		
BL	9101 C	Exhaust Fan	Melter Facility Zone I exhaust fan	1	centrifugal fan	16,000 / 15	cfm / in wc						75			standby power req'd 2 of 3 operating		
AHU	9201 A	Air Handling Unit	Melter Facility Zone II air handling unit	1	centrifugal fan	40,000 / 2	cfm / in wc						25			standby power req'd 2 of 3 operating		
AHU	9201 B	Air Handling Unit	Melter Facility Zone II air handling unit	1	centrifugal fan	40,000 / 2	cfm / in wc						25			standby power req'd 2 of 3 operating		
AHU	9201 C	Air Handling Unit	Melter Facility Zone II air handling unit	1	centrifugal fan	40,000 / 2	cfm / in wc						25			standby power req'd 2 of 3 operating		
AHU	9101 A	Air Handling Unit	Melter Facility Zone I air handling unit	1	centrifugal fan	16,000 / 2	cfm / in wc						10			standby power req'd 2 of 3 operating		
AHU	9101 B	Air Handling Unit	Melter Facility Zone I air handling unit	1	centrifugal fan	16,000 / 2	cfm / in wc						10			standby power req'd 2 of 3 operating		
AHU	9101 C	Air Handling Unit	Melter Facility Zone I air handling unit	1	centrifugal fan	16,000 / 2	cfm / in wc						10			standby power req'd 2 of 3 operating		

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
H	9201 A	Heater	Melter Facility Zone II air handling unit heater	1	electric heater for supply air		Btu/hr					########				2 of 3 operating		
H	9201 B	Heater	Melter Facility Zone II air handling unit heater	1	electric heater for supply air		Btu/hr					########				2 of 3 operating		
H	9201 C	Heater	Melter Facility Zone II air handling unit heater	1	electric heater for supply air		Btu/hr					########				2 of 3 operating		
H	9101 A	Heater	Melter Facility Zone I air handling unit heater	1	electric heater for supply air		Btu/hr					########				2 of 3 operating		
H	9101 B	Heater	Melter Facility Zone I air handling unit heater	1	electric heater for supply air		Btu/hr					########				2 of 3 operating		
H	9101 C	Heater	Melter Facility Zone I air handling unit heater	1	electric heater for supply air		Btu/hr					########				2 of 3 operating		
Utilities																		
CT	CT-5001, 02	Cooling Towers	Evaporative cooling Towers	3				6.6	2.6	3.4		23000				3 at 7.5 kw		
P	P-50	Pump	Cooling water pump	2				1.8	0.6	0.8			15			Standby power required		
AC	AC-5003	Air Compressor	Facility Air compressor	2		8.5	m^3	2	1.2	1.5			20					
CH	8001	HVAC Chiller	20 ton chiller									460v, 48 a						
																	$638K	

Equipment numbering / Area Designation

2000	Pre-treatment
3000	Thermal Desorption
4000	Chemical Leach
5000	Melter / offgas
6000	Incinerator / offgas
7000	
8000	Utilities
9000	HVAC

Equipment Type Legend

A	auger	HEPA	high efficiency particulate filter
AC	air compressor	HX	heat exchanger
AHU	air handling unit	MX	mixer
B	bin	P	pump
BL	blower	R	reactor
C	chiller	SCR	scrubber
CO	conveyer system	SCS	slag collection system
CEM	continues emissions monitor	ST	Stack
CR	control room equipment	T	tank
CT	cooling towers	TL	tank level sensor
CV	control valve	TO	thermal Oxidizer
F	filter	TS	temperature sensor
GS	glass sampling	V	valve
H	heater		
HEME			

Option 4a
Combined Equipment List
(4a and 3aP)

