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Engineering Design File

PROJECT FILE NO. OU 1-07B

New Groundwater Treatment Facility planning conceptual design and cost estimate

[The following statement is optional:
Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho]

INEEL
Idaho National Engineering & Environmental Laboratory
BECHTEL BWXT IDAHO, LLC

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10/05/99
Rev. 02

ENGINEERING DESIGN FILE

1. Project File No. _____ 2. Project Task OU-107B Field Demonstration Report

3. Subtask New Groundwater Treatment Facility (NGWTF)

4. Title: NGWTF planning conceptual design and cost estimate

5. Summary: This EDF establishes the NGWTF planning conceptual design and associated cost estimate. This design and cost estimate is used to evaluate alternatives to the In-Situ Bioremediation technology presented in DOE/ID-10718, *Field Demonstration Report, TAN Final Groundwater Remediation, OU1-07B*. The cost estimate is presented in Table 2-3 of the demonstration report. Conclusions and recommendations are presented in the demonstration report and are not presented in this EDF.

6. Distribution (complete package):

Distribution (summary package only):

7. Review (R) and Approval (A) Signatures: (Minimum reviews and approvals are listed. Additional reviews/approvals may be added as necessary.)

	R/A	Printed Name	Signature	Date
Author	R	Al Cram	Al Cram	7/12/00
Independent Verification	R	ER Operational Review Board Jerry Shea Chairman	Jerry Shea	7/12/00
Requestor	A	Joe Rothennel, Project Mgr.	Joe Rothennel	7/13/00

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1. PURPOSE AND SCOPE

This EDF establishes the cost estimate and New Groundwater Treatment Facility (NGWTF) conceptual design used as a basis in evaluation of alternatives (this conceptual design being one alternative) to the ISB technology presented in DOE/ID 10718, *Field Demonstration Report, Test Area North Final Groundwater Remediation, Operable Unit 1-07B.* The cost estimate is used in Table 2-3 of the demonstration report. Conclusions and recommendations are presented in the demonstration report and are not presented in this EDF.

2. COST ESTIMATE SUMMARY

The cost estimate includes capital costs for construction of the NGWTF and annual operating costs as detailed on page 1 and 3 of the attached estimate. These costs are used for comparison against similar costs for the ISB treatment system in the Field Demonstration Report. Life Cycle Costs and escalation are presented in the Field Demonstration Report, Table 2-3 and Figures B-39 and B-40.

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Operation COST TOTALS Sheet 3 of 28

Job NEW GWTF Est By AJC Date 5/23/00

Description			
CAPITAL COSTS (SH 3 OF 14)		1,019,000	
OPERATIONAL COSTS (ANNUAL)			
MATERIALS, FILTERS	9900		
PROCESSING	21,000		
INSPECTIONS	10,900		
SUPPORT SERVICES	12,000		
TOTAL OP. COSTS	53,800		

Form No E5

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Operation ONE YEAR OP. COST Sheet 4 of 28

Job NEW GWTF Est By ATC Date 5/23/00

Description	Quan	MAT up	MAT Total	LAB up	LAB Total	SUB up	SUB Total
MATERIALS							
FILTERS							
8Ø X 30	200	7.00	1418				
6Ø X 18	104	5.00	520				
6Ø X 30	52	6.00	312				
MULTI-MEDIA	0.5	500	250				
CARBON	4	500	2000				
MISC. OP. SUPPLIES							
8% OF CRAFT LABOR			5400				
PROCESSING COSTS							
OPERATOR	700 Hr			30	21,000		
SYSTEM INSPECTIONS	364 Hr			30	10,900		
SUPPORT SERVICES							
HSO	200 Hr			30	6,000		
RCT	200 Hr			30	6,000		
TOTAL OP. COSTS			9,900		43,900		

Form No E5a

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Operation CONSTRUCTION COSTS Sheet 5 of 29
Job NEW GWTF Est By JCG Date 8-26-99

Description			
DIRECT COSTS	635,000		
CONTRACTOR OVERHEAD	77,000		
CONTRACTOR PROFIT	72,000		
TOTAL CONSTRUCTION COST	784,000		
CONTENCENCY	235,000		
TOTAL	1,019,000		

Form No E5

Operation 1 Sheet 6 of 28

Job NEW GWTF & TAN Est By JCG Date 8-25-99

Code	Description	Quan	UM	MR	Total Man Hrs	Unit Costs Lab	Mat	Other	LABOR	MATERIAL	SUPPLY	OTHER	TOTAL
02	SITE WORK	20	HR	6	120	45	—	235	5400	⊘	⊘	4700	10100
02	BLDG EX	330	CY	.1	33	45	—	5.25	1485	⊘	⊘	1733	3,218
02	BACKFILL	330	CY	.15	50	45	—	5.25	2250			1733	3,983
03	CONCRETE	250	CY	6	1500	45	80/40	50	67,500	20,000	10,000	12,500	110,000
08	DOORS 3070 EXT	4	EA	12	48	45	500	—	2160	2000			4160
08	DOORS 3070 INT	4	EA	8	32	45	300		1440	1200			2640
08	DOORS 16X14 ROLL	256	SF		24	45	8		1080	2048		500	3628
11	EQ (SEE ATTACHED)	20	E		802	45			36090	99100	3600	4000	106,700
13	METAL BLDG	4800	SF			15	10	10	72,000	48,000	48,000	⊘	168,000
15	MECH PIPE INT	300	LF	1.5	450	45	10		20,250	3000	⊘	⊘	23,250
	" " EXT	500	LF	2.5	1250	45	20		56,250	10,000			66,250
16	ELECT	4800	SF			8	10	2	38,400	48,000	9600	⊘	96,000
	TOTAL								304,305	233,348	72,200	25,166	635,019

Form No E5b

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Operation EQUIPMENT Sheet 7 of 28

