

94336 (file 94336A1)

TVA - FHP FHE ESTIMATING

Phase II Approval
rept:n195

KINGSTON FOSSIL PLANT
COAL YARD RUNOFF POND
ALT 1 - ONE PUMPS & ONE PIPELINE.

31 - Aug - 94

01:24 PM

ATTACHMENT 1

Loc	Description	Quantity	Unit	Material \$\$	M-H/Unit	Man-Hours	Labor \$\$	Eqpt/Othr \$\$	Subcont \$\$	Unit Cost	Total Cost
A REMOVALS											
	Electrical Demolition	1.0 ls		24.00		24	580			580.00	580
	Remove Pump & Piping	1.0 ls		144.00		144	2,561			2,561.00	2,561
	Remove Pump House & Slab	1.0 ls		360.00		360	5,228			5,228.00	5,228
	Remove Pump Platform & Piping	1.0 ls		168.00		168	3,594			3,594.00	3,594
	subtotal A REMOVALS			0		696	11,963	0	0		11,963

COAL YARD SUMP

	Excavate for sump	620	cy			256	4,373			5.40	4,373
	Backfill for sump	4700	cy			128	2,187			4.65	2,187
	Backfill 1" crushed stone	3400	cy			40	652			12.04	4,005
	Formwork for slab & walls sump	1792	sq ft			358	6,327			5.58	9,992
	Reinforcing place walls #3 #7	100	sq ft			47	1,020			722.73	3,180
	Pour concrete in place	900	psf			160	2,610			108.50	6,510
	Welded shear coat	3/4	in x 4			18	394			17.42	418
	9x8x5/16 steel angle	A36				6	131			17.10	171
	St-4x10	45	sq ft			32	672			26.20	1,310
	Steel Plates	3/4	in x 1			16	341			81.83	1,917
	1-1/2 x 3/16 galv-bar-grating					24	515			16.12	2,045
	1" PVC pipe sch 40					4	94			18.40	134
	subtotal COAL YARD SUMP			15,560		1,089	19,316	0	0		34,876

DX PUMPING ASSY

	1.0 ea			80.00		80	1,696			19,696.00	19,696
	1.0 ls			144.00		144	3,362			15,471.00	15,471
	1.0 ea			48.00		48	1,118			73,623.00	73,623
	1.0 ea			24.00		24	580			3,580.00	3,580
	subtotal DX PUMPING ASSY			105,514		296	6,756	0	0		112,370

EARTHFILL

	couplings for 36" PE pipe										
--	----------------------------------	--	--	--	--	--	--	--	--	--	--

* Comes in 20' lengths - install only 50 L.F.

41775
20863

6 Bars @ 28"

Structure Excavation for 36" Pipe

Estimate Information
(changes) given to
Felix Keaton on 7/24/94 J.F.

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Loc	Description	Quantity	Unit	M	H/Unit	Man-Hours	Labor \$\$	Eqpt/Othr \$\$	Subcont \$\$	Unit Cost	Total Cost
	Earth Fill & compaction	700.0	C.Y.		0.01	9	151			0.22	151
	Crushed Stone Pmp House Area	230.0	tn		2,070	46	819			12.56	2,889
	1"GRS conduit w/fts & sps	80.0	ft		165	32	758		19	11.78	942
	subtotal EARTHFILL				2,235	87	1,728	19	0		3,982
	PIPE TO ASHPOND										
	Temporary dike @ coal yd sump	1.0	ls		160.00	160	2,454	562		3016.00	3,016
	Backfill sand around 10" pipe	620.0	cy		0.08	48	743			6.65	4,125
	Excavate for 10" pipe trench	2,050.0	cy		0.11	219	3,639			1.78	3,639
	Backfill earth for 10" trench	1,430.0	cy		0.04	64	1,065			0.74	1,065
	::10" Polyethylene Pipe SDR 19	4,200.0	ft		> 0.28	1,176	27,454			10.89	45,724
	::10" Polyethylene Pipe fgs 90d	2.0	ea		> 4.50	9	216			277.50	555
	::10" Polyethylene Pipe fgs 45d	5.0	ea		> 4.50	23	540			185.00	925
	::10" Polyethylene Pipe flange	1.0	ea		> 4.50	5	108			205.00	205
	Rent polyethylene fusion welder	1.0	ls					8,250		8250.00	8,250
	::10" Polyethylene Pipe fgs WYE	1.0	ea		> 295	6	144			439.00	439
	subtotal PIPE TO ASHPOND				22,768	1,710	36,363	8,812	0		67,943
	STNLS STL PIPE										
	10" SSteel 316 pipe sch 40	1.0	ea		260	10	368			588.00	588
	10" SSteel 316 pipe sch 40	1.0	ea		100	8	194			294.00	294
	10" SSteel 316 flange, 150# SO	1.0	ea		700	6	145			845.00	845
	6" SSteel 316 flange, 150# SO	1.0	ea		235	4	96			331.00	331
	6" SSteel 316 90deg sch 40	1.0	ea		375	9	217			592.00	592
	10" SSteel 316 reducer sch 40	2.0	ea		1,760	24	578			1169.00	2,338
	10" SSteel 316 pipe sch 40	1.0	ea		600	12	289			889.00	889
	10" SSteel 316 pipe sch 40	10.0	ft		1,420	10	233			165.30	1,653
	10" SSteel 316 pipe sch 40	10.0	ft		70	4	96			16.66	166.6
	10" SSteel 316 pipe sch 40	1.0	ea		108	4	94			262.00	262
	10" SSteel 316 pipe sch 40	2.0	ea		100	8	149			144.50	289
	10" SSteel 316 pipe sch 40	1.0	ea		90	4	94			164.00	164
	1/2" plug hex head 316 ss	1.0	ea		15	1	24			39.00	39

