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RTB, inc.

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CAVE CREEK LANDFILL

***WELL REPORTS
Contract No. SWMD-97-01***

&

OPERATION MANUAL

***MARICOPA COUNTY SOLID WASTE
MANAGEMENT DEPARTMENT***

Project: Cave Creek Landfill

Well ID#: GW-1

Start Date: 1/6/98

Completion Date: 1/6/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock, dark soil
10	20	Refuse, rock, dark soil
20	30	Refuse, rock, dark soil/ Metal, Engine block
30	40	Refuse, rock, dark soil
40	50	Refuse, rock, dark soil
50	55	Rock, dark soil, no refuse
55	57	Clean Native Soil/ NO trash
Native at 55'		

Drill Hours: 2.4

Installation:

Depth From Surface:

ft		
ft	ft	
54	18	Perforated 6" SDR 17
18	0	6" SDR 17
0	7' AG	6" SDR 17
57	17	1 1/2 Gravel
17	15	Bentonite
15	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-2

Start Date: 1/6/98

Completion Date: 1/6/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock, dark soil
10	20	Refuse, rock, dark soil, large rocks
20	30	Refuse, rock, dark soil
30	38	Rock, dark soil, little refuse
38	41	Rock, dark soil, no refuse
41	43	Clean Native Soil/ NO trash

Native at 41'

Drill Hours: 4.5

Installation:

Depth From Surface:

ft		
ft	ft	
40	12	Perforated 6" SDR 17
12	0	6" SDR 17
0	7' AG	6" SDR 17
43	11	1 1/2 Gravel
11	9	Bentonite
9	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-3

Start Date: 1/6/98

Completion Date: 1/7/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock, dark soil
10	20	Moist refuse, rock, dark soil
20	30	Moist refuse, rock, dark soil
30	40	Dry refuse, rock, dark soil
40	46	Rock, dark soil, little refuse
46	49	Clean Native Soil/ NO trash

Native at 46'

Drill Hours: 4

Installation:

Depth From Surface:

ft		
ft	ft	
45	13	Perforated 6" SDR 17
13	0	6" SDR 17
0	8' AG	6" SDR 17
48	12	1 1/2 Gravel
12	10	Bentonite
10	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-4

Start Date: 1/7/98

Completion Date: 1/7/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, rock, dark soil
10	20	Rock, dark soil, little refuse
20	30	Rock, dark soil, little refuse
30	40	Rock, dark soil, little refuse
40	46	Rock, dark soil, little refuse
46	47	Clean Native Soil/ NO trash

Native at 46'

Drill Hours: 3.4

Installation:

Depth From Surface:

ft		
ft	ft	
45	13	Perforated 6" SDR 17
13	0	6" SDR 17
0	8' AG	6" SDR 17
47	12	1 1/2 Gravel
12	10	Bentonite
10	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-5

Start Date: 1/7/98

Completion Date: 1/8/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, rock, dark soil
10	20	Rock, dark soil, no refuse
20	30	Rock, dark soil, no refuse
30	40	Rock, dark soil, dry refuse
40	46	Rock, dark soil, little refuse
46	49	Clean Native Soil/ NO trash

Native at 46'

Drill Hours: 3.4

Installation:

Depth From Surface:

ft		
ft	ft	
45	13	Perforated 6" SDR 17
13	0	6" SDR 17
0	8' AG	6" SDR 17
49	12	1 1/2 Gravel
12	10	Bentonite
10	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-6

Start Date: 1/8/98

Completion Date: 1/8/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock, dark soil
10	20	Rock, dark soil, dry refuse
20	30	Rock, dark soil, moist refuse
30	40	Rock, dark soil, refuse
40	50	Rock, dark soil, dry refuse
50	60	Rock, dark soil, little dry refuse
60	62	Clean Native Soil/ NO trash

Native at 60'

Drill Hours: 7.4

Installation:

Depth From Surface:

ft		
ft	ft	
59	23	Perforated 6" SDR 17
23	0	6" SDR 17
0	6' AG	6" SDR 17
61	22	1 1/2 Gravel
22	20	Bentonite
20	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-7

Start Date: 1/8/98

Completion Date: 1/11/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Rock, dark soil, dry refuse
20	30	Rock, dark soil, dry refuse
30	40	Rock, dark soil, dry refuse
40	51	Rock, dark soil, little dry refuse
51	53	Clean Native Soil/ NO trash

Native at 51'

Drill Hours: 4

Installation:

Depth From Surface:

ft		
ft	ft	
50	14	Perforated 6" SDR 17
14	0	6" SDR 17
0	6' AG	6" SDR 17
51	13	1 1/2 Gravel
13	11	Bentonite
11	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-8

Start Date: 1/11/98

Completion Date: 1/11/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Rock, dark soil, dry refuse
20	30	Rock, dark soil, dry refuse
30	40	Rock, dark soil, dry refuse
40	49	Rock, dark soil, little dry refuse
49	51	Clean Native Soil/ NO trash

Native at 49'

Drill Hours: 2.5

Installation:

Depth From Surface:

ft		
ft	ft	
48	14	Perforated 6" SDR 17
14	0	6" SDR 17
0	7' AG	6" SDR 17
51	13	1 1/2 Gravel
13	11	Bentonite
11	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-9

Start Date: 1/11/98

Completion Date: 1/12/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Rock, dark soil, dry refuse
20	30	Rock, dark soil, dry refuse
30	40	Rock, dark soil, dry refuse
40	48	Rock, dark soil, little dry refuse
48	51	Clean Native Soil/ NO trash

Native at 48'

Drill Hours: 4

Installation:

Depth From Surface:

ft		
ft	ft	
47	14	Perforated 6" SDR 17
14	0	6" SDR 17
0	7' AG	6" SDR 17
51	13	1 1/2 Gravel
13	11	Bentonite
11	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-10

Start Date: 1/12/98

Completion Date: 1/12/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Rock, dark soil, dry refuse
20	30	Rock, dark soil, moist refuse
30	40	Dark soil, dry refuse
40	50	Rock, dark soil, little dry refuse
50	60	Rock, dark soil, little dry refuse
60	62	Rock, dark soil, no refuse
62	63	Clean Native Soil/ NO trash

Native at 62'

Drill Hours: 6

Installation:

Depth From Surface:		
ft	ft	
61	21	Perforated 6" SDR 17
21	0	6" SDR 17
0	8' AG	6" SDR 17
63	20	1 1/2 Gravel
20	18	Bentonite
18	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-11

Start Date: 1/12/98

Completion Date: 1/13/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Dark soil, dry refuse
20	30	Dark soil, dry refuse
30	40	Dark soil, dry refuse
40	50	Rock, dark soil, little dry refuse
50	53	Clean Native Soil/ NO trash