Job Est By JCG Date 8-25-99

Description	Quan	MAT up	MAT Total	LAB up	LAB Total	SUB up	SUB Total
5,000 GAL TK	1	10K	10,000	20	20		
3,000 GAL TK	1	6K	6000	20	20		
3,500 GAL TK	1	8K	8000	20	20		
5HP PUMP	2	800	1600	24	48		
30 GPM PUMP	2	500	1000	24	48		
5HP FEED PUMP	2	1K	2000	24	48		
FILTER (mm)	2	7.8K	15 600	96	192		
BAG FILTER 8Φx30	2	2.5K	5000	16	32		
BAG FILTER 6Φx18	2	1.6K	3200	16	32		
BAG FILTER 6Φx30	2	2K	4000	16	32		
CONTROL VALVE	1	4K	4000	16	16		
AIR STRIPPER	1	30K	30000	240	240		
30 KW HEATER	1	4K	4000	16	16		
SUBTOTAL			94,400		764		
ADD 5% MISC?	? ?		4700		38		
	20		99,100		802		

Form No E5a

02 - SITE WORK

03 - CONCRETE

08 - DOORS & WINDOWS

09 - FINISHES

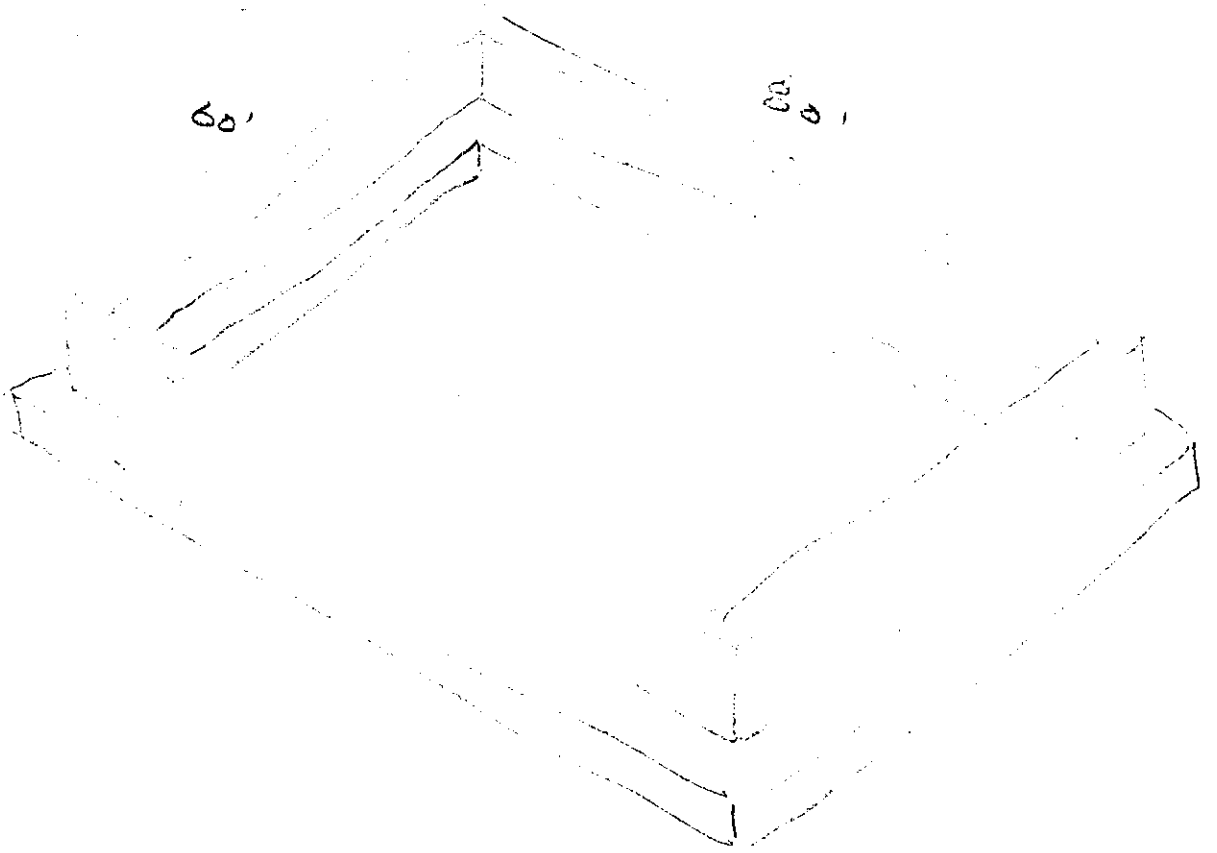
11 - EQ

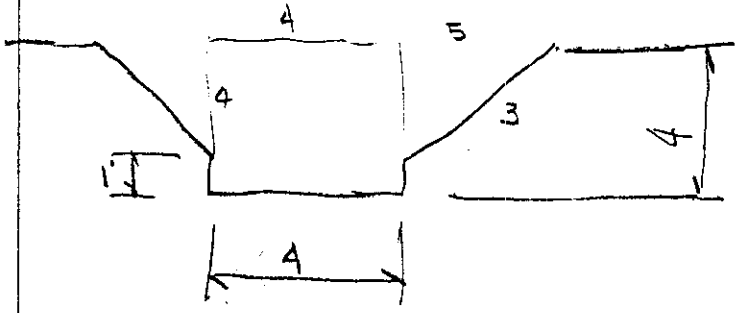
13 - SPECIAL CONST

15 - MECH

16 - ELECT

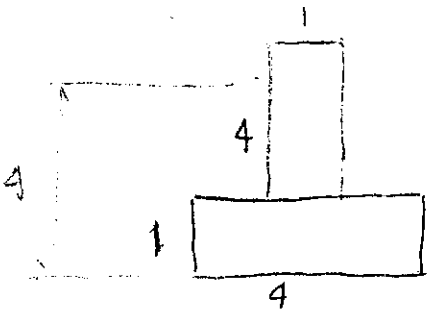
BLDG FDN





EXCAV

4 x 4 = 16
3 x 4 = 12
28 CF/LF



CONC FDN

20 1 x 4 = 8 CF/LF

02 EARTHWORK

1. GENERAL SITE (CLEAR & GRUB)

USE 2 DAYS FOR CREW

2. FINE GRADE SLAB

- C/E DATABASE = .017 MH/SF x 4800SF = 82 MH
- ADD 15% - 0.02 MH/SF x 4800SF = 96 MH

3. BLDG EX

- FDN 280LF x 28 CF/LF = 7840CF = 290 CY
- TRENCH 70 LF x 2x2 = 10 CY

300 CY

ADD 10% OVER EX

330 CY

03 CONCRETE

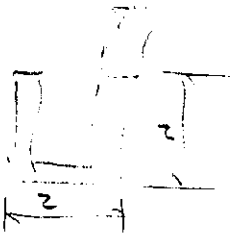
1. BLDG FDN

- 280 LF × 8 CF/LF = 2240 CF ÷ 27 = 83 CY

+ 5 %

87 CY

2. TRENCH



4 CF/LF × 80' = 12 CY

+ 5%

12 CY

3. SLAB

60 × 80 × .67 = 3216 ÷ 27 = 119 CY

+ 10%

131 CY

4. EQ PADS

4@ 10 × 10 × .67 = 268
4@ 5 × 5 × .67 = 67
4@ 2 × 5 × .67 = 27

362 CF ÷ 27 = 13.4 ~ 14 CY

TOTAL 244

WSE 250 CY

08 - DOORS & WINDOWS

- 4 ea 3070 EXT DOORS

- 2 ea 3070 INT DOORS

- 1 ea 16x16 ROLL-UP

11 EQUIPMENT

2.8.3 Transportation

The amounts of radioactivity in the samples and lab residuals are below the threshold at which U.S. Department of Transportation (DOT) regulations apply. The samples and residuals will be generated as a result of a CERCLA treatability study, and hence the RCRA transportation requirements described in 40 Code of Federal Regulations (CFR) 261.4(e) will be followed for samples that are shipped off-site for analysis, and for excess samples and laboratory residuals.

3. EQUIPMENT LIST

Table 3-1 provides a list of the major components for the NGWTF system.

Table 3-1. Equipment list and description.

Service	Quantity	Description
Surge tank	1 ea /0000	Vertical tank, 5,000 gallon flat bottom enclosed top, 12'dia x 10'-3", Polyethylene construction, 10 nozzles,
Backwash water tank	1 ea 6000	Vertical tank, 3,000 gallon flat bottom enclosed top, 10'dia x 10'-6", Polyethylene construction, 10 nozzles,
Settling tank	1 ea 8000	Vertical cone bottom tank, 3,500 gallon cone bottom enclosed top, 8'dia x 14'-7" high, Polyethylene construction, 10 nozzles,
Backwash pumps 800	2 ea /600	2 ½" x 2" single stage centrifugal pump, 125gpm @ 65 ft head, 480V/3PH/60HZ, TEFC motor, 5 HP, Mechanical shaft seal, Bronze fit, 9" impeller, 1750 RPM. Peerless Model C1020A, MISCO, Inc. Pocatello, ID or equal.
Extraction Well pumps /600	4 ea 4000	Submersible well pump, 3" outlet, 100 gpm @ 300 ft. head min rating, SST materials of construction, 480V/3 Ph/ 15 HP, Grundfos model 80S150-15 or equal.