14 ft of
Add 6" SS pipe sch 40

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	12" pipe sleeves, A53 cs, coated	100.0	lf	4,800	1.00	100	2,409			72.09	7,209
	40" ea check valve 150# flngd	1.0	ea	6,300	24.00	24	592			6,892.00	6,892
	1" ss gate valve 150# flngd	1.0	ea	6,300	2.50	3	69			6,369.00	6,369
	subtotal STNLS STL PIPE			23,173		237	5,687	0	0		28,860
	Z0 ELECTRICAL										
	3/4" GRS conduit w/flgs & spts	30.0	lf	52	0.72	22	517			19.20	576
	1 - 1/2" GRS conduit w/flgs & spts	12.0	lf	35	0.80	10	230			22.17	266
	2" GRS conduit w/flgs & spts	30.0	lf	116	0.50	15	359			15.97	479
	3/4" flexible conduit, sealite	5.0	lf	18	1.20	6	145			32.60	163
	1" flexible conduit, sealite	10.0	lf	45	0.90	9	218			26.30	263
	2" flexible conduit, sealite	5.0	lf	53	1.80	9	218			54.20	271
	#10 - 3/c PXMJ 600v P & C cable	100.0	lf	79	0.04	4	87			1.66	166
	#12 - 4/c PXMJ 600v P & C cable	40.0	lf	37	0.08	3	73			2.75	110
	#2/0 - s/c PXJ-600v P & C cable	120.0	lf	228	0.08	9	221			3.74	449
	Cable Terminations	62.0	ea	62	0.40	25	600			10.68	662
	Bare copper wire stranded #2	50.0	lf	39	0.30	15	363			8.04	402
	Grnd, cdwl, #2 wfe mot frame	4.0	ea	40	2.00	8	196			59.00	236
	1" FD outlet box	1.0	ea	10	0.67	1	16			26.00	26
	Ground fault indicating, 15 amp	1.0	ea	40	1.00	1	24			64.00	64
	Cover plwthr proof nema 7-23	1.0	ea	19	1.00	1	24			43.00	43
	Safety hvy duty 600v 3p 60 a	1.0	ea	700	6.00	6	141			841.00	841
	subtotal z0 ELECTRICAL			1,573		144	3,432	12	0		5,017
	Z1 HEAVY EQUIP										
	AirComp, 551 - 600cfm	1.0	ea					4,500		4,500.00	4,500
	Trac, Crawl, Hvy, D8, 270 - 300 hp	1.0	ea					5,250		5,250.00	5,250
	Compct, SheepFL, Rex 3-50	1.0	ea					4,200		4,200.00	4,200
	Bkhol, dr, 1 - 1/4 CY x 17' x 18"	2.0	ea					2,700		1,350.00	2,700
	TrkDmp, 4x2, Platform	1.0	ea					3,000		3,000.00	3,000
	TrkDmp, 6x4, 12-14CY, OnRd	4.0	ea					5,400		1,350.00	5,400
	Trk, Fuel, 4x2	1.0	ea					750		750.00	750