Native at 50'

Drill Hours: 3

Installation:

Depth From Surface:

ft		
ft	ft	
49	13	Perforated 6" SDR 17
13	0	6" SDR 17
0	7' AG	6" SDR 17
51	12	1 1/2 Gravel
12	10	Bentonite
10	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-12

Start Date: 1/14/98

Completion Date: 1/14/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Dark soil, dry refuse
20	30	Dark soil, rock, dry refuse
30	40	Dark soil, dry refuse
40	50	Rock, dark soil, dry refuse
50	60	Rock, dark soil, dry refuse
60	69	Rock, dark soil, little dry refuse
70		Clean Native Soil/ NO trash

Native at 70'

Drill Hours: 3.5

Installation:

Depth From Surface:

ft		
ft	ft	
69	39	Perforated 6" SDR 17
39	0	6" SDR 17
0	10' AG	6" SDR 17
70	38	1 1/2 Gravel
38	36	Bentonite
36	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-13

Start Date: 1/13/98

Completion Date: 1/13/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Dark soil, dry refuse
20	30	Dark soil, rock, dry refuse
30	40	Dark soil, dry refuse
40	45	Rock, dark soil, no refuse
45	47	Clean Native Soil/ NO trash

Native at 45'

Drill Hours: 2

Installation:

Depth From Surface:

ft		
ft	ft	
44	12	Perforated 6" SDR 17
12	0	6" SDR 17
0	7' AG	6" SDR 17
47	11	1 1/2 Gravel
11	9	Bentonite
9	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-14

Start Date: 1/13/98

Completion Date: 1/13/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock
10	20	Dark soil, dry refuse, rock
20	30	Dark soil, rock, dry refuse
30	40	Dark soil, dry refuse
40	51	Rock, dark soil, little refuse
51	53	Clean Native Soil/ NO trash

Native at 53'

Drill Hours: 4

Installation:

Depth From Surface:

ft		
ft	ft	
50	16	Perforated 6" SDR 17
16	0	6" SDR 17
0	8' AG	6" SDR 17
51	14	1 1/2 Gravel
14	13	Bentonite
13	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-15

Start Date: 1/13/98

Completion Date: 1/13/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface
ft ft

Material Discription

NO DRILL

Drill Hours: 0

Installation:

Depth From Surface:
ft ft

Project: Cave Creek Landfill

Well ID#: GW-16

Start Date: 1/13/98

Completion Date: 1/14/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock, dark soil
10	20	Dry refuse, rock, dark soil
20	30	Refuse, rock, dark soil
30	40	Refuse, rock, dark soil
40	50	Refuse, rock, dark soil
50	60	Refuse, rock, dark soil
60	70	Refuse, rock, dark soil
70	78	Refuse, rock, dark soil

Complete at 78'

Drill Hours: 3

Installation:

Depth From Surface:

ft	ft	
77	37	Perforated 6" SDR 17
37	0	6" SDR 17
0	8' AG	6" SDR 17
78	36	1 1/2 Gravel
36	34	Bentonite
34	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-17

Start Date: 1/13/98

Completion Date: 1/13/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface
ft ft

Material Discription

NO DRILL

Drill Hours: 0

Installation:

Depth From Surface:
ft ft

Project: Cave Creek Landfill

Well ID#: GW-18

Start Date: 1/16/98

Completion Date: 1/16/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Refuse, rock, dark soil
10	20	Dry refuse, rock, dark soil
20	30	Dry refuse, rock, dark soil
30	40	Dry refuse, rock, dark soil
40	50	Dry refuse, rock, dark soil
50	60	Dry refuse, rock, dark soil
60	70	Rock, dark soil
70	71	Clean soil/ no refuse

Native at 71'

Drill Hours: 3

Installation:

Depth From Surface:

ft		
ft	ft	
70	30	Perforated 6" SDR 17
30	0	6" SDR 17
0	10' AG	6" SDR 17
71	29	1 1/2 Gravel
29	27	Bentonite
27	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-19

Start Date: 1/14/98

Completion Date: 1/15/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface Material Discription

ft	ft	
0	10	Dry refuse, dark soil, rock
10	20	Dry refuse, dark soil
20	30	Dry refuse, dark soil
30	40	Dry refuse, dark soil
40	50	Dry refuse, rock, dark soil
50	60	Dry refuse, rock, dark soil
60	70	Rock, dark soil
70	71	Clean soil/ no refuse

Native at 70'

Drill Hours: 6

Installation:

Depth From Surface:

ft	ft	
70	37	Perforated 6" SDR 17
37	0	6" SDR 17
0	10' AG	6" SDR 17
70	36	1 1/2 Gravel
36	33	Bentonite
33	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-20

Start Date: 1/18/98

Completion Date: 1/18/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil,rock
10	20	Dry refuse, dark soil,rock
20	30	Dry refuse, dark soil,rock
30	40	Dry refuse, dark soil,rock
40	50	Dry refuse, dark soil,rock
50	60	Dry refuse, dark soil,rock
60	70	Dry refuse, dark soil,rock
70	71	Dark soil/ no refuse
71		Native Clean soil/ no refuse

Native at 71'

Drill Hours: 5

Installation:

Depth From Surface:

ft		
ft	ft	
70	36	Perforated 6" SDR 17
36	0	6" SDR 17
0	8' AG	6" SDR 17
71	35	1 1/2 Gravel
35	33	Bentonite
33	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-21

Start Date: 1/18/98

Completion Date: 1/19/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil,rock
10	20	Dry refuse, dark soil
20	30	Dry refuse, dark soil
30	40	Dry refuse, dark soil,rock
40	50	Dry refuse, dark soil,rock
50	60	Dry refuse, dark soil,rock
60	70	Dry refuse, dark soil,rock
70	76	Dark soil,rock
76		Solid Rock

Complete at 76'

Drill Hours: 5

Installation:

Depth From Surface:

ft	ft	
75	41	Perforated 6" SDR 17
41	0	6" SDR 17
0	8' AG	6" SDR 17
76	40	1 1/2 Gravel
40	38	Bentonite
38	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-22

Start Date: 1/19/98

Completion Date: 1/20/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil, rock
10	20	Dry refuse, dark soil
20	30	Dry refuse, dark soil
30	40	Dry refuse, dark soil
40	50	Dry refuse, dark soil
50	60	Dry refuse, dark soil
60	70	Dry refuse, dark soil
70		Clean soil/ no refuse

Native at 70'

Drill Hours: 9

Installation:

Depth From Surface:

ft		
ft	ft	
69	34	Perforated 6" SDR 17
34	0	6" SDR 17
0	6' AG	6" SDR 17
70	33	1 1/2 Gravel
33	30	Bentonite
30	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-23