OU 7-10 Treatment Equipment List

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft)	Width or Dia. (ft.)	Height ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Unit Estimated Cost, 1000	Estimated Cost Basis
Leach/Precipitate/Calcine																		
A	4010	Auger	Transfer auger	1	Enclosed auger from thermal desorber	720	kg/hr	25	0.67		304 SS		3.0	4a-3				
S	4010	Screen	Hot soil screen	1	Vibrating screen			5	3		C.S.		2.0	4a-3				
B	4010	Bin	Thermal Desorber surge Bin	1	vertical bin, mas flow type bot.	7500	L		6	14	C.S.			4a-3	10 hours			
V	4010	Feeder	Star valve	1	motorized rotary gate						C.S.		1.0	4a-3			4.5	
A	4011	Auger	Transfer auger	1	Auger for oversized from screen	150	kg/hr	10	0.83		C.S.		3.0	4a-3	20% T.D.			
A	4110	Auger	Transfer auger	1	Auger from hot surge bin	7200	kg/hr	67			304 SS		7.5	4a-3	30 min batch fill			
A	4111	Auger	Transfer auger	1	Auger from hot surge bin	7200	kg/hr	11.5			304 SS		5.0					
A	4112	Auger	Transfer auger	1	Auger from hot surge bin	7200	kg/hr	8			304 SS		3.0					
T	4110	Tank	Leach Tank	1	Jacketed tank, conical heads	11600	L		8.0	9.0	316L SS			4a-3	1 batch +30	Asme design for 15 psi and full vacuum		
T	4120	Tank	Leach Tank	1	Jacketed tank, conical heads	11600	L		8.0	9.0	316L SS			4a-3	1 batch +30	Asme design for 15 psi and full vacuum		
T	4130	Tank	Leach Tank	1	Jacketed tank, conical heads	11600	L		8.0	9.0	316L SS			4a-3	1 batch +30	Asme design for 15 psi and full vacuum		
T	4420	Tank	Nitric acid feed tank	1	8 M nitric acid feed tank	7600	L		6.0	7.5	316L SS			4a-3	1 batch +10%			
T	4410A,B	Tank	Nitric acid storage tank	2	13 M nitric acid storage tank	76000	L		11.5	26.0	316L SS			4a-3				
P	4411A, B	Pump	Nitric acid feed pump	2	8 M acid feed pump	400	L/min				316L SS		3.0	4a-3				
P	4412A, B	Pump	Nitric acid transfer pump	2	13 M acid transfer pump	150	L/min				316L SS		2.0	4a-3				
HX	4430	Ht. Exchanger	Nitric acid heater	1	8 M acid shell and tube HX	120	Kw				316L SS			4a-3		ASME design for 150 psi and full vacuum		
P	4110A, B	Pump	Slurry Pump	2	Concrete pump	260	L/min				304 SS		25.0	4a-3	4.8 Bar	drain leach tank in 30 min., Standby Power	140	
V	4410	Valve	13 M Nitric storage tk. discharge valve	1	ball valve-air operated	50	mm				316 SS			4a-3				
V	4420	Valve	8 M nitric acid feed tk. discharge valve	1	ball valve-air operated	76	mm				316 SS			4a-3				
HX	4150	Ht. Exchanger	Off-gas condenser	1	shell & tube heat exchanger	30	Kw		2	10	316 SS			4a-3	40 kg/hr wtr.			
MX	4110	Mixer	Leach tank mixer	1	propeller type w/ shaft seal						316 SS		3.0	4a-3			3.5	
MX	4120	Mixer	Leach tank mixer	1	propeller type w/ shaft seal						316 SS		3.0	4a-3			3.5	
MX	4130	Mixer	Leach tank mixer	1	propeller type w/ shaft seal						316 SS		3.0	4a-3			3.5	
V	4110	Valve	Knife gate valve	1	Air operated guillotine valve	150	mm				316 SS			4a-3			3	
V	4120	Valve	Knife gate valve	1	Air operated guillotine valve	150	mm				316SS			4a-3			3	
V	4130	Valve	Knife gate valve	1	Air operated guillotine valve	150	mm				316 SS			4a-3			3	
F	4100	Filter	Liquid Filter	1	Batch type w/ slurry disch.	260	L/min		5.0	15.0	316L SS			4a-3	6.7Bar	Fundabac type using 5.5 Bar air to dry	500	
V	4101	Valve	Knife gate valve	1	Air operated guillotine valve	200	mm				316 SS		0.5	4a-3			3	
V	4102	Valve	Diverter valve	1	rotary type valve with 3 ports						316L SS		0.5	4a-3	3X200mm		10	
T	4020	Tank	Blending tank	1	vertical tank w/ cone top & bot.	11,600	L		8.0	9.0	316L SS			4a-4	10 hr. surge			
MX	4020	Mixer	Blending tank mixer	1	Pitched blade turbine w/ seal						316 SS		3.0				5	
T	4021	Tank	Surge tank	1	vertical tank w/ cone top & bot.	30,000	L		10.0	15.5	316L SS			4a-4	10 hr. surge			
MX	4021	Mixer	Surge tank mixer	1	Pitched blade turbine w/ seal								3.0	4a-4				
P	4021	Pump	Return Pump	1	Diaphram pump	20	L/min										2	
V	4020	Valve	Blending tank discharge valve	1	ball valve, air operated	50	mm				316 SS			4a-4				
V	4021	Valve	Surge tank discharge valve	1	ball valve, air operated	50	mm				316 SS			4a-4				
P	4020A, B	Pump	Calciner feed pump	2	Diaphram pump	45	L/min									Air operated	3	
C	4100	Dryer	Hollow flight tandum auger	1	Oil heated auger for drying	4,000	kg/hr	16.0	2x3'		316L SS		30.0	4a-4	4.0E9 J/hr		300	
A	4110	Auger	Recycle auger	1	Inclined hot mat'l transfer screw conv	3,400	kg/hr	16.0	1.6		C.S.		3.0				40	
V	4120	Valve	Star valve	1	Motorized rotary star valve	200	mm						0.5	4a-4			4.5	
C	4103	Calciner	Heated auger	1	Elec. Heated auger	850	kg/hr	16.0	2x1.3'		304 SS	370Kw	15.0	4a-4			250	
V	4130	Valve	Star valve	1	Motorized rotary star valve	200	mm						0.5	4a-4			4.5	
A	4104	Auger	Cooling auger	1	Cooling auger	870	kg/hr	16.0	2x1.3'		304 SS		5.0	4a-4	2.5E8 J/hr	cooling wtr. 60 L/min @ 15 C		
A	4105	Auger	Transfer auger	1	Horz. hot mat"l transfder screw	4,200	kg/hr	10.0	0.8		304 SS		2.0	4a-4				
A	4106	Auger	Transfer auger	1	Horz. hot mat"l transfder screw	3,400	kg/hr	10.0	0.8		304SS		2.0	4a-4				
A	4107	Auger	Transfer auger	1	Inclined mat'l transfer screw	870	kg/hr	13.0	0.7		C.S.		3.0	4a-4				
A	4108	Auger	Transfer auger	1	Inclined mat'l transfer screw	870	kg/hr	52.5	0.7		C.S.		5.0	4a-4				
B	4101	Bin	hot calcine surge bin	1	Insulated mass flow bin	2,500	L				304 SS			4a-4	4 hr prod.			
V	4104	Valve	Star valve	1	Motorized rotary star valve	200	mm				304 SS		0.5	4a-4		variable speed drive	4.5	

Option 4a
Combined Equipment List
(4a and 3aP)