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	Sprnktr,6x4, 2,000 Gal	1.0 ea						900		900.00	900
	Crn,RghtTrn,41-50Tn,SwCb	1.0 ea						6,000		6000.00	6,000
	Welder	2.0 ea						1,500		750.00	1,500
	Tugger, 2,000-2,500 lb	1.0 ea						870		870.00	870
	subtotal z1 HEAVY EQUIP			0		0	0	35,070	0		35,070
	z1 TAGGED EQUIP										
	Air Hoist(Tugger)1000#	1.0 ea						750		750.00	750
	AirEqp,Jkhr,to 70# paving bkr	1.0 ea						200		200.00	200
	CmptEqp,Tamper,175lb,	1.0 ea						1,200		1200.00	1,200
	Cncte bucket,laidown,1 C.Y.	1.0 ea						240		240.00	240
	Cncte,mtrzd,buggy,walk-behind	1.0 ea						1,365		1365.00	1,365
	Bndr,hydrt,cndt/pipe,to 2"	1.0 ea						585		585.00	585
	subtotal z1 TAGGED EQUIP			0		0	0	4,340	0		4,340
	Construction Facilities										
	Mobilization	1.0 WKS.				192	2,876	243		3119.00	3,119
	Admin Time(Employees proc,etc.)	13.0 WKS.				117	2,442			187.85	2,442
	General Cleanup	13.0 WKS.				208	3,109	788		299.77	3,897
	Drinking Water	13.0 WKS.				104	1,741	1,438		244.54	3,179
	Hauling	13.0 WKS.				312	5,223	2,365		583.69	7,588
	Small Tool Dispense & Repair	5,488.0 sthr						3,732		0.68	3,732
	Portable Toilet Service	13.0 WKS							244	18.77	244
	Consumables & Expendables	5,488.0 cehr						4,478		0.82	4,478
	Demobilization	1.0 WKS.				64	927	121		1048.00	1,048
	subtotal Construction Facilities			0		997	16,318	13,165	244		29,727

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ATTACHMENT 1

Loc	Description	Quantity	Unit	Material \$\$	M-H/Unit	Man -Hours	Labor \$\$	Eqpt/Othr \$\$	Subcont \$	Unit Cost	Total Cost
	TOTAL DIRECT COST	170,921				5,252	101,558	61,417	244		334,140
	Non-Manual Labor	(Phase 2 = 6,000 + Phase 3 = 23,960)									
	Total Contingency	(Phase 2 = 6,000 + Phase 3 = 21,069)									
	Partner Expenses/Charges (84E)	(Fee = 9,470 + Insur = 9,470)									
	TOTAL CONSTRUCTION										410,109
	LESS Engineered Materials - (indicated by ><)										131,000 <
	TOTAL CONTRACT CONSTRUCTION										279,109
	F&H Engineering - Phase 1										
	F&H Engineering - Phase 2										21,580
	F&H Engineering - Phase 3										1,670
	Plant Overhead Charges for Procurement & Handling of Capital Materials										12,000
	Project Manager's Contingency										44,641
	== TOTAL (PAB APPROVAL) COST ==										490,000

KINGSTON FOSSIL PLANT

COAL YARD RUNOFF POND

COMPUTED JLG DATE 9/23/94

CHECKED DATE

- ① 36" Polyethylene Pipe for Dump Intake
 Length = ~~50~~⁵⁰ ft. (20 ft. Lengths ∴ buy 60 L.F.)

ADS: 800-733-9987
 (McGowan)

36" diameter - corrugated - smooth interior : 19⁸⁷ / ft
 premium coupler (if required) : 28⁰⁰ each

- ② Polyethylene Dump - 16' High

Spirelet: 9-1-404-949-3436

Left message - no one returned my call

ADS: 800-733-9987 (McGowan)

Largest Manhole they make is 4' diameter - have used
 as sump - can weld plates in bottom for submersible pump -

set sump on dense graded crushed stone - filter fabric
 backfill (min 1') around manhole w/ dense graded crushed stone
 can weld riser so tank comes in one piece w/ 36" steel and
 anchor for flotation not required?

estimated to cost \$4,000 say \$5,000

per Vic Davis - need at least 5' diam - 8' preferred for
 maintenance.