Start Date: 1/20/98

Completion Date: 1/20/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil, rock
10	20	Dry refuse, dark soil
20	30	Dry refuse, dark soil
30	40	moist refuse, dark soil
40	50	wet refuse, dark soil
50	60	refuse, dark soil, rocky
60	70	little refuse, dark soil, rocky
70	72	Clean soil/ no refuse

Native at 72'

Drill Hours: 9

Installation:

Depth From Surface:

ft	ft	
71	36	Perforated 6" SDR 17
36	0	6" SDR 17
0	6' AG	6" SDR 17
72	35	1 1/2 Gravel
35	33	Bentonite
33	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-24

Start Date: 1/21/98

Completion Date: 1/21/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil, rock
10	20	Dry refuse
20	30	Dry refuse
30	40	Dry refuse
40	50	Dry refuse
50	60	Dry refuse
60	68	little refuse, dark soil, rocky
68	70	Clean soil/ no refuse

Native at 70'

Drill Hours: 7

Installation:

Depth From Surface:

ft		
ft	ft	
69	34	Perforated 6" SDR 17
34	0	6" SDR 17
0	6' AG	6" SDR 17
70	33	1 1/2 Gravel
33	31	Bentonite
31	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-25

Start Date: 1/21/98

Completion Date: 1/21/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil, rock
10	20	Dry refuse
20	30	Dry refuse
30	40	Dry refuse
40	50	Dry refuse
50	60	Dry refuse
60	70	Dry refuse
70		complete

Complete at 70'

Drill Hours: 4

Installation:

Depth From Surface:

ft		
ft	ft	
69	34	Perforated 6" SDR 17
34	0	6" SDR 17
0	6' AG	6" SDR 17
70	33	1 1/2 Gravel
33	31	Bentonite
31	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-26

Start Date: 1/22/98

Completion Date: 1/27/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, dark soil,rock
10	20	Dry refuse
20	30	Dry refuse
30	40	Dry refuse
40	50	Dry refuse, dark soil,rock
50	60	Dry refuse, dark soil,rock
60	65	Dark soil,rock
65		complete

Complete at 65'

Drill Hours: 5

Installation:

Depth From Surface:

ft	ft	
64	29	Perforated 6" SDR 17
29	0	6" SDR 17
0	6' AG	6" SDR 17
65	28	1 1/2 Gravel
28	26	Bentonite
26	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-27

Start Date: 1/27/98

Completion Date: 1/27/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface Material Discription

ft	ft	
0	10	Dry refuse, dark soil,rock
10	20	Dry refuse
20	30	Dry refuse
30	40	Dry refuse
40	50	Dry refuse, dark soil,rock
50	60	Dry refuse, dark soil,rock
60	65	Dark soil,rock
65	68	Dark soil,rock, no refuse
68		native
		Native at 68'

Drill Hours: 6.5

Installation:

Depth From Surface:

ft	ft	
67	32	Perforated 6" SDR 17
32	0	6" SDR 17
0	6' AG	6" SDR 17
68	31	1 1/2 Gravel
31	29	Bentonite
29	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-28

Start Date: 1/27/98

Completion Date: 1/28/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface Material Discription

ft	ft	
0	10	Dry refuse, dark soil,rock
10	20	Dry refuse
20	30	Dry refuse
30	40	Dry refuse
40	50	Dry refuse,rock
50	55	Dark soil,rock, no refuse
55		clean soil/ no refuse/rock
		Native at 55'

Drill Hours: 5

Installation:

Depth From Surface:

ft	ft	
54	19	Perforated 6" SDR 17
19	0	6" SDR 17
0	6' AG	6" SDR 17
55	18	1 1/2 Gravel
18	16	Bentonite
16	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-30

Start Date: 1/28/98

Completion Date: 1/29/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck.

Drilling

Depth from Surface		Material Discription
ft	ft	
0	10	Dry refuse, rocky
10	20	Dry refuse, rocky
20	30	Dry refuse, rocky
30	40	Dry refuse, rocky
40	45	Dry refuse, rocky
45	50	Dark soil,rock, no refuse
50		clean soil/ no refuse/rock

Native at 50'

Drill Hours: 5

Installation:

Depth From Surface:

ft		
ft	ft	
49	15	Perforated 6" SDR 17
15	0	6" SDR 17
0	6' AG	6" SDR 17
50	14	1 1/2 Gravel
14	12	Bentonite
12	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil

Project: Cave Creek Landfill

Well ID#: GW-31

Start Date: 1/28/98

Completion Date: 1/28/98

Equipment: AF-10 IMT Drill Rig, John Deere 544 Loader, International 5 yard Dump Truck,

Drilling

Depth from Surface Material Discription

ft	ft	
0	10	Dry refuse, rocky
10	20	Dry refuse, rocky
20	30	Dry refuse, rocky
30	40	Dry refuse, rocky
40	45	Dry refuse, rocky
45	50	Dark soil, rock, no refuse
50	51	clean soil/ no refuse/rock