Decant water pumps 500	2 ea /000	1 ½" X 1" single stage centrifugal pump, 30 gpm @ ____ ft. head,
Feed pumps 800	2 ea. /600	2 ½" x 2" single stage centrifugal pump, 125gpm @ 65 ft head, 480V/3PH/60HZ, TEFC motor, 5 HP, Mechanical shaft seal, Bronze fit, 9" impeller, 1750 RPM. Peerless Model C1020M, MISCO, Inc. Pocatello, ID or equal.
Slurry pumps /000	2 ea 2000	2 ½" x 2" progressing cavity slurry pump, 10 gpm @ _____ ft. head, 5 hp, Moyno pumps or equal.

ROSIDALE 1-800-821-5373

- OIL COALESCE FILTER 8ϕ x 30
  $7.00

- DECANT WATER FILTER 6ϕ x 18
  $5.00

- SLURRY FILTERS 6ϕ x 30
  $6.01

Multi-media filters 7850	2 ea. 15650		Multimedia depth filter containing three layers of filter media capable of removing particles down to 10 microns. 100 gpm minimum flowrate @ 13 psi pressure drop, 100 psi pressure rating @ 100°F, non-code construction, 42"dia x 54"side shell tank, CS tank, phenolic epoxy lined, 2" inlet and outlet, equipped with top head opening for mineral filling and inspection, equipped with a SST upper distributor plate and plastic lower distributor plate. Culligan model HR 422 or equal.
Oil coalesce filters 2456 30	2 ea. 5000		Bag filter housing with filter basket, 150#, 8"O.D. x 30 " depth, SST housing and filter basket with adjustable height legs and liquid displacer, 3" flanged side inlet & outlet, teflon cover gasket, Rosedale model no. 8-30-3F-150-NSDTS-BP
Decant water filters 1550	2 ea. 1600		Bag filter housing with filter basket, 150#, 6"O.D. x 18 " depth, SST housing and filter basket with adjustable height legs and liquid displacer, 1 1/2" NPT side inlet & outlet, teflon cover gasket, Rosedale model no. 6-18-1 1/2P-150-NSDTS-BP
Slurry Filters 1876	2 ea. 2000		Bag filter housing with filter basket, 150#, 6"O.D. x 30 " depth, SST housing and filter basket with adjustable height legs and liquid displacer, 1 1/2" NPT side inlet & outlet, teflon cover gasket, Rosedale model no. 6-30-1 1/2P-150-NSDTS-BP
Surge tank level control valve	1 ea 4000		3" level control valve, rotary plug style, CS or SST 150# body, electric actuator, modulating service, 55°F water, linear operating characteristic, max ΔP across valve =50psi, valve sizing ΔP=? psi at 125 gpm, C_V = ? min, input control signal 4-20 mAdc, Available power for electric actuator will be 120 VAC, 60 Hz, single phase. Manufacturer-Leslie Controls, Tampa, FL, K-Max model , Jordan electric actuator.
Vent gas blowers INC W/STRIPPER	2 ea		Vent gas blower, 70 SCFM @ _____ static pressure, cast aluminum pressure blower, direct drive, 1/3 HP, Cincinnati Fan, model PB-8 or equal.
Air Stripper	1 ea 30,000		Low profile air stripper, four tray, 304L SS fabrication, 3 – 160 gpm flow rate, Stripper skid mounted, 6 ft × 6.5 ft × 6.75 ft high, 99.9% removal efficiency for TCE @ 125 gpm, 55°F water.
Air Blowers INC W/STRIPPER	2 ea.		7.5 hp forced draft blowers, 900 scfm @ _____ static pressure.
Stripper sump pumps INC W/STRIPPER	2 ea		Centrifugal single stage pump, 2 in. suction, 1 ½ in. discharge, 125 gpm @ 100 ft head, 22 ft NPSH available, bronze fit mechanical shaft seal, 5 hp, 480V, 3