P.E.	escalation for 5' diam	say	\$7,500
P.E.	10' diameter		\$18,000
P.E.	8' diameter	(say \$5,000 ^b)	\$15,000 *
Fiberglass	8' diameter		23,400 X
316 SS	8' "		19,500 X
304 SS	8' "		

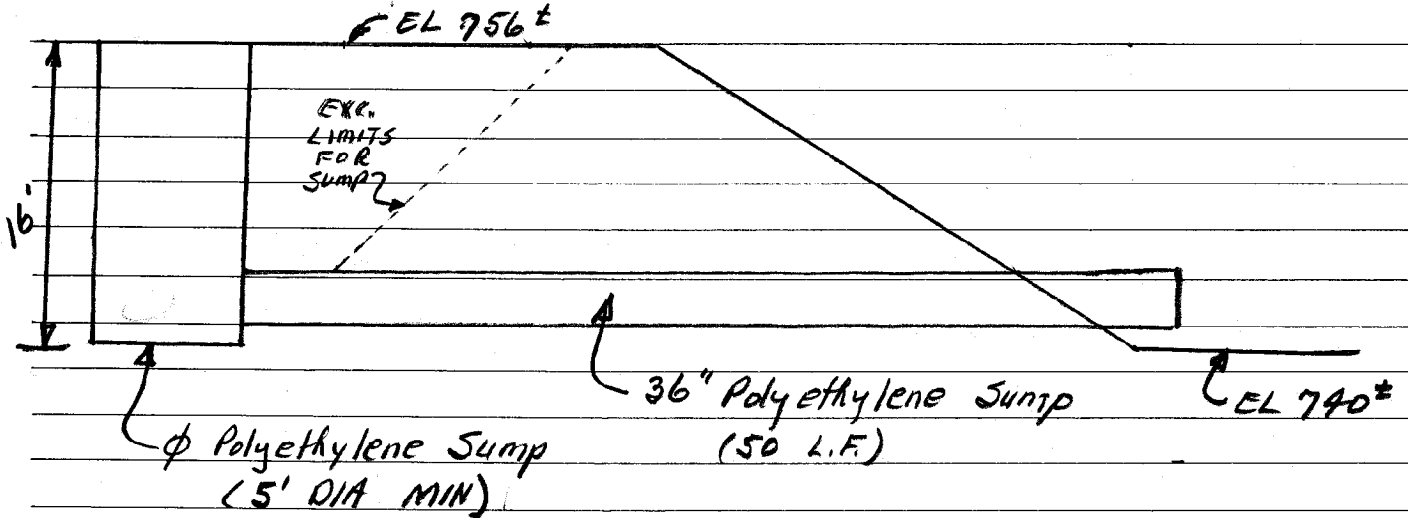
NOTE: If we use a submersible that sets in bottom of
 sump, we can eliminate the concrete enclosure.