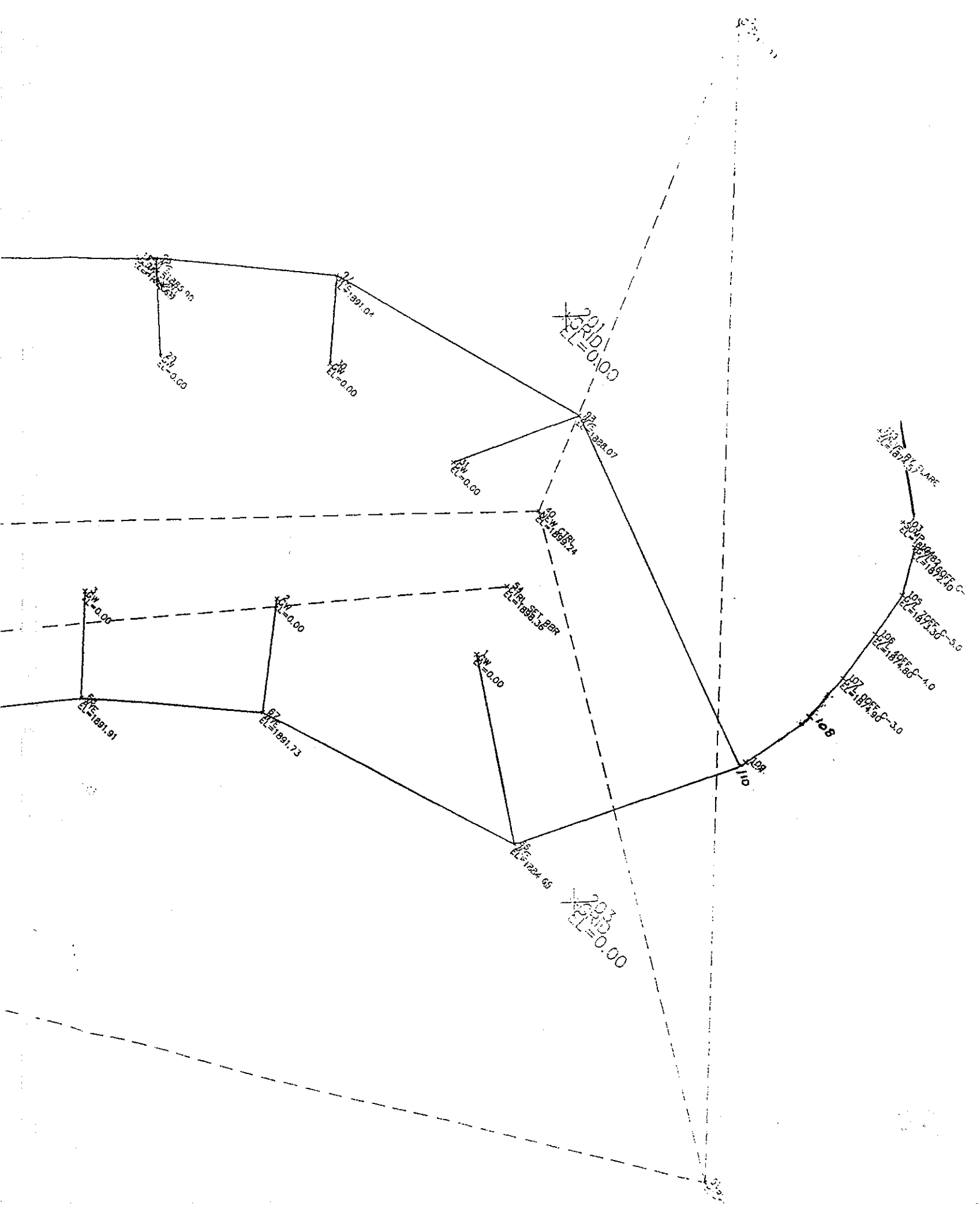
Native at 51'

Drill Hours: 3

Installation:

Depth From Surface:

ft	ft	
50	16	Perforated 6" SDR 17
16	0	6" SDR 17
0	6' AG	6" SDR 17
51	14	1 1/2 Gravel
14	12	Bentonite
12	3	Clean Soil
3	1	Bentonite
1	2' AG	Clean Soil



201
GRID
EL=0.00

202
GRID
EL=0.00

21
EL=1991.07
22
EL=0.00
23
EL=0.00

24
EL=0.00

25
EL=0.00

26
EL=1891.91

27
EL=0.00

28
EL=1891.73

29
EL=0.00

30
EL=1891.56

31
EL=1891.56

32
EL=1891.56

33
EL=1891.56

34
EL=1891.56

35
EL=1891.56

36
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37
EL=1891.56

38
EL=1891.56

39
EL=1891.56

40
EL=1891.56

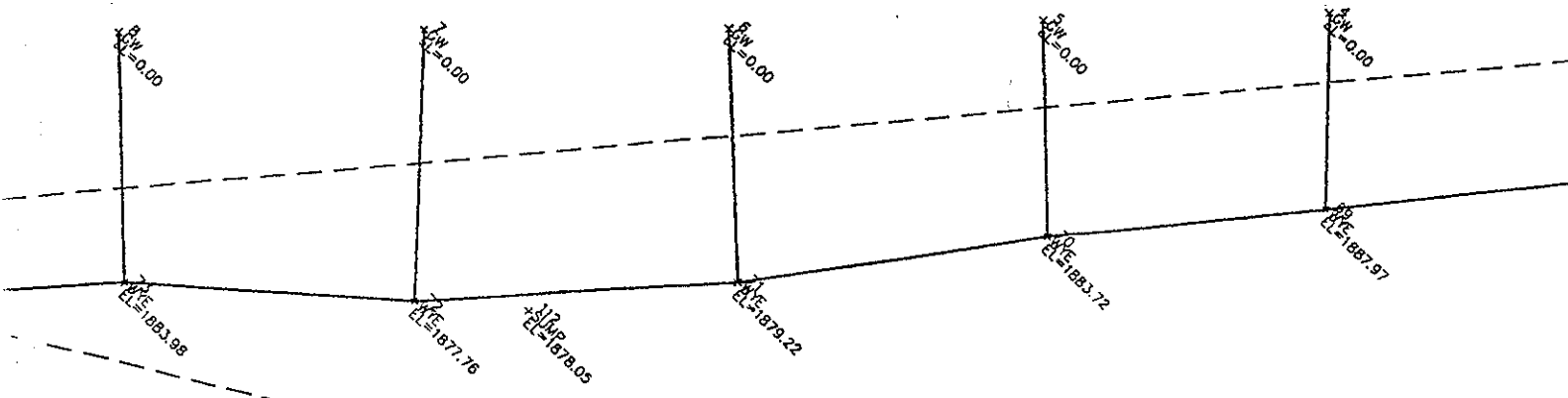
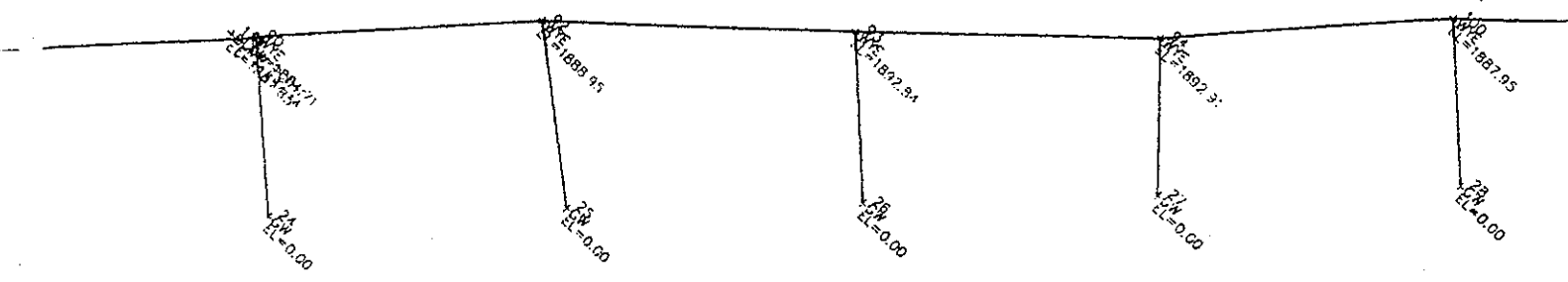
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EL=1891.56