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft)	Width or Dia. (ft.)	Height ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Unit Estimated Cost, 1000	Estimated Cost Basis
CR	4100	Crane	Bridge Crane	1	Service bridge crane	9,100	kg	56.0	26.0	26.0	C.S.		3,3,10			Pendent controlled at floor		
F	4500	Filter	Percipitate Filter	1	Batch type w/ slurry disch.	400	L/min		5.0	15.0	316L SS			4a-3	6.7Bar	Fundabac type using 5.5Bar air to dry	500	
V	4500	Valve	Knife gate valve	1	Air operated guillotine valve	200	mm				316 SS			4a-3			3	
GB	4100	Glovebox	Container Loading Glovebox	1	packaging glovebox			5	5	5	304 SS						120	Approx. 23K/lineal ft.
T	4600	Tank	Percipitater Tank	2	Jacketed tankw/ conical heads	18,000	L		8.0	13.5	316L SS			4a-3		Asme design for 15 psi and full vacuum	30	
MX	4600	Mixer	Percipitater Tank Mixer	2	Pitched blade turbine w/ seal						316 SS		3	4a-3			5	
P	4600	Pump	Percipitate Pump	2	Diaphram pump	400	L/min											
T	4640	Tank	Surge Tank	1	Surge tank/ acid nutraliaztion	24,000	L		10.0	12.5	316L SS			4a-3		ASME design for 15 psi and full vacuum		
P	4640	Pump	Evaporator feed pump	1	Centrifugal for throttled service	60	L/min				316 SS		1.5	4a-3				
T	4700	Tank	Evaporator flash tank	1	Sim. to: HLW VES-NCC-150	5,600	L		5.0	12.0	316L SS			4a-3		ASME design for 25 psi and full vacuum.	90	
HX	4700	Ht. Exchanger	Evaporator heat exchanger	1	Sim. to: PEW HE-WL-300	1.5	Mw		2.0	11.0	304L Shell/ Nitronic 50 tubes			4a-3		ASME design for 150 psi and full vacuum	120	
HX	4710	Ht. Exchanger	Evaporator vapor superheater	1		3.5	Kw		1.3	10.0	304L Shell/ Nitronic 50 tubes			4a-3		ASME design for 150 psi and full vacuum	60	
T	4720	Tank	Evaporator hold tank	1	vertical tank w/ cone top & bot	30,000	L		10.0	15.5	316L SS			4a-3	10 hr. surge			
P	4720	Pump	Return Pump	1	Diaphram pump	20	Umin										2	
T	4630	Tank	Oxalic Acid feed tank	1	Vertical tank w/ cone bot. & flat top	16,000	L		8.0	12.5	Polyethylene			4a-3	8 hr. sup	Atornospherictank, vented to room		
T	4620	Tank	50 % Caustic solution feed tank	1	Vertical tank w/ cone bot. & flat top	3,500	L		5.0	7.5	Polyethylene			4a-3	8 hr. sup	Atornospherictank, vented to room		
T	4610	Tank	50 % Caustic solution mix tank	1	Vertical tank w/ flat top and bot.	12,000	L		6.5	12.5	C.S.			4a-3	24 hr. sup	Atomospheric tank, vented to room		
T	4650	Tank	Oxalic Acid mix tank	1	Vertical tank w/ flat top and bot.	50,000	L		11.5	17.0	304 L SS			4a-3	24 hr. sup	Atomospheric tank, vented to room		
MX	4650	Mixer	Oxalic Acid mixer	1	Pitched blade turbine w/ seal						Coated 316 SS		3	4a-3				
MX	4610	Mixer	Caustic mixer	1	propeller type w/ shaft seal						Coated 316 SS		3	4a-3				
P	4630	Pump	Ox Acid feed pump	2	Diaphram pump	600	L/min				Polyethylene			4a-3				
P	4620	Pump	Caustic feed pump	2	Diaphram pump	140	L/min				Polyethylene			4a-3				
P	4610	Pump	Caustic transfer pump	2	Diaphram pump	140	L/min				Polyethylene			4a-3				
P	4650	Pump	Ox Acid transfer pump	2	Diaphram pump	600	L/min				Polyethylene			4a-3				
LWF	4650	Feeder	Ow crystal feeder	1	Auger type w/ hopper & load calls	40	Kg/min				316 SS		1	4a-3				
LWF	4610	Feeder	Caustic pellet feeder	1	Auger type w/ hopper & load cells	100	Kg/min				316 SS		1	4a-3				
BB	4650	Unloader	Bulk Bag Ox crystal unloadar	1	Dustfree bulk bag unloader	4,000	Kg/hr.				C.S., epoxy paint		2	4a-3				
BB	4610	Unloader	Bulk Bag Caustic Pellet unloader	1	Dustfree bulk bag unloader	4,000	Kg/hr.				C.S., epoxy paint		2	4a-3				
Building/Process area HVAC																		
AHU	9010-13	Air handler unit	HVAC fan, filter and coils	4	Fresh air HEPA and blower AHU	510	M3/min	18	15	7.5	304 SS		40			ISO 9000, 6 wide x 3 high x 1 stage HEPA		
AHU	9020,21	Air handler unit	HVAC fan, filter and coils	2	Fresh air HEPA and blower AHU	450	M3/min	18	13	7.5	304 SS		40			ISO 9000, 5 wide x 3 high x 1 stage HEPA		
AHU	9031-4	Air handler unit	HVAC ID fan and filter	4	Exhaust air HEPA and blower	510	M3/min	24	15	7.5	304 SS		60			ISO 9000, 6 wide x 3 high x 2 stage HEPA		
AHU	9040	Air handler unit	HVAC ID fan and filter	1	Exhaust air HEPA and blower	680	M3/min	24	15	10	304 SS		75			ISO 9000, 6 wide x 4 high x 2 stage HEPA		
AHU	9050	Air handler unit	HVAC ID fan and filter	1	Exhaust air HEPA and blower	250	M3/min	24	7.5	7.5	304 SS		40			ISO 9000, 3 wide x 3 high x 2 stage HEPA		
H	9060-5	Duct heater	O. A. heater	6	Electric duct heater	400	Kw											
CH	9101,2,3	Chiller		3	Chiller, water cooled	350	Kw						125					
P	9201,2,3	Pump	Chilled water pump	3	Chilled water pump	600	Umin						75			Centrifugal pump, Iron		
P	9301,2	Pump	Cooling water pump	2	Cooling water circulation pump	1590	Umin						10			Centrifugal pump, Iron		
CT	9400	Evaporartor	Cooling tower	1	Cooling tower, direct evaporation	13	Mw						2X15					
Incineration Equipment																		
T	6010A-F	Tank	Pencil Tank	6	criticality pencil tanks			6	4 inch		SS			4a-5				
V	6010	Valve	Plug Valve	1	fines control from pencil tanks				6 inch		SS			4a-5				
P	6010	Pump	Transport slurry From Pencil Tanks to Incinerator	2	Diaphragm Pump	10	l/min				SS			4a-5		Air driven pump		
B	6040	Bin	Holding Bin	1	Receiving Bin	23,592	kg	8	8	10.5	SS			4a-5		24 hrs storage capacity		
V	6020	Valve	Plug Valve	1	Plug Valve	1,050	kg/hr		1					4a-5				
V	6030	Valve	Metering Feed Valve	1	double gate valve	1,050	kg/hr		1					4a-5				
T	6050	Tank	Propane Storage Tank	1	bulk liquid propane storage	40	m^3		10	18	CS			4a-5				
VA	6010	Vaporizer	Propane Vaporizer	1	propane liquid to vapor equipment	123	kg/hr	4	6	8				4a-5				
CC	6010	Incinerator	Primary Combustor	1	first stage of incineration	1050	kg/hr							4a-5		includes; hearth, kiln, grate drive	**	
H	6010	Heater	Air Heater	1	primary combustion air heater									4a-5			**	
BLO	6010	Blower	Combustion Air Blower	1	primary combustion air FD blower	1900	acmh	3	4	4				4a-5			**	
V	6040	Valve	Open or Closed Valve	1	Slide Valve	750	kg/hr		1					4a-5			**	
V	6050	Valve	Metering Feed Valve	1	double gate valve	750	kg/hr		1					4a-5			**	

Option 4a
Combined Equipment List
(4a and 3aP)