KINGSTON FOSSIL PLANT COAL YARD RUNOFF SUMP

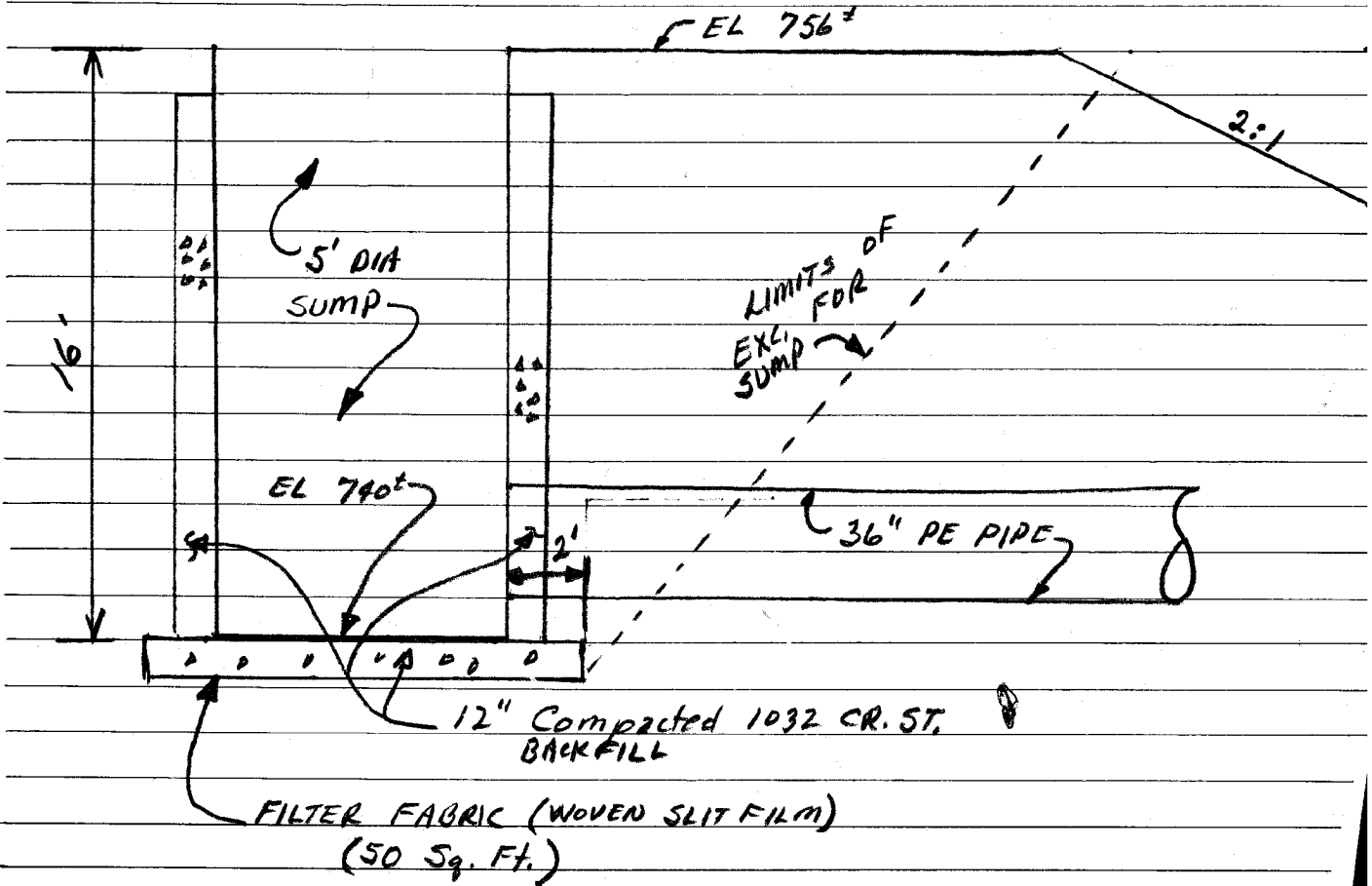
COMPUTED JLG DATE 9/24/94

CHECKED DATE

1-Pump Scheme - Small Sump



1) SUMP



KINGSTON FOSSIL PLANT COAL YARD RUNOFF SUMP

COMPUTED JLG DATE 9/24/94

CHECKED DATE

1- PUMP SCHEME - Small Sump

1) SUMP (Continued)

2) STRUCTURAL EXCAVATION

$$\frac{(7 \times 7) + (43 \times 43)}{2} \times 17 \div 27 = \underline{600 \text{ C.Y.}}$$

b) Crushed Stone Backfill (1032)

THOROUGHLY COMPACTED IN 9" MAX LAYERS

BASE: $7 \times 7 \times 1' = 49 \text{ C.F.}$

SIDES: $\left[\left(\frac{\pi \times 7^2}{4} \right) - \left(\frac{\pi \times 5^2}{4} \right) \right] (16) =$

$$(38.5 - 19.6) (16) = 302.4 + 302 = \underline{393 \text{ C.F.}}$$

$$\underline{442 \text{ C.F.}} = 16.3 \text{ say } \underline{20 \text{ C.Y.}}$$

$$(442 \text{ ft}^3) \left(\frac{130 \text{ lb}}{\text{ft}^3} \right) \left(\frac{1 \text{ Ton}}{2000 \text{ lb}} \right) = 28.7 \text{ say } \underline{30 \text{ TON}}$$

c) Filter Fabric

WOVEN SLIT FILM

50 S.F. under sump $\approx 40' @ \text{Pipe JA.}$ 100 S.F.

d) Compacted Backfill (EARTH)