42
EL=1891.56

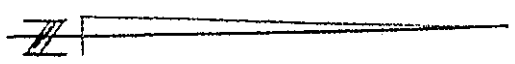
43
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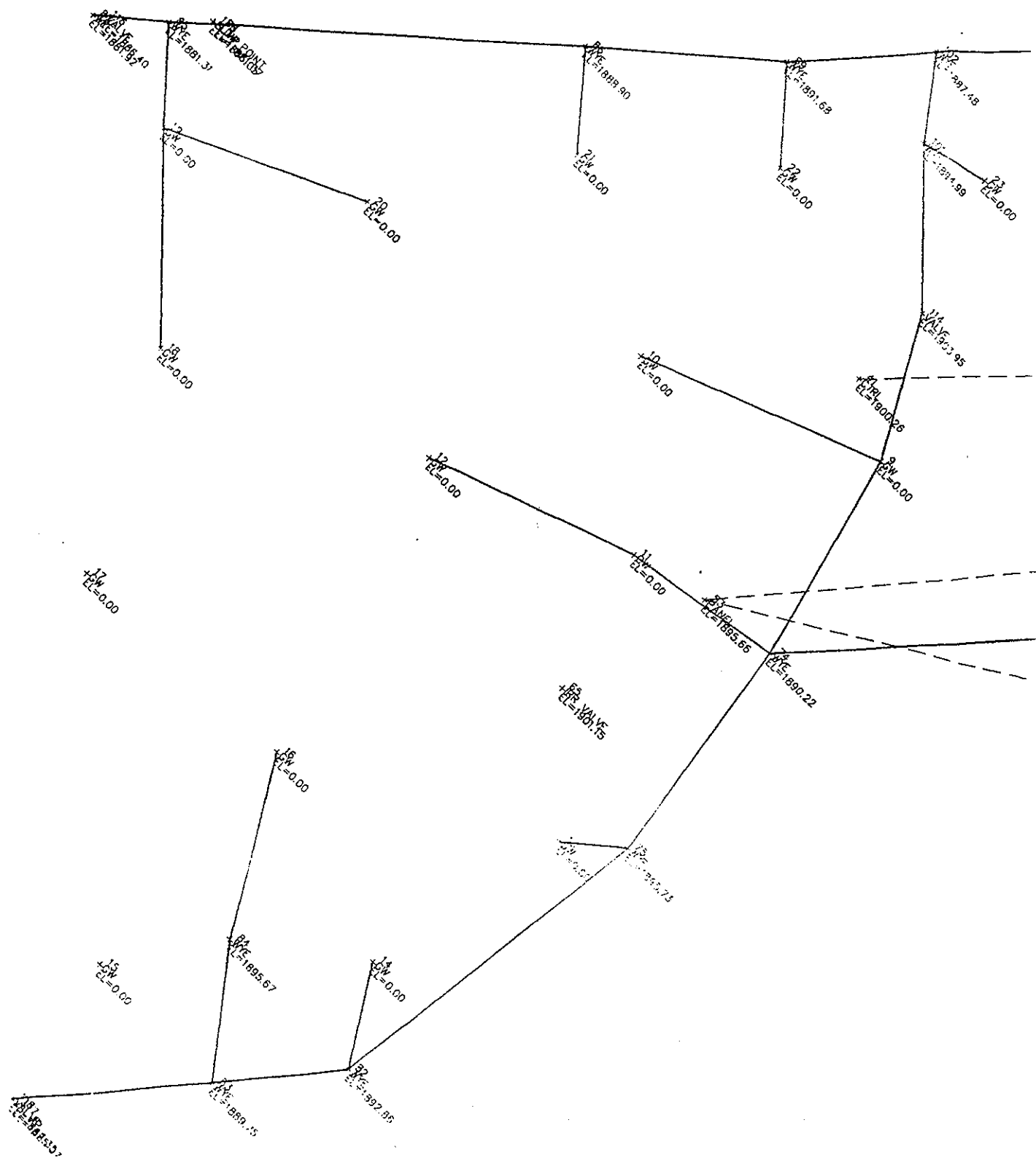
44
EL=1891.56

45
EL=1891.56



SCALE 1"=100'





200
EL = 0.00

200
EL = 0.00

List Nodes Report

#####

node #	north	east	elev	descrip
1015422.00	475788.00	475788.00	0.0	GW
1015257.00	475738.00	475738.00	0.0	GW
1015095.00	475729.00	475729.00	0.0	GW
1014946.00	475731.00	475731.00	0.0	GW
1014802.00	475732.00	475732.00	0.0	GW
1014642.00	475733.00	475733.00	0.0	GW
1014488.00	475731.00	475731.00	0.0	GW
1014333.00	475730.00	475730.00	0.0	GW
1014186.00	475734.00	475734.00	0.0	GW
1014021.00	475658.00	475658.00	0.0	GW
1014015.00	475798.00	475798.00	0.0	GW
1013873.00	475728.00	475728.00	0.0	GW
1013961.00	475999.00	475999.00	0.0	GW
1013832.00	476082.00	476082.00	0.0	GW
1013642.00	476082.00	476082.00	0.0	GW NOT BUILT
1013766.00	475934.00	475934.00	0.0	GW
1013635.00	475807.00	475807.00	0.0	GW NOT BUILT
1013688.00	475649.00	475649.00	0.0	GW
1013691.00	475493.00	475493.00	0.0	GW
1013832.00	475547.00	475547.00	0.0	GW
1013977.00	475515.00	475515.00	0.0	GW
1014118.00	475526.00	475526.00	0.0	GW
1014262.00	475535.00	475535.00	0.0	GW
1014412.00	475534.00	475534.00	0.0	GW
1014562.00	475533.00	475533.00	0.0	GW
1014712.00	475533.00	475533.00	0.0	GW
1014862.00	475532.00	475532.00	0.0	GW
1015015.00	475528.00	475528.00	0.0	GW
1015161.00	475529.00	475529.00	0.0	GW
1015303.00	475538.00	475538.00	0.0	GW
1015405.00	475624.00	475624.00	0.0	GW
1015475.41	475667.06	1899.2	1899.2	NEW CTRL
1014171.30	475675.17	1900.3	1900.3	CTRL
1015648.70	475244.26	1872.0	1872.0	CTRL
1015607.22	476238.23	1879.0	1879.0	CTRL
1014064.10	475830.44	1895.7	1895.7	PANEL
1015447.90	475730.87	1898.4	1898.4	CTRL SET R
1015706.19	475830.34	0.0	0.0	NW COR
1015676.85	475830.34	0.0	0.0	SW COR
1015706.19	475918.34	0.0	0.0	NE COR
1015676.85	475918.34	0.0	0.0	SE COR
1013964.04	475891.39	1901.2	1901.2	IRR VALUE CONTROL POINT
1015450.81	475949.52	1884.7	1884.7	WYE
1015243.85	475834.37	1891.7	1891.7	WYE
1015090.13	475819.86	1891.9	1891.9	WYE
1014942.52	475832.94	1888.0	1888.0	WYE
1014802.36	475844.44	1883.7	1883.7	WYE
1014644.57	475864.64	1879.2	1879.2	WYE
1014481.27	475871.41	1877.8	1877.8	WYE
1014333.92	475860.27	1884.0	1884.0	WYE