ROSDALE 800-821-5373

		phase, Peerless model 615J, MISCO, Pocatello, ID or equal
Stripper sump level control valve	1 ea INA W/STRIPPER	3" level control valve, rotary plug style, CS or SST 150# body, electric actuator, modulating service, 55°F water, linear operating characteristic, max ΔP across valve =50psi, valve sizing ΔP=? psi at 125 gpm, C_V = ? min, input control signal 4-20 mAdc, Available power for electric actuator will be 120 VAC, 60 Hz, single phase. Manufacturer-Leslie Controls, Tampa, FL, K-Max model , Jordan electric actuator.
Electric heater	1 ea	Electric air heater, 30 KW
Carbon Adsorbers	2 ea 12,000 6000	Carbon adsorber capable of handling 900 cfm air flow, 60 cu. Ft. of activated carbon capable of VOC removal, PVC and polyethylene construction. Calgon Carbon Corp. or equal

412-787-2700

Preliminary

New Groundwater Treatment Facility Planning Conceptual Design Test Area North Operable Unit 1-07B

1. DESIGN OVERVIEW

The New Groundwater Treatment Facility (NGWTF) is a water treatment facility that will be part of the final remedial action in support of Phase C as described in the *Remedial Design/Remedial Action Scope of Work, Test Area North Final Groundwater Remediation Operable Unit 1-07B*, (U.S. Department of Energy Idaho Operations Office [DOE-ID] 1997). This system will support the long-term clean up of the Operable Unit (OU) 1-07B "hot spot," which is the contaminated groundwater within the vicinity of the injection well Technical Support Facility (TSF)-05.

The air stripper treatment technology was chosen as a default remedy in the OU 1-07B Record of Decision (ROD) and is based on past success of air stripping for volatile organic compound (VOC) removal.

1.1 Process System Requirements

The following is a summary of the general design parameters:

- The system will provide pumping and treatment of water at a normal operating flowrate of 472 L/min (125 gpm).
- Water will be extracted from Wells TSF-05, Test Area North (TAN)-25, -26, and -37 and will be reinjected into wells Test Area North (TAN)-31, and TAN-53 (not yet drilled) as shown on drawing P-2.
- The system will be designed for a 30-year operating life.
- The air stripper must remove the VOCs in the extracted water to below the set maximum contamination level (MCL). The design influent concentrations for VOCs are as shown in Table 1-1. In order to meet MCLs, the air stripper must obtain a removal efficiency of approximately 99.99%.
- Ion exchange columns will not be provided for radionuclide removal, however, most radionuclides are attached to suspended solids that will be removed in the bag filters and multi-media filters.
- During normal operation, the water will be extracted from TAN-37. While pumping from the well, the air stripper off-gas will not require the use of the activated carbon adsorber.
- The building will have a plant air system and a potable water supply.

Preliminary

- All piping exterior to the building will have double containment. The building will have curbing and trenching to provide secondary containment in accordance with Resource Conservation and Recovery Act (RCRA) requirements.

- Freeze protection shall be provided for all exterior piping and piping in the wellhouses. Unit heaters will provide freeze protection within the NGWTF building.

- Fire protection systems will be installed as specified in Fire Hazardous Analysis and Life Safety Code. Portable fire extinguishers and exit and emergency lighting will be provided.

- Operation will have manual capability to discharge collected solids from the settling tank into U.S. Department of Transport (DOT) 208-L (55-gal) drums or other containers instead of into the slurry filters

1.2 Assumptions

The following assumptions are applicable to the NGWTF 10% design:

- Processed water containing residual amounts of radionuclides above MCLs will be allowed to be re-injected

- The radioactively contaminated expended carbon from the carbon adsorbers will be able to be disposed of as mixed waste rather than being regenerated

- TAN-31 and Tan-53 will be acceptable for reinjection of all treated effluent water from the New Groundwater Treatment Facility (NGWTF)

- There is enough volume of settled solids in the settling tank to warrant using slurry pumps, rather than simply dumping the solids into 208-L (55 gal) drums

- The air stripper off-gas concentration of VOCs will not exceed the allowable air emission discharge when pumping from TAN-37 at 473 L/min (125 gpm).

Table 1-1. Air stripper design influent concentration.