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft)	Width or Dia. (ft.)	Height ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Unit Estimated Cost, 1000	Estimated Cost Basis
CC	6020	Incinerator	Seconday Combustor	1	second stage of incineration	10	m^3							4a-5			**	
BLO	6020	Blower	Combustion Air Blower	1	secondary combustion air FD blower	1000	acmh							4a-5			**	
CONV	6010	Mechanical	Incinerator Discharge Equipment	1	discharge conveyer	75	kg/hr							4a-5			**	
C	6060	Cooler	Incinerator Ash Cooling Equipment	1	gravity cooler	75	kg/hr	2	2	4				4a-5		cool ash to 40 deg. C	**	
I&C	6010	Instrumentation	Incinerator Instruments and Controls	TBD										4a-5			**	
GB	6020	Glovebox	Drum Loading Glovebox	1	packaging glovebox			8	4	7				4a-5				360 GEM Pit 9, Approx. 45K/lineal ft.
CR	6010	Crane	Bridge Crane	1	Service bridge crane	18,000	kg	80	32	70	C.S.		3,3,15			Pendent controlled at floor		
CR	6020	Crane	Monorail	1	Tote Transfer	4500	kg	20		30	C.S.		2.5					
Incineration Off Gas Treatment Equipment, Low Nox																		
CY	6010A,B	Cyclone	Cyclone Separator/Filter	2	off gas cyclone separater/filter	18000	acmh		3	6				4a-6			**	
V	6060	Valve	Actuated Valve	1	Open and close cyclone									4a-6			**	
SCR	6010	Scrubber	Off Gas Scrubber	1	Off Gas Scrubber	41000	kg/hr		4	10				4a-6			**	
V	6070	Valve	Actuated Valve	1	blowdown valving	52	kg/hr		2 inch					4a-6				
HX	6010	Heat Exchange	Scrubber Heat Ex hanger	1		4	MMBTU/hr							4a-6			**	
T	6070	Tank	Caustic Storage Tank	1	storage of caustic for off gas	4500	l		6	8	CS			4a-6			**	
P	6050A,B	Pump	Caustic Pump	2	pumping caustic	1	l/min						1	4a-6			**	
P	6040A,B	Pump	Scrubber Recirculation Pump	2	recirculate scrubber contents	10	l/min						0.13	4a-6				
P	6060A,B	Pump	Blowdown Pump	2	scrubber blowdown pump	86	kg/hr						0.13	4a-6				
T	6060	Tank	Blowdown Tank	1	off gas scrubber blowdown tank	4500	l							4a-6				
MX	6080	Mixer	Blowdown Tank Mixer	1	mix contents of blowdown tank								0.5	4a-6				
E	6010	Evaporator	Blowdown Evaporator	1	evaporate blowdown liquid	760	kg/hr							4a-6				
P	6070A,B	Pump	Brine Pump	2	discharge brine blowdown	10	l/min						0.13	4a-6				
T	6070	Tank	Brine Storage Tank	1	storage of brine from evaporator	1000	l		3	6	CS			4a-6				
P	6080A, B	Pump	Brine Transfer Pump	2	brine transfer	5	kg/hr						0.06	4a-6				
V	6080	Valve	Actuated Valve	1	brine transfer	5	kg/hr							4a-6				
HOP	6010	Hopper	Storage Hopper	1	hopper for grout storage	4	m^3							4a-6				
V	6090	Valve	Plug Valve	1	open and close hopper grout flow				6 inch					4a-6				
V	6095	Valve	Star Valve	1	meter grout	31	kg/hr		6 inch					4a-6				
MX	6010	Mixer	In-drum Mixer	1	mix grout and water in drums									4a-6				
GB	6100	Glovebox	Enclosure for in Drum Grouting	1	containment of Alpha			8	4	7	SS			4a-6				280 GEM Pit 9, Approx. 35K/lineal ft.
HEME	6010	Mist Eliminator	High Efficiency Mist Eliminator	1	off gas mist eliminator	3500	acmh		4	8	CS			4a-6		Include HEME Wash Valve Train	**	
H	6010	Duct heater	Exhaust gas heater	6	Electric duct heater	40	Kw							4a-6				
HEPA	6010A, B, C	Filter	HEPA Filter	1	filters; roughing, primary, secondary	2200	SM^3/hr							4a-6		5 housing each with 4 X 4 filters		
GAC	6010	GAC	GAC Adsorber	1	carbon adsorber	500	kg							4a-6				
T	6080	Tank	Nitrogen Tank	1	Fire Suppression	1000	l							4a-6				
V	6090	Valve	Control Valve	1	Fire Suppression				l inch					4a-6				
SCR	6020													4a-6				
BL	6040A, B	Blower	Stack Blower	2	Stack Blower	4000	acmh	4	6	6	SS		50	4a-6			**	
BL	6050	Blower	SCR Blower	1	SCR Blower	400	kg/hr							4a-6				
BL	6060	Blower	Stack Blower	1	Stack Blower									4a-6				
HEPA	6020A, B, C	Filter	HEPA Filter	1	filters; roughing, primary, secondary	39000	acmh							4a-6		6 wide x 4 high HEPA		
S	6010	Stack	Off Gas Stack	1	Environmental Stack				36	60				4a-6			**	
CEM	6010	Instrumentation	Continuous Emissions Monitoring	1	monitor emissions at the stack			2	2	4				4a-6			**	
CR	6020	Crane	Bridge Crane	1	Service bridge crane	9,100	kg	85	26	25	C.S.		3,3,10			Pendent controlled at floor		
Off-gas treatment, High Nox																		
CY	6100	Cyclone	Cyclone Separator/Filter	1	off gas cyclone separater/filter	6000	acmh							4a-7				
F	6100	Baghouse Filte	Off Gas Filteration	1	baghouse filter, ceramic candles	6000	acmh							4a-7				
HX	6110	Heat Exchange	Scrubber Heat Ex hanger	1	water cooled heat exchanger	0.2	MMBTU/hr							4a-7				
O	6120	Reduction	NOx Reduction Section	1	propane fired, refractory lined reduction s	1	MMBTU/hr							4a-7				
Q	6110	Quench	Integral quench Section	1	water injection quench	0.2	MMBTU/hr							4a-7				
O	6130	Reoxidation	Reoxidation Section	1	air injection reoxidation									4a-7				
Q	6120	Quench	Offgas Quench	1	water injection quench	0.07	MMBTU/hr							4a-7				
Thermal Desorption, soil <100 nCi																		
HOP	3001	Hopper	Wet Soil Feed Hopper	1	Retention of Wet Soil and Feeder to TD.	23592	kg	8	8	10.5	SS					24 hrs storage capacity		
V	3002	Valve	Slide Isolation Valve	1	Slide Isolation valve				1		CS				12 in. line			
V	3001	Valve	Metering feed valve	1	Feeder Valve	1000	kg/hr				CS		0.5					
A	3001	Auger	Rotary Screw Auger	1	Product Feed to TD	1000	kg/hr		1		CS		3					
TD	3001	Mechanical	Thermal Desorber	1	Water and VOC Removal Chamber - Hollow Screw Type	1000	kg/hr	16	3		CS and SS		15			"Holo-Scru" Unico Services, Inc	148	
GB	3001	Glovebox	Container Unloading Glovebox	1	feed end glovebox	3.5	m3	5	5	5	304 SS						120	Approx. 23K/lineal ft.

Option 4a
Combined Equipment List
(4a and 3aP)