List Nodes Report

#####

#	north	east	elev	descrip
1014108.45	475868.95	1890.2	WYE	
1014008.96	476004.68	1895.7	WYE	
1013814.34	476157.48	1892.9	WYE	
1013719.45	476166.14	1889.8	WYE	
1013732.35	476065.10	1895.7	WYE	
1013695.26	475417.34	1881.3	WYE	
1013983.56	475438.59	1888.9	WYE	
1013642.06	475411.55	1881.9	WYE	
1013728.75	475420.16	1881.1	LOW POINT	
1014122.91	475450.03	1891.7	WYE	
1014407.25	475440.06	1884.7	WYE	
1014398.97	475441.02	1884.1	LOW POINT	
1014550.98	475435.00	1889.0	WYE	
1014709.55	475443.77	1892.8	WYE	
1014864.39	475449.47	1892.9	WYE	
1015145.45	475444.36	1885.1	LOW POINT	
1015158.89	475444.10	1885.9	WYE	
1015309.62	475462.50	1891.0	WYE	
1015509.76	475585.51	1888.1	WYE	
1015640.89	475887.84	1876.6	WYE	
1015012.30	475440.52	1887.9	WYE	
1014217.62	475508.75	1895.0	WYE	
1014226.94	475443.64	1887.5	WYE	
1015779.60	475682.09	1876.8	SUMP	
1015789.42	475704.24	1872.4	G/L 16OFF	} G PIPE
1015778.43	475745.09	1873.3	G/L 7OFF C	
1015755.08	475778.15	1874.8	G/L 4OFF C	
1015727.61	475815.39	1874.9	G/L 0OFF C	
1015692.59	475853.38	1875.8	G/L 0OFF C	
1015645.37	475884.21	1881.3	VALVE	
1015642.70	475887.52	1881.2	VALVE	
1015142.24	475442.48	1888.7	SUMP	
1014538.22	475877.38	1878.0	SUMP	
1014394.60	475438.26	1887.9	SUMP	
1014215.57	475629.55	1903.9	VALVE	
1013725.57	475417.88	1886.1	SUMP	
1013649.82	475412.32	1886.4	VALVE	
1013582.93	476180.58	1885.1	SUMP	
1013580.32	476176.50	1887.3	VALVE	
1015760.63	475603.37	1874.6	VALVE BY FLARE	
1013500.00	475500.00	0.0	GRID	} GRID TICKS
1015500.00	475500.00	0.0	GRID	
1013500.00	476000.00	0.0	GRID	
1015500.00	476000.00	0.0	GRID	

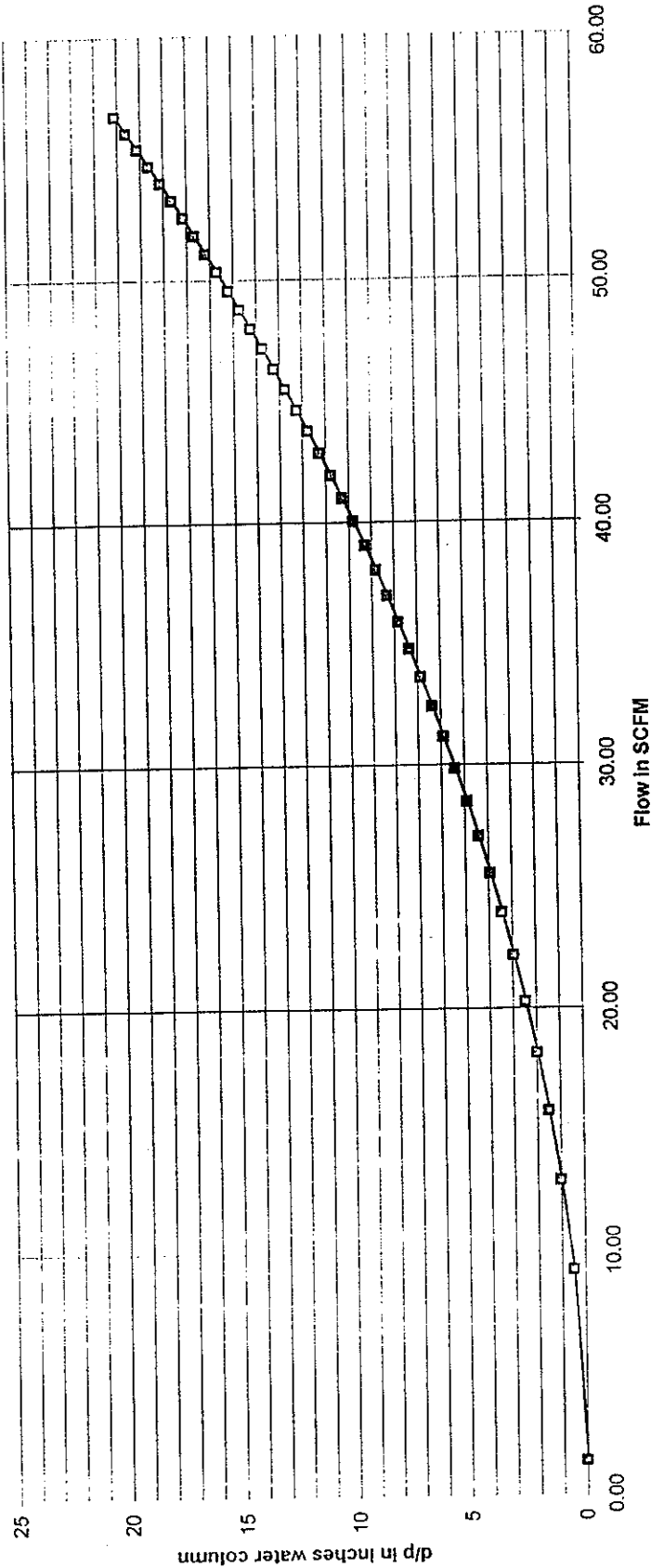
ORIPAC CALCULATIONS

DATE 10/17/97
 CUSTOMER 0
 CUSTOMER ID 0
 PROJECT NAME 2.0" Wellhead : 1.0" Orifice Bore
 PROJECT ID 10" w.c. vacuum
 TAG NUMBER 0
 CALCULATED RATE (SCFM) 28.77