Contaminant	Design Influent Concentration (µg/L)
TCE	3,000
PCE	150
cis-DCE	750
trans-DCE	600

TCE = trichloroethylene
PCE = tetrachloroethylene
DCE = dichloroethylene

Preliminary

2. SYSTEM DESCRIPTION

2.1 General

The NGWTF consists of the equipment and piping needed to: (1) pump water from wells TSF-05, TAN-25, TAN-26, and TAN-37, (2) filter the extracted water using oil coalescent bag filters and a multi-media filter, (3) remove the VOCs using an air stripper treatment train, and (4) discharge the treated water into an injection well(s) (TAN-31, New Well). The system will pump water from a combination of the wells at a total flowrate of 472 L/min (125 gpm). The system will also be able to accept water from other sources with the use of transfer pump located in the truck transfer station. Well TAN-26 is located at the approximate center of the extraction wells. The extracted groundwater will be considered F001 listed waste and all components of this system will meet secondary containment requirements required by the RCRA. After the air stripping process, the water will be considered to no longer contain the listed hazardous waste. The water may still be radioactively contaminated, however, it may still be discharged back into the hot spot without undergoing any additional treatment for radionuclide removal.

2.2 Process Equipment

The extracted groundwater will be pumped into a 18,926 L (5,000 gal) surge tank. The surge tank will be a single wall, flat bottom vertical tank, 3.6 m diameter × 3 m-7.6 cm high (12 ft diameter × 10ft-3 in. high). It will be constructed of high density polyethylene, and will have a slightly negative design pressure due to operation of the gas vent blower. The tank is sized to allow for approximately 30 minutes of operation, at the maximum flowrate, that will allow for system stabilization during startup and shutdown activities. Water from the surge tank is pumped through the filters into an air stripper treatment train using feed pumps. The gas vent blower will remove any VOCs that potentially may be released due to turbulent flow in the surge tank and direct the gasses to the air stripper off-gas system.

The NGWTF will utilize backup filters and pumps to allow continuous operation while servicing the pumps or changing bag filters. Standard model, low-profile air strippers will be used to provide removal of VOCs at an efficiency of at least 99.99% when processing water at 473 L/min (125 gpm).

The air stripper unit will be equipped with a forced air blower that will input approximately 900 cfm of air in a counter flow configuration relative to the water stream. The air stripper is approximately 1.8 m wide × 1.9 m deep × 2 m high (6 ft wide × 6.5 ft deep × 6.75 ft high), and can process water at a maximum flowrate of 606 L/min (160 gpm). Outside air will be supplied to the blowers through inlet ductwork, which will eliminate the need to heat the incoming blower supply air. Calculations show that a minimum flowrate of 26.5 L/min (7 gpm) is required to prevent freeze-up at minus 40°C (-40°F) outside air temperature. The exhaust air will be vented through an electric heater, through a carbon adsorber that will remove the VOCs, then vertically out through the roof of the building. Based on the design influent concentration and mass of VOCs, air pollution control equipment is required for the exhaust air when processing water from a location other then TAN-37.

The discharge pumps will then pump the treated water through 10 cm (4 in.) single wall pipe to the reinjection well.

2.3 Process Building

The process building will be divided into two areas: (1) a process equipment area, and (2) an electrical/control room. The process building will house the surge tank, air stripper, carbon adsorbers,

filters, backwash water tank, settling tank, pumps, piping, and associated equipment. The control room will house the main control panel, motor control center, and electrical circuit panels. The overall building size is approximately 18 x 24 m (60 x 80 ft) with an interior height ranging from 4.8 m (16 ft) to 6 m (20 ft). Building height is determined by height of the highest tank which is the settling tank at 4 m 17 cm (14 ft 7in.) high. The building will have a concrete floor and curbing sized to provide secondary containment that will hold at least 110% of the capacity of the surge tank and interior piping. The floor under the process equipment will be sloped so that any leaked water will accumulate in a building sump. The sump will be equipped with a high level alarm tied into the systems main control panel. The floor will have an impermeable coating to prevent seeping of contaminated water into the concrete. The specific arrangement/design is shown in the drawing package.

2.4 Extraction/Reinjection Wells

Water may be extracted from wells TSF-05, TAN-25, TAN-26, and TAN-37. The wells are 91 to 121 m (300 to 400 ft) deep and will be completed with individually controlled submersible pumps located at approximately 85 m (280 ft) deep. Water may be extracted from any of the four wells, or a combination of wells, at various pumping rates. The total cumulative flow from all wells shall be approximately 125 gpm. The actual flowrate from each well is controlled using a manual valve at each of the wellheads. All influent piping will be double walled steel pipe with leak detection located at the low points of each pipe branch. Wells TSF-05, TAN-25, and TAN-26 are currently covered. TAN-37 will require a new removable wellhouse with a concrete base. The concrete base will provide the secondary containment for the piping and valving until the double wall pipe begins and will be equipped with leak detection switches. The removable wellhouse will provide weather protection for the duration of this project and allow easy access to the well in case of pump repair or replacement.

The enclosed design will utilize TAN-31 and TAN-53 as injection wells for the treated effluent water. Based on existing knowledge of hydrologic parameters in the area and configuration of the well, it will be able to accept the total quantity of effluent water. The piping to the final extraction well location will be above ground single wall steel pipe.

2.5 Operational Materials

The consumable materials required for operation consist of the following estimated quantities:

- Bag filters:
  - Oil coalescent filters—4 per week during times in which the units are online
  - Decant water filters—2 per week
  - Slurry filters—1 per week.
- Multi-media filters:
  - filter media - one change every 2 years.
- Activated Carbon—2 changes per 6 months for times in which the carbon units are on line.
- 208-L (55 gal) drums and other containers

- Personal protective equipment (PPE)

- Spare parts—pumps, blower motor, well pumps, valves, valve actuators, level transmitters, gaskets, strainers, etc.

2.6 Utilities

Electrical power will be is supplied by the pole mounted 300 KVA 13,800/480 V step-down transformer used to supply the original GWTF. Power will be supplied to a motor control center that will contain all motor starters, supply breakers for the heaters, supply breaker for the 480/120 V transformer, and a heat trace panels

Potable water will be provided from the TAN fire water/potable water system. Pressure must be reduced from 120 psi to less than 80 psi using a pressure regulator. A backflow preventer must be installed on the potable water line prior to any process water connections.

Plant air will be provided for operation of air actuated control valves, portable air operated diaphram pumps and general maintenance operations. An electric motorized compressor will be provided for this service.