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft)	Width or Dia. (ft.)	Height ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Unit Estimated Cost, 1000	Estimated Cost Basis
V	3006	Valve	Slide Isolation Valve	1	Isolate TD from Cooling Auger				1		CS				12 in. line			
CS	3002	Auger	Cooling Screw Auger	1	Cool TD Product	1000	kg/hr	16	24		CS		15					
A	3002	Auger	Feed Auger	1	Rotary Screw Feed Auger	1000	kg/hr		1		CS		3					
HOP	3002	Hopper	Dry Soil Feed Hopper	1	Retention of Dry Soil and Feeder to Packaging.	10740	kg	6.25	6.25	10.5	CS					provides 15 hrs storage capacity		
V	3007	Valve	Hopper Isolation Slide Valve	1	Hopper Valve				1		CS				12 in. line			
A	3003	Auger	Rotory Screw Auger	1	TD Product Transfer	1000	kg/hr		1				5		12 in. line			
GB	3003	Glovebox	Packaging Glovebox	1	Packaging TD Product			12	7	7						packaging into 5'X5'X6' hard box	480	Gem Pit 9, approx. 40k/running ft.
CR	3000	Crane	Bridge Crane	1	Service bridge crane	9,100	kg	56	19	25	C.S.		3,3,10			Pendent controlled at floor		
CR	3001	Crane	Monorail	1	Tote Transfer	4500	kg	20		30	C.S.		2,5					
			Water and VOC Collection & Process															
C	3001	Condenser	Tube and Shell Condenser	1	VOC and Water Condenser	350	kg/hr		1.5	6	SS					Cold water side supplied by incinerator PFD		
GAC	3010	GAC	Carbon Bed	2	Carbon Bed	TBD												
F	3020A, B, C	Filter	Off Gas Filter	1	Filter Off-Gas	TBD		3	3	4								
V	3009	Valve	Isolation Valve (Sol.)	1	Isolate Condenser Drain				0.083						1 in. line			
P	3003A, B	Pump	Water Pump	2	Condensate Pump	1363	l/hr				SS		0.25			Sized for 200 ft head loss		
T	3001	Tank	Organic Separator	1	oil/water/organic separation	2270	l		4	8	SS							
P	3004A, B	Pump	VOC Pump	2	VOC Pump	300	l/hr				SS		0.06			Sized for 100 ft of head loss		
P	3005A, B	Pump	Water Pump	2	Water Removal From T-3001	480	l/hr				SS		0.06			Sized for 100 ft of head loss		
T	3002	Tank	VOC Storage	1	VOC Storage Tank	265	l		2	4	SS							
P	3006A, B	Pump	VOC Transfer Pump	2	Transfer VOC to Off-site Treatment	300	l/hr				SS		0.06			Sized for 100 ft of head loss		
AB	3001	Absorber	Oil absorber	1	absorb oil from T-3001	208	l									asume 1 drum per week		
GAC	3001-1	GAC	Carbon Bed	1	Carbon Bed	208	l									asume this drum is depleted every 8 hr shift		
GAC	3001-2	GAC	Carbon Bed	1	Carbon Bed	208	l											
GAC	3001-3	GAC	Carbon Bed	1	Carbon Bed	208	l											
GAC	3001-4	GAC	Carbon Bed	1	Carbon Bed	208	l				SS							
E	3003	Evaporator	Water Evaporator	1	Evaporate Water	293	kg/hr	15	6		SS							
HX	3003	Heat Exchange	Assist Evaporator	1	Evaporate Water	12	Kw	12	1.5									
Thermal Desorption, soil >100 nCi																		
A	3101	Auger	Rotary Screw Auger	1	Rotary Screw Auger	1000	kg/hr	15	2		SS		3	4a-2		This item may be supplied by Retrieval Ops.		
V	3101	Valve	Slide Isolation Valve	1	Slide Isolation valve				0.5		SS			4a-2	6 in line	This item may be supplied by Retrieval Ops.		
HOP	3101	Hopper	Wet Soil Feed Hopper	1	Retention of Wet Soil and Feeder to TD.	23592	kg	8.0	8.0	10.5	SS		3	4a-2		24 hrs holding capacity		
V	3102	Valve	Metering feed valve	1	Feeder Valve	1000	kg/hr				SS		0.5	4a-2				
TD	3101	Mechanical	Thermal Desorber	1	Water and VOC Removal Chamber - Hollow Screw Type	1000	kg/hr	16	3		CS and SS		15	4a-2		"Holo-Scru" Unico Services, Inc	148	
GB	3100	Glovebox	Container unloading Glovebox	1	feed end glovebox	3.5	m3	5	5	5	304 SS						120	Approx. 23K/lineal ft.
V	3106	Valve	Double Dump Valve	1	Isolate TD and Control Feed to HOP-2				0.5		SS			4a-2	6 in line			
HOP	3102	Hopper	Dry Soil Feed Hopper	1	Retention of Dry Soil and Feeder to Leaching.	34368	kg	8.2	8.2	21.3	SS			4a-2		provides 24 hr holding capacity		
V	3107	Valve	Hopper Valve	1	Hopper Valve				0.5		SS			4a-2	6 in line			
CR	3100	Crane	Bridge Crane	1	Service bridge crane	9,100	kg	23	56	25	C.S.		3,3,10			Pendent controlled at floor		
CR	3101	Crane	Monorail	1	Tote Transfer	4500	kg	20		30	C.S.		2,5					
			Water and VOC Collection & Process															
C	3101	Condenser	Tube and Shell Condenser	1	VOC and Water Condenser	350	kg/hr		1.5	6	SS			4a-2		Cold water side supplied by incinerator PFD		
V	3109	Valve	Isolation Valve (Sol.)	1	Isolate Condenser Drain									4a-2				
P	3103	Pump	Water Pump	1	Condensate Pump	1363	l/hr				SS		0.25	4a-2		Sized for 200 ft head loss		
T	3101	Tank	Organic Separator	1	oil/water/organic separation	2270	l		4	8	SS			4a-2				
P	3104	Pump	VOC Pump	1	VOC Pump	300	l/hr				SS		0.06	4a-2		Sized for 100 ft of head loss		
P	3105	Pump	Water Pump	1	Water Removal From T-1	480	l/hr				SS		0.06	4a-2		Sized for 100 ft of head loss		
T	3102	Tank	VOC Storage	1	VOC Storage Tank	265	l		2	4	SS			4a-2				
P	3106	Pump	VOC Transfer Pump	1	Transfer VOC to Incinerator	300	l/hr				SS		0.06	4a-2		Sized for 100 ft of head loss		
AB	3101	Absorber	Oil absorber	1	absorb oil from T-3001	208	l							4a-2		asume 1 drum per week		
GAC	3101-1	GAC	Carbon Bed	1	Carbon Bed	208	l							4a-2		asume this drum is depleted every 8 hr shift		
GAC	3101-2	GAC	Carbon Bed	1	Carbon Bed	208	l							4a-2				
GAC	3101-3	GAC	Carbon Bed	1	Carbon Bed	208	l							4a-2				
GAC	3101-4	GAC	Carbon Bed	1	Carbon Bed	208	l							4a-2				
T	3103	Tank	Water Tank	1	Tank	1200	l		3	6	SS			4a-2				
P	3101	Pump	Pump	1	Pump	4800	l/hr				SS		1	4a-2		Sized for 200 ft head loss		
V	3108	Valve	Flow Control Valve	1	Flow Control Valve				0.083		SS			4a-2	1 in line			
V	3110	Valve	Isolation Valve (Sol.)	1	Water Blowdown of T-3001				0.083		SS			4a-2	1 in line			
V	3111	Valve	Isolation Valve (Sol.)	1	VOC Blowdown of T-3001				0.083		SS			4a-2	1 in line			

Option 4a
Combined Equipment List
(4a and 3aP)