LINE TEMPERATURE (DEG. F) 110
 BASE TEMPERATURE (DEG. F) 60
 LINE PRESSURE (PSIA) 14.335
 BASE PRESSURE (PSIA) 14.696
 BASE SPECIFIC GRAVITY 0.997
 LINE SPECIFIC GRAVITY 0.997
 SPECIFIC HEAT 1.3
 DIFFERENTIAL (IN. H₂O) 5
 LINE DIAMETER (IN.) 1.943
 VISCOSITY IN CP 0.011

FINAL BETA USED 0.51467
 K VALUE USED 0.63164
 Y VALUE USED 0.99609
 REYNOLDS NUMBER USED 38401
 CALCULATED ORIFICE DIAMETER 1
 HEADLOSS 1 - β^2
 73.51% of differential at calculated rate
 3.68 "w/c

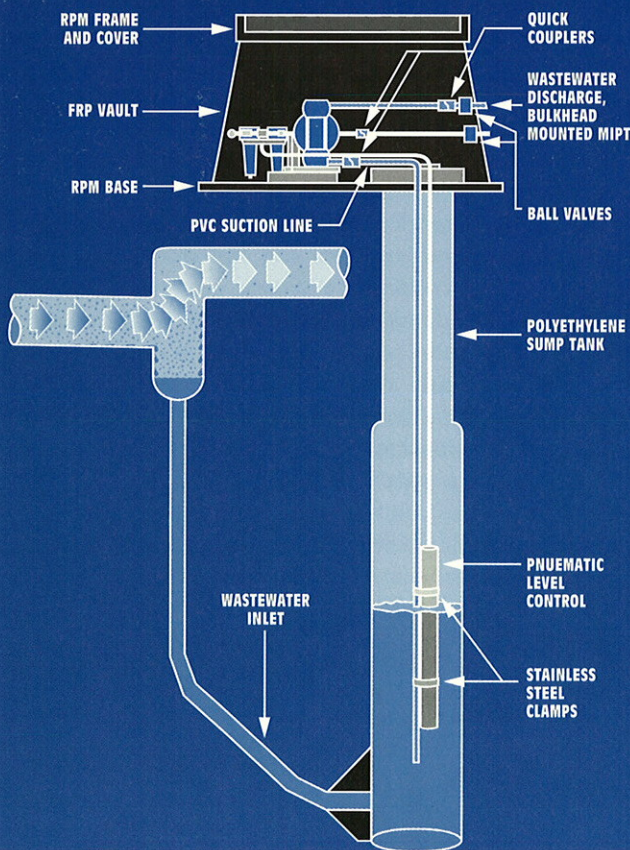
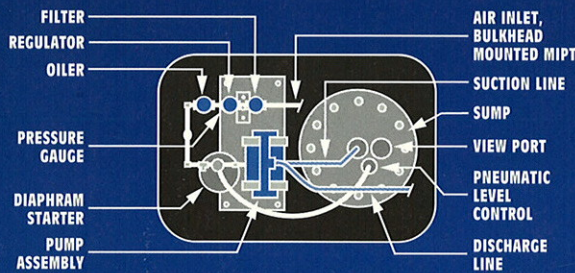
Differential Pressure v. Flow



LFG&E Pneu-Pump™ Automated Condensate & Leachate Recovery System

Options

- ▲ Different pump materials
- ▲ Customized inlets
- ▲ Balance line
- ▲ Custom sump depth



Performance Guarantee

Landfill Gas and Environmental Products, Inc. provides a full line of landfill specific equipment designed to be accurate, rugged, reliable, and cost-effective. In fact, we're so confident that you'll be completely satisfied with the quality and performance of our equipment that we back all our products with a unique **100% PERFORMANCE GUARANTEE**. Call one of our Landfill Product Specialists for details.

At LFG&E, we are dedicated to customer service. Our friendly staff of experienced Product Specialists are always available to support your needs through all phases of equipment specification, installation and operation. You can depend on LFG&E to deliver quality intensive products with attractive pricing and responsive ongoing support.

Specifications

PUMP – Air-operated, double-diaphragm, positive displacement, self-priming, lube free. Infinitely variable capacity and discharge pressures

1-220 feet of head
1-35 GPM
1" inlet and outlet,
1" PVC suction line
0.25" air inlet
Max. inlet air pressure: 125 psig

Wetted housing: Polypropylene
Non wetted housing: Polypropylene
Check valves: Nordel®
Diaphragms: Nordel®
(Other materials available)

LEVEL CONTROL:

Floatless pneumatic level control, normally closed;
10" differential
Pressure range: 40-125 psig
Temperature range: 35°-180°F

Valve: Air pilot operated 3-way
PVC sensing tube
Buna N (standard) diaphragm

INLET AIR:

0.5" bulkhead-mounted MIPT with stainless steel ball valve.
Built-in filter, regulator, and oiler

WASTE WATER DISCHARGE:

0.75" bulkhead-mounted MIPT with stainless steel ball valve

TANK:

HDPE, 10" x 12" x 8" deep, 2" inlet, 10" flange connection;
35-gallon maximum capacity; 6" solids settling area

VAULT:

17"W x 30"L x 24"D fiberglass reinforced plastic (FRP) body with reinforced plastic mortar (RPM) lid and base rated at 20,000 lbs. loading capacity (incidental traffic)

DOCUMENTATION:

Instruction manual; flow rates versus air consumption chart

Custom configurations and applications available.



LFG&E

Landfill Gas & Environmental Products, Inc.

9855 Prospect Ave., Ste. G
Santee, CA 92071
TEL 619/596-9083
FAX 619/596-9088



LFG&E Pneu-Pump™ Automated Condensate & Leachate Recovery System



Features

- ▲ Virtually maintenance free
- ▲ Double diaphragm, lube free, polypropylene pump
- ▲ 35-gallon collection reservoir
- ▲ Containment vault rated at 20,000 lbs. loading capacity
- ▲ Built-in view port for visual inspection
- ▲ Completely pneumatic
- ▲ Built-in air regulator and conditioners
- ▲ Quick disconnect fittings throughout
- ▲ All corrosion resistant materials

Benefits

- ▲ Utilizes field proven prefabricated design
- ▲ Reduces life cycle cost of ownership
- ▲ Eliminates constant operator adjustments & pumping
- ▲ Assures completely safe operation
- ▲ Withstands temperature and pressure extremes
- ▲ Provides extended life expectancy
- ▲ Permits a wide range of customized applications
- ▲ Fits into new or existing landfill collection systems
- ▲ Uses built-in air regulator & conditioners to eliminate the need for special air supplies

Landfill Gas and Environmental Products' (LFG&E) **PNEU-PUMP™** Automated Condensate & Leachate Recovery System provides safe, reliable landfill liquids recovery with automated transfer to any central collection facility. Designed for easy installation, it can be incorporated into new or existing recovery systems and can be customized to meet your specific needs. It is an efficient, cost-effective alternative to field fabricated pumping systems. Extremely rugged and reliable, **PNEU-PUMP** is backed by our unique **100% Performance Guarantee**.