2.7 Manning

The system will operate 24 hours a day, 7 days a week while maintaining a facility uptime of >90%. The system will be designed for unmanned operation and will have the necessary alarms and notification equipment to indicate when manned operations are required (i.e. multimedia filter backwash. The manpower loading is estimated as follows:

- Operations—1 operator/construction engineer at 4 days per week, 1 RCT at 1 day per week, 1 HSO at 1 day per week

- Routine maintenance—2 craft at 1 day per week, 1 operator at 1 day per week

- Inspections—1 operator at 2 hours day, 7 days at week.

2.8 Waste management

This section describes the waste streams that will be generated and identifies the approach for managing those wastes.

2.8.1 Identification of Waste Streams

The waste types that will be generated are listed below. The number and waste type on the first line of each entry correspond to headings in Table 2-1. The waste type is described on subsequent lines.

Table 2-1. Waste management procedures

Number	Waste Type	Waste Management Technique
1	Processed Water	Inject this water into the injection well without further treatment.
2	Produced Solids	Manage as a mixed (F001 and radioactive) waste and store in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) waste storage unit pending development of a disposal alternative for mixed waste.
3	Activated carbon	Dispose of as low level mixed waste at the Waste Experimental Reduction Facility (WERF).
4	Excess Samples—field lab	Excess samples shall be added to the surge tank and managed as a portion of Waste Category 2. No RCRA wastes are added to the samples during the preservation or analysis processes.
5	Lab Residuals—off-Site labs	Lab residuals generated by off-site labs will be managed by those laboratories. If samples are unaltered they may be returned to the facility and processed through the treatment system.

2.8.2 Management of Waste Streams

All wastes generated during this field evaluation will be managed in accordance with the provisions of the *Waste Management Plan for Test Area North Final Groundwater Remediation – Operable Unit 1-07B* (Lockheed Martin Idaho Technologies Company [LMITCO] 1998). Additional details for management of specific wastes are provided below. Equipment and material decontamination requirements and procedures are contained in the *Remedial Action Work Plan for Test Area North Final Groundwater Remediation – Operable Unit 1-07B Phase C* (Department of Energy Idaho Operations Office [DOE-ID] 1999).

The management technique for Waste Types 2 through 7 will be determined through preparation of a hazardous waste determination in accordance with the waste management plan for OU 1-07B.

2.8.3 Transportation

The amounts of radioactivity in the samples and lab residuals are below the threshold at which DOT regulations apply. The samples and residuals will be generated as a result of a CERCLA treatability study, and hence the RCRA transportation requirements described in 40 Code of Federal Regulations (CFR) 261.4(e) will be followed for samples that are shipped off-site for analysis, and for excess samples and laboratory residuals.

Preliminary

3. EQUIPMENT LIST

Table 3-1 provides a list of the major components for the NGWTF system.

Table 3-1. Equipment list and description.

Service	Quantity	Description
Surge tank	1	Vertical tank, 5,000 gal flat bottom enclosed top, 12 ft diameter x 10 ft-3 in., Polyethylene construction, 10 nozzles,
Backwash water tank	1	Vertical tank, 3,000 gal flat bottom enclosed top, 10 ft diameter x 10 ft-6 in., Polyethylene construction, 10 nozzles,
Settling tank	1	Vertical cone bottom tank, 3,500 gal cone bottom enclosed top, 8 ft diameter × 14 ft-7 in. high, Polyethylene construction, 10 nozzles,
Backwash pumps	2	2.5 in. × 2 in. single stage centrifugal pump, 125gpm @ 65 ft head, 480V/3PH/60HZ, TEFC motor, 5 HP, Mechanical shaft seal, Bronze fit, 9 in. impeller, 1750 RPM. Peerless Model C1020A, MISCO, Inc. Pocatello, ID or equal.
Extraction well pumps	4	Submersible well pump, 3 in. outlet, 100 gpm @ 300 ft. head min rating, SST materials of construction, 480V/3 Ph/ 15 HP, Grundfos model 80S150-15 or equal.
Decant water pumps	2	1.5 I n. X 1 in. single stage centrifugal pump, 30 gpm @ ____ ft. head,
Feed pumps	2	2.5 in. × 2 in. single stage centrifugal pump, 125gpm @ 65 ft head, 480V/3PH/60HZ, TEFC motor, 5 HP, Mechanical shaft seal, Bronze fit, 9 in. impeller, 1750 RPM. Peerless Model C1020M, MISCO, Inc. Pocatello, ID or equal.
Slurry pumps	2	2.5 in. × 2 in. progressing cavity slurry pump, 10 gpm @ _____ ft. head, 5 hp, Moyno pumps or equal.
Multi-media filters	2	Multimedia depth filter containing three layers of filter media capable of removing particles down to 10 microns. 100 gpm minimum flowrate @ 13 psi pressure drop, 100 psi pressure rating @ 100°F, non-code construction, 42 in. diameter × 54 in. side shell tank, CS tank, phenolic epoxy lined, 2 in. inlet and outlet, equipped with top head opening for mineral filling and inspection, equipped with a SST upper distributor plate and plastic lower distributor plate. Culligan model HR 422 or equal.
Oil coalesce filters	2	Bag filter housing with filter basket, 150#, 8 in.O.D. × 30 in. depth, SST housing and filter basket with adjustable height legs and liquid displacer, 3 in. flanged side inlet & outlet, teflon cover gasket, Rosedale model no. 8-30-3F-150-NSDTS-BP
Decant water filters	2	Bag filter housing with filter basket, 150#, 6 in.O.D. × 18 in. depth, SST housing and filter basket with adjustable height legs and liquid displacer, 1.5 in. NPT side inlet & outlet, teflon cover gasket, Rosedale model no. 6-18-1 1/2P-150-NSDTS-BP

Preliminary

Table 3-1. (continued).