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft)	Width or Dia. (ft.)	Height ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Unit Estimated Cost, 1000	Estimated Cost Basis
V	3112	Valve	Isolation Valve (Sol.)	1	T-3002 Blowdown				0.083		SS			4a-2	1 in line			
V	3113	Valve	Isolation Valve (Sol.)	1	T-3003 Blowdown				0.083		SS			4a-2	1 in line			
Building/Process Utilities																		
V	8003	Valve	Water Flow Control Valve	1	Supply Water to the Boiler				0.083		CS			4a-2	6 in line	Assume potable water (non-treated)		
B	8001	Boiler	Steam Boiler	1	Process Steam	4600	kg/hr		3	8	CS		5	4a-2		50 psi ASME B & PV Package water tube		
V	8004	Valve	Flow Control Valve	1	Control the Flow rate of Steam	40	kg/hr		0.083		CS			4a-2	1 in line	To support 1000 kg/hr thermal desorption		
P	8005	Pumps	Feedwater pumps	2	Feedwater pump	95	l/min						5	4a-2				
DA	8006	Treatment	Water Softener	1	Duplex water softener	70	l/min				CS			4a-2			4.5	Phone w/ vendor
T	8007	Tank	Deaerator	1	Deaerator/ feedwater storage tank	1000	L	5	3		CS			4a-2				
T	8100	Tank	Propane Tank	3	Boiler Propane Supply	100	m3	75	8		CS			4a-2		4 wk supply, Estimated usage is 300 kg/hr		
V	8110	Vaporizer	Propane vaporizer	1	Boiler Propane Supply	TBD						35Kw		4a-2				
H	8200	Heater	Thermal liquid heater	1	Thermal oil heater	630,000	k cal/hr				CS			4a-2		Propane fueled	85	Parker Boiler quote
P	8210,20	Pump	Centrifugal pump	2	Thermal oil circulating pump	1700	L/min						10	4a-2				included with heater
V	8231	Valve	Control Valve	1	Oil control valve to equipment	100	mm							4a-2		1000 L/min to soil dryer	5.5	Vendor quote
V	8232,3	Valve	Control Valve	2	Oil control valve to equipment	50	mm							4a-2		700 L/min to one of the T.D. units	5.5	Vendor quote
F	8340	Filter	Duplex oil filter	1	Oil filter	150	mm							4a-2			3	
T	8350	Tank	Feed tank	1	Surge/Storage tank	190	L				CS			4a-2				included with heater
		Fluid	Oil		Thermal oil	3000	L							4a-2		Paratherm, NF series	7.6	$9.53 /gal
CT	8400	Cooling Tower	Evaporative cooling Tower	1	Process cooling water	1.8	Mw	6.6	2.6	3.4			2x15	4a-2				
P	8410,20,30	Pump	Cooling water pump	3	Centrifuugal pump	1900	L/min	1.8	0.6	0.8	C.I.		35	4a-2		140 feet of head		
AC	8500	Compressor	Air Compressor	1	Plant air compressor	6000	L/min						50			150 psi		
T	8500	Tank	Air Receivor	1	Plant air receivor	3700	L		4	10	C.S.							
AC	8600	Compressor	Breathing Air	1	Plant Breathing air compressor	2800	L/min						25			Oilless reciprocating compressor		
F	8610	Filter	Breathing Air filter purifier	1	Filter, CO catalyst, dryer	2800	L/min											

Notes: 1. Equipment costs in red and noted with a double astrick are all included in the incinerator cost
2. Revision A changes noted in light blue shading on electronic copy.
3. Equipment on standby power noted in bold.
4. Change to pump noted in yellow

1355.81

Equipment numbering / Area Designation

2000	Pre-treatment	
3000	Thermal Desorption	
4000	Chemical Leach	
5000	Melter / offgas	
6000	Incinerator / offgas	
7000		
8000	Utilities	
9000	HVAC	

elect. Power Kw 1948.5275

Equipment Type Legend	
AHU	Air Handling Unit
B	Bin
BL	Blower
BR	Boiler
C	Calciner
CO	Condenser
CH	Chiller
CV	control valve
F	Filter
GAC	Granulated Activated carbon
H	Heater
HX	Heat exchanger
LWF	Loss in weight feeder
MX	Mixer
P	pump
T	Tank
TD	Thermal-Desorber
TL	Tank level sensor
TS	Temperature Sensor
A	Auger (screw conveyor)
V	Valve