$$\text{Vol Sump} = \frac{\pi \times 5^2}{4} = 19.6 \text{ C.F.}$$

$$\text{Vol CR. ST.} = \frac{\pi \times 5^2}{4} = 442 \text{ C.F.}$$

$$\underline{462 \text{ C.F.}}$$

$$17 \text{ C.Y.}$$

$$\text{BACKFILL} = \text{EXC.} - (\text{VOL SUMP}) - (\text{VOL CR. ST.})$$

$$= 600 - 17 =$$

$$\underline{583 \text{ C.Y.}}$$

KINGSTON FOSSIL PLANT
COAL YARD RUNOFF SUMP

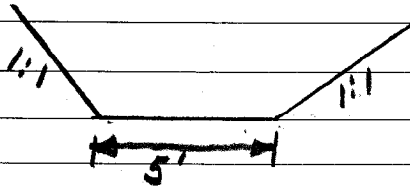
COMPUTED JLG DATE 9/24/94

CHECKED DATE

2) 36" PE PIPE

2) 50' LF (BUY 60'- 20' LENGTHS @ 20⁰⁰/FT
4 COUPLINGS @ 28⁰⁰)

b) Structural Excavation



Area @ SUMP = 0

Area @ 17': H = 15'
Area = $\frac{(5) + (35)}{2} = 20 \text{ ft}^2$

Area @ 50': = 0

Vol = $\left(\frac{0+20}{2}\right)(17) + \left(\frac{20+0}{2}\right)(50-17) =$
 $= 170 + 330 = 500 \text{ C.F.} = 18.5 \text{ day } \underline{20 \text{ C.Y.}}$

c) BACKFILL: THOROUGHLY COMPACTED EARTH
Backfill = EXCAVATION - (PIPE VOL)

PIPE VOL = $\left(\frac{\pi 3^2}{4}\right)(40) = 7$

BACKFILL = 20 - 7 = 13

13 C.Y.

Spero-Lite

1400 g
80%
1500

32
10
5
47 pay 60 L.F.

ADS:

800-733-9987

36" → 45" head? →

COMPUTED DATE

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36" Polyethylene Pipe ≈ 70 L.F. water tight:

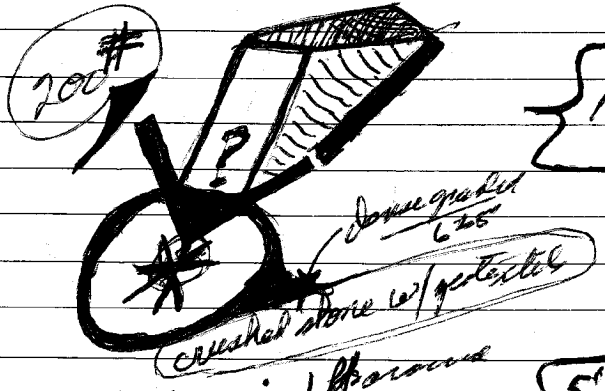
mouth well 19 5/8" per ft.

premium x length 20 ft length 200 ft length 19 5/8"

7 foot in length

8" diameter X 16' depth →
10" diameter X 16' depth →

10" → 2 1/2" include 20 lengths:



1500 gpm!

do not put on pressure side of pump!

Anti Float:
Ballcock Ext.
4" diam. C.I.:

Cr. St. Fill - mixed Porous
15' compacted in 6-8' lifts
5'
4'
no anchor:

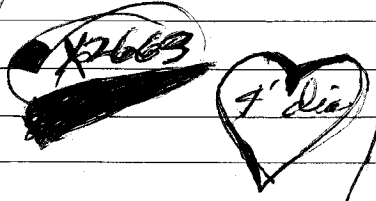
250# ~ 300#



Sperolite:
9-1-800-241-8970 (3):

9-1-404-948-1793 Larry French?
9-1-404-426-1581 Steve Morgan

Larry Kesterson
Lynn Becker:
Calvin Toney:



10,000 #

Fiberglass ≈ 15000
Stainless Steel ≈
4' diam. ≈ 5,000
1/36" pipe

Vic Davis: X 6846

Mc Gowen

1000

Submersible Pump

8 ft diameter x 16 ft tall tank

304 SS - \$19,500

316 SS - 23,400

Fiberglass - \$15,000

* Estimate needs to show savings if PVC can be used instead of SS.

Questions for Dan Bohl

- Can we use PVC pipe instead of SS
- Can we eliminate SS 45°
- Can we use all 8" pipe instead of 6" and 10" up to transition to polyethylene pipe