Service	Quantity	Description
Slurry Filters	2	Bag filter housing with filter basket, 150#, 6"O.D. x 30 " depth, SST housing and filter basket with adjustable height legs and liquid displacer, 1 1/2" NPT side inlet & outlet, teflon cover gasket, Rosedale model no. 6-30-1 1/2P-150-NSDTS-BP
Surge tank level control valve	1	3" level control valve, rotary plug style, CS or SST 150# body, electric actuator, modulating service, 55°F water, linear operating characteristic, max ΔP across valve =50psi, valve sizing ΔP=? psi at 125 gpm, C_V = ? min, input control signal 4-20 mAdc, Available power for electric actuator will be 120 VAC, 60 Hz, single phase. Manufacturer-Leslie Controls, Tampa, FL, K-Max model , Jordan electric actuator.
Vent gas blowers	2	Vent gas blower, 70 SCFM @ _____ static pressure, cast aluminum pressure blower, direct drive, 1/3 HP, Cincinnati Fan, model PB-8 or equal.
Air stripper	1	Low profile air stripper, four tray, 304L SS fabrication, 3 – 160 gpm flow rate, Stripper skid mounted, 6 ft × 6.5 ft × 6.75 ft high, 99.9% removal efficiency for TCE @ 125 gpm, 55°F water.
Air blowers	2	7.5 hp forced draft blowers, 900 scfm @ _____ static pressure.
Stripper sump pumps	2	Centrifugal single stage pump, 2 in. suction, 1 ½ in. discharge, 125 gpm @ 100 ft head, 22 ft NPSH available, bronze fit mechanical shaft seal, 5 hp, 480V, 3 phase, Peerless model 615J, MISCO, Pocatello, ID or equal
Stripper sump level control valve	1	3 in. level control valve, rotary plug style, CS or SST 150# body, electric actuator, modulating service, 55°F water, linear operating characteristic, max ΔP across valve =50psi, valve sizing ΔP=? psi at 125 gpm, C_V = ? min, input control signal 4-20 mAdc, Available power for electric actuator will be 120 VAC, 60 Hz, single phase. Manufacturer-Leslie Controls, Tampa, FL, K-Max model, Jordan electric actuator.
Electric heater	1	Electric air heater, 30 KW
Carbon adsorbers	2	Carbon adsorber capable of handling 900 cfm air flow, 60 cu. Ft. of activated carbon capable of VOC removal, PVC and polyethylene construction. Calgon Carbon Corp. or equal

4. AIR EMISSIONS

The air emissions from the air stripper will be limited based on the discharge limits set in the OU 1-07B ROD and additional modeling performed specifically for the NGWTF. The ROD limits were set based on modeling of the Groundwater Treatment Facility (GWTF) location and operations.

The results of the air modeling for the NPTF and the GWTF (as specified in the ROD) are shown in Table 4-1. Until further design is completed and a separate air modeling limit is set specifically for the NGWTF the most conservative limits listed in Table 4-1 will be used as the compliance limits.

Table 4-1. Air discharge limits.

	NPTF Modeling (SCREEN3) lbs/hr	ROD Limits (SCREEN) lbs/hr
TCE	0.18	0.185
PCE	4.9	5.05
DCE	564.3	1,254
VC	0.33	N/A

5. REFERENCES

DOE-ID 1997, *Remedial Design/Remedial Action Scope of Work, Test Area North, Final Groundwater, Operable Unit 1-07B*, U.S. Department of Energy Idaho Operations Office, DOE/ID-10522, Revision 5, August.

EDF-ER-185
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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

VENT

VENT GAS BLOWERS
70 SCFM

VENT TO ATMOSPHERE

CARBON ADSORBERS

ELECTRIC HEATER

125 GPM

SURGE TANK
5,000 GALLON

EXTRACTION PUMP
TAN-37

EXTRACTION PUMP
TSF-05

EXTRACTION PUMP
TAN-25

EXTRACTION PUMP
TAN-26

FEED PUMPS
125 GPM

OIL COALESCER FILTERS
125 GPM EA

MULTI-MEDIA FILTERS
125 GPM EA

FIC

AIR STRIPPER

AIR BLOWERS

VENT

SETTLING TANK
4,000 GALLON

STRIPPER SUMP PUMPS
125 GPM

DECANT WATER FILTERS

DECANT WATER PUMPS
30 GPM

SLURRY FILTERS

SLURRY PUMPS
10 GPM

RECYCLE

BACKWASH WATER TANK
3,000 GALLON

BACKWASH PUMPS
125 GPM

FQ

REINJECTION WELL

REINJECTION WELL

FOR DRAWING INDEX SEE DRAWING NO.		APPROVALS	DATE
SCALE: 1"= 1" IN 1/16"	PROJECT NOS	CONST REV	
		P.M.	
SCALE: 1"= 1" IN 1/16"	DESIGN PHASE	DES MGR	
	10% DESIGN	DESIGN	
	APPROVED DATE	CHECKED	
		DRAWN	
QUALITY LEVEL 3		SUBCONTRACT NO.	
		RELEASED	

PARSONS

U.S. DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
IDAHO FALLS, IDAHO

TAN

OU 1-07B NEW GWTF
PROCESS FLOW DIAGRAM
FINAL REMEDIATION

SIZE	DRAWING NO.	REV
D	893	
SCALE NO SCALE		A/E DWG NO. PF-1

ADOCS NO.

File: PF-1.DWG
User ID: MBC\PARSONS
Date: 03/20/98
Time: 11:32 A.M.

PF-1

P-1

EDF-ER-185
SH 27 OF 28

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
1	MOVED ISB BUILDING SOUTH EAST 31 FEET, CHANGED ANGLE ON NORTH ARROW	4/22/98	

33.1°

SNAKE AVE.

TAN-31

EXISTING FENCE

INJECTION WELL TSF-05

655

TAN-25 WELL

TAN-26 WELL

TAN-37

GWTF

NEW GWTF BUILDING 60' X 80'

EXISTING FENCE

POLE W/TRANSFORMER

TAN-28

TAN-30a

TAN 670

TAN 623

TAN 711

TAN-29

TAN-49

2"/4" DOUBLE WALL PIPE

EXISTING AIR STRIPPER ENCLOSURE

EXISTING FENCE (TYP.)