OU 7-10 Alternative 2aP Thermal All																								
												Electrical												
Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Watt	HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis						
Incineration Equipment																								
B	6040	Bin	Holding Bin	1	Receiving Bin	23,592	kg	8	8	10.5	SS					24 hrs storage capacity								
V	6040	Valve	Open or Closed Valve	1	Slide Valve	1,050	kg/hr		1															
V	6045	Valve	Metering Feed Valve	1	double gate valve	1,050	kg/hr		1												Diameter	height	Volume ft^3	Volume m^3
T	6050	Tank	Propane Storage Tank	1	bulk liquid propane storage	40	m^3		10	18	CS										10	18	1414	40
VA	6010	Vaporizer	Propane Vaporizer	1	propane liquid to vapor equipment	123	kg/hr	4	6	8														
C	6010	Incinerator	Primary Combustor	1	first stage of incineration											Includes; hearth, kiln, grate drive								
T	6200	Tank	Propane Tank	1	propane storage tank	40	m^3									100 kg/hr								
V	6010	Vaporizer	Propane Vaporizer	1	vaporize liquid propane	100	kg/hr					15 kW												
CC	6010	Burner	Primay Burner System	1	incinerator burner	1050	kg/hr																	
H	6010	Heater	Air Heater	1	primary combustion air heater																			
BLO	6010	Blower	Combustion Air Blower	1	primary combustion air FD blower	1900	acmh	3	4	4														
V	6010	Valve	Open or Closed Valve	1	Slide Valve	750	kg/hr		1															
V	6020	Valve	Metering Feed Valve	1	double gate valve	750	kg/hr		1															
CC	6020	Incinerator	Secondey Combustor	1	second stage of incineration	10	m^3																	
BLO	6020	Blower	Combustion Air Blower	1	secondary combustion air FD blower	1000	acmh																	
CONV	6010	Mechanical	Incinerator Discharge Equipment	1	discharge conveyer	75	kg/hr																	
C	6010	Cooler	Incinerator Ash Cooling Equipment	1	gravity cooler	75	kg/hr	2	2	4						cool ash to 40 deg. C								
I&C	6010	Instrumentation	Incinerator Instruments and Controls	TBD																				
GB	6020	Glovebox	Wood Box Loading Glovebox	1	packaging glovebox			12	7	7							480K	GEM Pit 9, Approx. 40K/lineal ft.						
Off Gas Equipment																								
CY	6010A,B	Cyclone	Cyclone Separator/Filter	2	off gas cyclone separator/filter	18000	acmh		3	6														
SCR	6060	Scrubber	Off Gas Scrubber	1	Off Gas Scrubber	41000	kg/hr		4	10														
V	6080	Valve	Actuated Valve	1	blowdown valving	52	kg/hr		2 inch															
EVS	6060	EVS	Ejector Venturi Scrubber	1	ejector venturi scrubber	3000	kg/hr																	
HX	6060	Heat Exchanger	Scrubber Heat Ex hanger	1		4	MMBTU/hr																	
T	6070	Tank	Caustic Storage Tank	1	storage of caustic for off gas	4500	l		6	8	CS													
P	6070A,B	Pump	Caustic Pump	2	pumping caustic	1	l/min						1											
P	6025A,B	Pump	Blowdown Pump	2	off gas scrubber blowdown pump	10	l/min						0.13											
P	6200A,B	Pump	Blowdown Pump	2	scrubber blowdown pump	4.7	kg/hr						0.13											
T	6200	Tank	Blowdown Tank	1	off gas scrubber blowdown tank	4500	l																	
MX	6020	Mixer	Blowdown Tank Mixer	1	mix contents of blowdown tank								0.5											
E	6200	Evaporator	Blowdown Evaporator	1	evaporate blowdown liquid	760	kg/hr																	
P	6300A,B	Pump	Discharge Pump	2	discharge brine blowdown	10	l						0.13											
T	6300	Tank	Brine Storage Tank	1	storage of brine from evaporator	120	kg		3	6	CS													
MX	6020	Mixer	Brine Storage Tank Mixer	1	maintain mix during filling and draining								0.13											
P	6400A, B	Pump	Brine Transfer Pump	2	brine transfer	5	kg/hr						0.06											
V	6400	Valve	Actuated Valve	1	brine transfer	5	kg/hr																	
HOP	6500	Hopper	Storage Hopper	1	hopper for grout storage	4	m^3																	
V	6500	Valve	Metering Valve	1	meter grout	31	kg/hr		2 inch															
MX	6010	Mixer	In-drum Mixer	1	mix grout and water in drums																			
GB	6020	Glovebox	Packaging glovebox	1	glovebox for in-drum mixing	1.25	drums/shift	8	4	7	SS						280k	GEM Pit 9, Approx. 35k/lineal foot						
HEME	6070	Mist Eliminator	High Efficiency Mist Eliminator	1	off gas mist eliminator	3500	acmh		4	8	CS					Include HEME Wash Valve Train								
H	6080	Heater	Reheat Off Gas	1	Reheat off gas	50	deg C					5.5 kW												
HEPA	6100A, B, C	Filter	HEPA Filter	1	filters; roughing, primary, secondary	2200	SM^3/hr									5 housing each with 4 X 4 filters								
GAC	6010	GAC	GAC Adsorber	1	carbon adsorber	500	kg																	
FC	6010	Fire Control	GAC Fire Supression	1	Fire supression in GAC																			
BLO	6030A,B	Stack Blower	Off Gas Stack Blower	2	stack blower	4000	acmh	4	6	6	SST		50											
S	6010	Stack	Off Gas Stack	1	Environmental Stack				36	60														
CEM	6010	Instrumentation	Continuous Emissions Monitoring	1	monitor emissions at the stack			2	2	4														
Ventilation Systems																								
HEPA	6503ABC	HEPA filter	Thermal All Zone III HEPA	1	1 high x 1 wide HEPA filter housing	1000	cfm																	
HEPA	6502ABC	HEPA filter	Thermal All Zone II HEPA	7	4 high x 4 wide HEPA filter housing	110,000	cfm																	
HEPA	6501ABC	HEPA filter	Thermal All Zone I HEPA	5	1 high x 1 wide HEPA filter housing	5000	cfm																	
BL	6503A	Exhaust Fan	Thermal All Zone III exhaust fan	1	centrifugal fan	300 / 15	cfm / in wc						2			standby power req'd 2 of 3 operating								
BL	6503 B	Exhaust Fan	Thermal All Zone III exhaust fan	1	centrifugal fan	300 / 15	cfm / in wc						2			standby power req'd 2 of 3 operating								
BL	6503 C	Exhaust Fan	Thermal All Zone III exhaust fan	1	centrifugal fan	300 / 15	cfm / in wc						2			standby power req'd 2 of 3 operating								
BL	6502 A	Exhaust Fan	Thermal All Zone II exhaust fan	1	centrifugal fan	55,000 / 15	cfm / in wc						216			standby power req'd 2 of 3 operating								
BL	6502 B	Exhaust Fan	Thermal All Zone II exhaust fan	1	centrifugal fan	55,000 / 15	cfm / in wc						216			standby power req'd 2 of 3 operating								
BL	6502 C	Exhaust Fan	Thermal All Zone II exhaust fan	1	centrifugal fan	55,000 / 15	cfm / in wc						216			standby power req'd 2 of 3 operating								
BL	6501 A	Exhaust Fan	Thermal All Zone I exhaust fan	1	centrifugal fan	2,100 / 15	cfm / in wc						8			standby power req'd 2 of 3 operating								
BL	6501 B	Exhaust Fan	Thermal All Zone I exhaust fan	1	centrifugal fan	2,100 / 15	cfm / in wc						8			standby power req'd 2 of 3 operating								
BL	6501 C	Exhaust Fan	Thermal All Zone I exhaust fan	1	centrifugal fan	2,100 / 15	cfm / in wc						8			standby power req'd 2 of 3 operating								
AHU	6502 A	Air Handling Unit	Thermal All Zone II air handling unit	1	centrifugal fan	55,000 / 2	cfm / in wc						29			standby power req'd 2 of 3 operating								
AHU	6502 B	Air Handling Unit	Thermal All Zone II air handling unit	1	centrifugal fan	55,000 / 2	cfm / in wc						29			standby power req'd 2 of 3 operating								
AHU	6502 C	Air Handling Unit	Thermal All Zone II air handling unit	1	centrifugal fan	55,000 / 2	cfm / in wc						29			standby power req'd 2 of 3 operating								
AHU	6501 A	Air Handling Unit	Thermal All Zone I air handling unit	1	centrifugal fan	2,100 / 2	cfm / in wc						2			standby power req'd 2 of 3 operating								

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
AHU	6501 B	Air Handling Unit	Thermal All Zone I air handling unit	1	centrifugal fan	2,100 / 2	cfm / in wc						2			standby power req'd 2 of 3 operating		
AHU	6501 C	Air Handling Unit	Thermal All Zone I air handling unit	1	centrifugal fan	2,100 / 2	cfm / in wc						2			standby power req'd 2 of 3 operating		
H	6502 A	Heater	Thermal All Zone II air handling unit heater	1	electric heater for supply air		Btu/hr					5.00E+05				2 of 3 operating		
H	6502 B	Heater	Thermal All Zone II air handling unit heater	1	electric heater for supply air		Btu/hr					5.00E+05				2 of 3 operating		
H	6502 C	Heater	Thermal All Zone II air handling unit heater	1	electric heater for supply air		Btu/hr					5.00E+05				2 of 3 operating		
H	6501 A	Heater	Thermal All Zone I air handling unit heater	1	electric heater for supply air		Btu/hr					2.05E+05				2 of 3 operating		
H	6501 B	Heater	Thermal All Zone I air handling unit heater	1	electric heater for supply air		Btu/hr					2.05E+05				2 of 3 operating		
H	6501 C	Heater	Thermal All Zone I air handling unit heater	1	electric heater for supply air		Btu/hr					2.05E+05				2 of 3 operating		
Cranes:																		
		Crane	monorail, 5 ton	1	receiving area	5	ton						5 & 2					
		Crane	bridge, 20 ton	1	incinerator cell	20	ton						15, 3, & 3					
		Crane	bridge, 10 ton	1	process/off gas	10	ton						10, 3, & 3					

Note: Items in red text are included with the purchase of the incinerator.

Equipment Type	Equipment Number	Equipment Type	Component Item	Number Required	Description	Size or Capacity	Units	Length (ft.)	Width or Dia. (ft.)	Height (ft.)	Materials of Construction	Electrical Watt	Electrical HP	Flow Diagram	Size Basis	Notes or Reference	Estimated Cost	Estimated Cost Basis
Thermal Desorber feed System		<60mm, RF Sludge, >Trigger feed																
HOP	HOP-3001	Hopper	Wet Soil Feed Hopper	1	Retention of Wet Soil and Feeder to TD.	23592	kg	8	8	10.5	SS					24 hrs storage capacity		
V	V-3002	Valve	Slide Isolation Valve	1	Slide Isolation valve				1		CS				12 in. line			
V	V-3001	Valve	Metering feed valve	1	Feeder Valve	1000	kg/hr				CS							
A	A-3001	Auger	Rotary Screw Auger	1	Product Feed to TD	1000	kg/hr		1		CS		5					
GB	GB-3000	Glovebox	Glovebox	1	in-feed glovebox			6	6	8	SS/Lexan						184K	GEM Pit 9 23K/lineal ft.
Sweep Gas System																		
V	V-3003	Valve	Water Flow Control Valve	1	Supply Water to the Boiler				0.083		SS				6 in line	Assume potable water (non-treated)		
B	B-3001	Boiler	Steam Producing Boiler	1	Process Steam	100	kg/hr		3	8	SS					55 kg/hr TD sweep;		
V	V-3004	Valve	Flow Control Valve	1	Control the Flow rate of Steam	40	kg/hr		0.083		SS				1 in line	To support 1000 kg/hr thermal desorption		
T	T-3100	Tank	Propane Tank	1	Boiler Propane Supply	40	m3											
E	E-3100	Vaporizer	Propane Evaporator	1	Boiler Propane Supply	0.1	gph	4	2	4		4000						
Rotary Screw Thermal Desorber																		
TD	TD-3001	Mechanical	Thermal Desorber	1	Water and VOC Removal Chamber - Hollow Screw Type	1000	kg/hr	16	3		CS and SS		10			"Holo-Scru" Unico Services, Inc	148K	
R	R-3001	Mechanical	Fluid Reservoir	1	Heat Transfer Fluid for TD	100	l	3	1	1	CS							
		Fluid	Hydraulic Fluid	1	Heat Transfer Fluid	100	l											
HX	HX-3001	Heat Exchanger	Heat Exchanger	1	Thermal Fluid Heater	50	l/hr	5	3	3	CS							
P	P-3008A, B	Pump	Pump	2	Heat Transfer Fluid Pump for TD	300	l/hr				CS		1			Sized for 200 ft head loss		
V	V-3005	Valve	Flow Control Valve	1	Heat Transfer Fluid Flow Control				0.083		CS				1 in line			
Desorbed Soil Collection System																		
V	V-3006	Valve	Slide Isolation Valve	1	Isolate TD from Cooling Auger				1		CS				12 in. line			
CS	CS-3002	Auger	Cooling Screw Auger	1	Cool TD Product	1000	kg/hr	16	24		CS		15					
A	A-3002	Auger	Feed Auger	1	Rotary Screw Feed Auger	1000	kg/hr		1		CS		5					
HOP	HOP-3002	Hopper	Dry Soil Feed Hopper	1	Retention of Dry Soil and Feeder to Packaging.	10740	kg	6.25	6.25	10.5	CS					provides 15 hrs storage capacity		
V	V-3007	Valve	Hopper Isolation Slide Valve	1	Hopper Valve				1		CS				12 in. line			
A	A-3003	Auger	Rotory Screw Auger	1	TD Product Transfer	1000	kg/hr		1				5		12 in. line			
GB	GB-3003	Glovebox	Packaging Glovebox	1	Packaging TD Product			12	7	7						packaging into 5'X5'X6' hard box	480K	Gem Pit 9, approx. 40k/running ft.
Water and VOC Collection & Process																		
C	C-3001	Condenser	Tube and Shell Condenser	1	VOC and Water Condenser	350	kg/hr		1.5	6	SS					Cold water side supplied by incinerator PFD		
GAC	GAC-3010A, B	GAC	Carbon Bed	2	Carbon Bed	TBD												
F	F-3020A, B, C	Filter, HEPA	Off Gas Filter	1	Filter Off-Gas	1000	cfm	3	3	4								
V	V-3009	Valve	Isolation Valve (Sol.)	1	Isolate Condenser Drain				0.083						1 in. line			
P	P-3003A, B	Pump	Water Pump	2	Condensate Pump	1363	l/hr				SS		0.25			Sized for 200 ft head loss		
T	T-3001	Tank	Organic Separator	1	oil/water/organic separation	2270	l		4	8	SS							
P	P-3004A, B	Pump	VOC Pump	2	VOC Pump	300	l/hr				SS		0.06			Sized for 100 ft of head loss		
P	P-3005A, B	Pump	Water Pump	2	Water Removal From T-3001	480	l/hr				SS		0.06			Sized for 100 ft of head loss		
T	T-3002	Tank	VOC Storage	1	VOC Storage Tank	265	l		2	4	SS							
P	P-3006A, B	Pump	VOC Transfer Pump	2	Transfer VOC to Off-site Treatr	300	l/hr				SS		0.06			Sized for 100 ft of head loss		
AB	AB-3001	Absorber	Oil absorber	1	absorb oil from T-3001	208	l									asume 1 drum per week	500./drum	called Selective Absorption Associat
GAC	GAC-3001-1	GAC	Carbon Bed	1	Carbon Bed	208	l									asume this drum is depleted every 8 hr shift		
GAC	GAC-3001-2	GAC	Carbon Bed	1	Carbon Bed	208	l											
GAC	GAC-3001-3	GAC	Carbon Bed	1	Carbon Bed	208	l											
GAC	GAC-3001-4	GAC	Carbon Bed	1	Carbon Bed	208	l											
E	E-3003	Evaporator	Water Evaporator	1	Evaporate Water	293	kg/hr	15	6		SS							
HX	HX-3003	Heat Exchanger	Assist Evaporator	1	Evaporate Water			12	1.5									
CT	CT-3001	Cooling Tower	Evaporative cooling Tower	1	cooling water recycle			6.6	2.6	3.4		240k						
P	P-3002A, B	Pump	Cooling water pump	2	cooling water recycle			1.8	0.6	0.8			5					
Cranes																		
		Crane	monorail, 5 ton	1	receiving area	5	ton						5 & 2					
		Crane	bridge, 20 ton	1	TD cell	20	ton						15, 3, & 3					
		Crane	bridge, 10 ton	1	process/off gas	10	ton						10, 3, & 3					