LIGHTING POLE

LIGHTING POLE

CERCLA WASTE STORAGE SEA VANS

POLE WITH NEW TRANSFORMER

NILE AVE.

GRAPHIC SCALE
40 0 20 40 80
(IN FEET)

APPROVALS		DATE
CONST REV		
P.M.		
DES MGR		
DESIGN	A.J.C.	8/99
CHECKED		
DRAWN	A.J.C.	8/99
SUBCONTRACT NO.		
RELEASED		

PROJECT NO.S

DESIGN PHASE

10% DESIGN

APPROVED DATE

PARSONS

FOR U.S. DEPARTMENT OF ENERGY IDAHO OPERATIONS OFFICE IDAHO FALLS, IDAHO

OU 1-07B NEW GWTF SITE LAYOUT PLAN

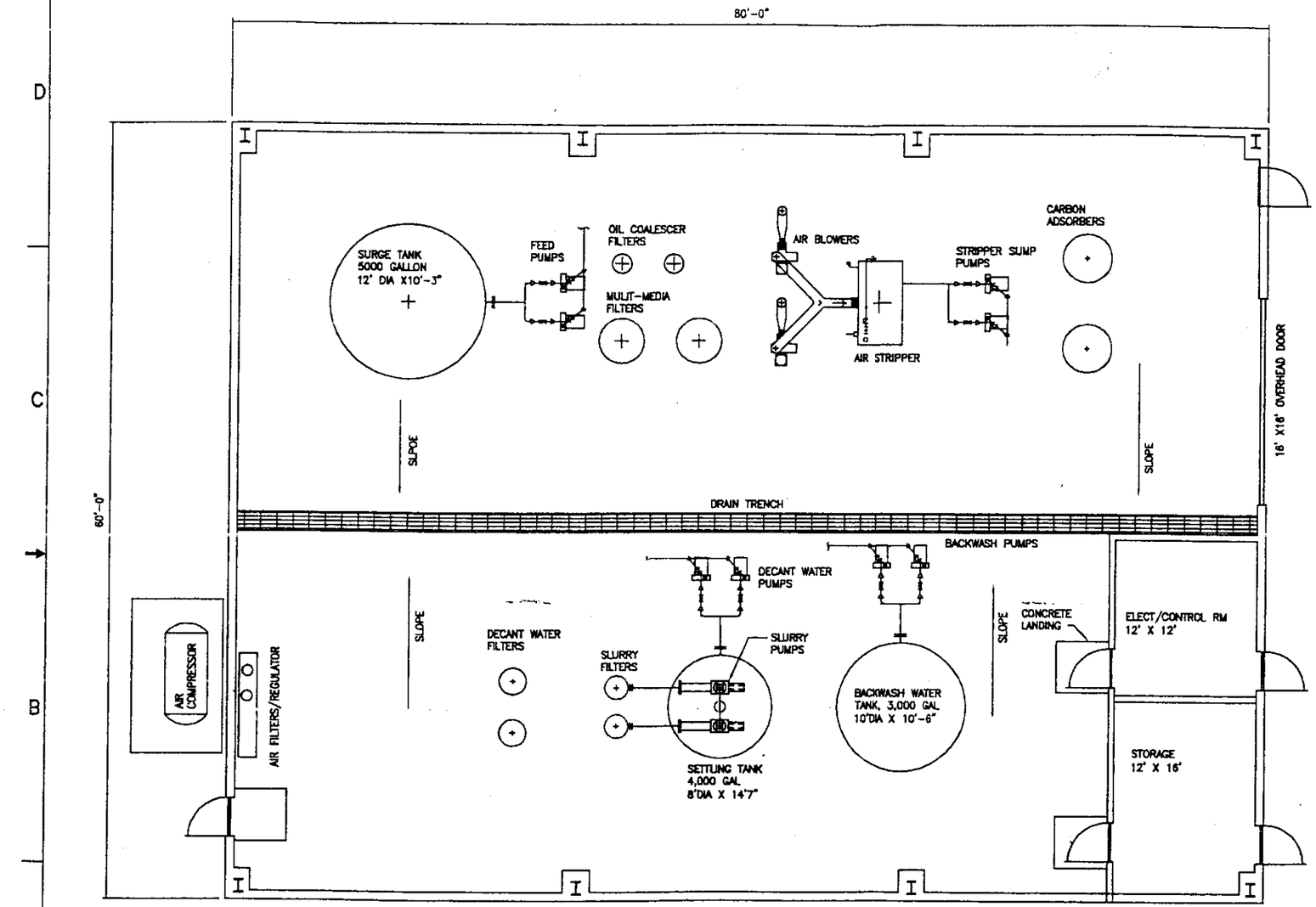
SIZE D | INDEX CODE NUMBER: AREA | TYPE | CA | SHEET | DRAWING NO. | REV 1 | A/E DWG. NO. P-1

SCALE 1"=30'

ADOCS NO.

EDF - ER - 185
SH 28 OF 29

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



GENERAL ARRANGEMENT

APPROVALS	DATE
CONST REV	
P.M.	
DES MGR	
DESIGN A.J.C.	8/99
CHECKED	
DRAWN A.J.C.	8/99
SUBCONTRACT NO.	
RELEASED	

PROJECT NO.S
DESIGN PHASE
10% DESIGN
APPROVED DATE

PARSONS

U.S. DEPARTMENT OF ENERGY IDAHO OPERATIONS OFFICE IDAHO FALLS, IDAHO

TAN 1611 OU 1-07B NEW GWTF
BUILDING ARRANGEMENT

SIZE D | DRAWING NO. AREA | TYPE | SEQ | DRG | REV A | A/E DRG. NO. P-2

SCALE 1/2"=1'-0"

ADDCS NO.