PNEU-PUMP is installed at the low or collection points in any condensate or leachate recovery system. As gravity fills the collection reservoir to a preset level, the float-less pneumatic level control automatically switches the pump on and reliably pumps the liquid from the holding tank to the collection facility. **PNEU-PUMP** is designed to withstand the dirty, corrosive environment of the landfill while providing safe and reliable service.

Superior Design & Performance

The **PNEU-PUMP** offers automated landfill condensate and leachate recovery with virtually maintenance free operation. Prefabricated and factory tested, it offers a safe, completely pneumatic design that eliminates the need for special air supplies and operator monitoring. Using corrosion resistant materials throughout, **PNEU-PUMP's** design ensures extended life and reduced costs. A double diaphragm, self-priming, lube free pump in a rugged polypropylene housing has infinitely variable capacity and discharge pressure, and can run dry indefinitely without damage. The collection reservoir is constructed of tough, long-lasting high-density polyethylene (HDPE) that can withstand extreme pressures and corrosive fluids produced by the landfill. An enclosed vault, rated at 20,000 pounds loading capacity, not only protects the pump and related components, but also acts as a containment structure for any waste water that may escape the pumping system. LFG&E's **ULTRA FLEX™** connectors can be used to connect the system to the inlet lines, providing maximum flexibility during landfill settlement. Combining durable components with the most advanced design in the industry, **PNEU-PUMP** is the ultimate choice for your automated landfill condensate and leachate recovery needs.



LFG&E

Landfill Gas & Environmental Products, Inc.

619/596-9083

LFG & E

Landfill Gas & Environmental Products, Inc.

9855 Prospect Ave.

Santee, CA 92071

(619) 596-9083 • FAX(619) 596-9088

PNEU-PUMP™

Automated Condensate Recovery System

Technical Data, Specifications,

Operation and Maintenance

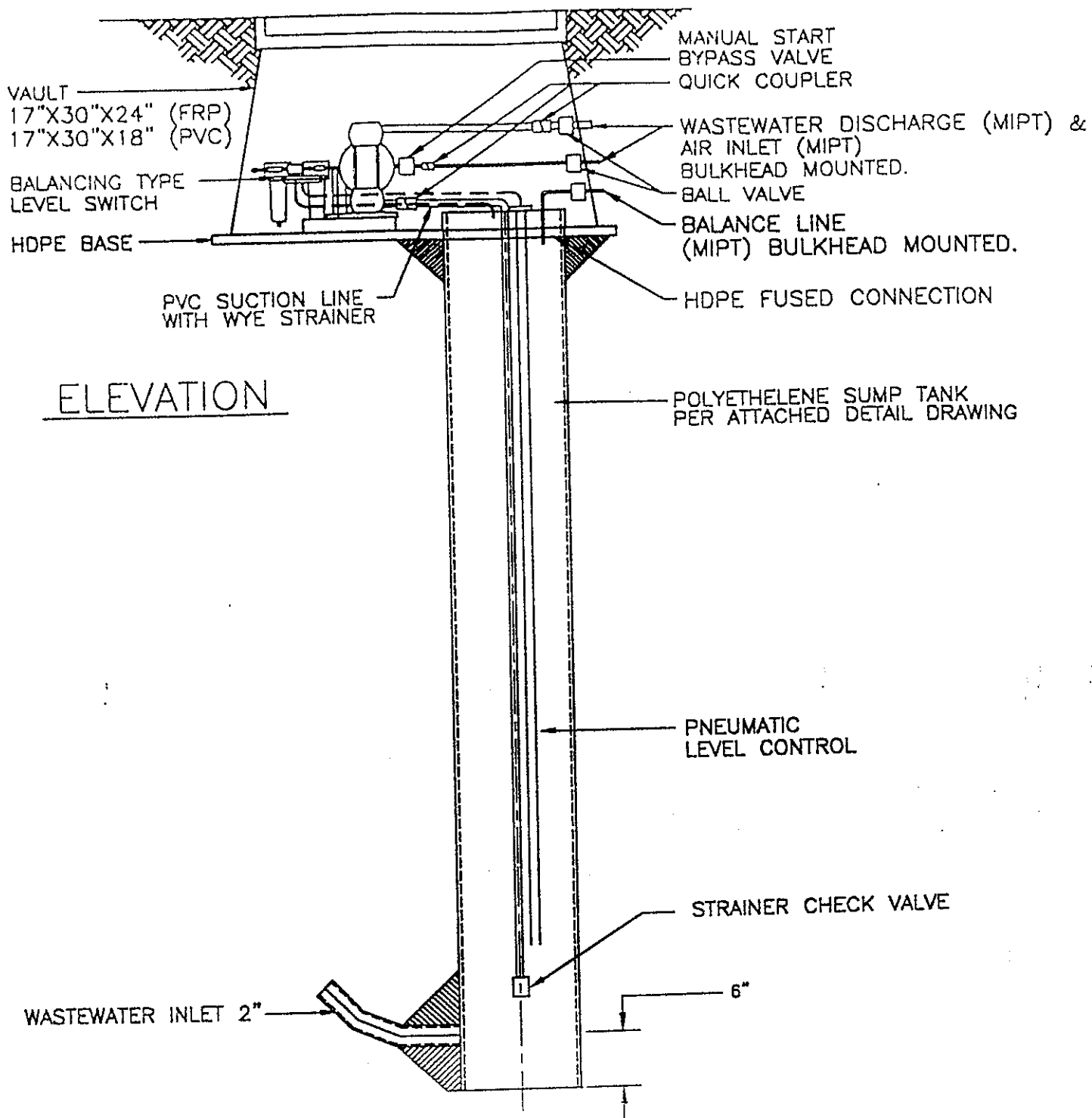
Manual

PNEU-PUMP™ Automated Condensate and Leachate Recovery System Specifications

The PNEU-PUMP as shown on the enclosed plan consists of the following:

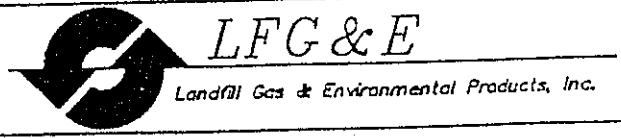
PUMP	Air operated, double diaphragm, positive displacement, self priming pump. Infinitely variable capacity and discharge pressures.
Capacity	1-220 feet of head 1-14 GPM 1/2" inlet and outlet, 1/2" PVC suction line 1/4" air inlet Maximum inlet air pressure 110 psig
Materials	Wetted housing: Polypropylene Non wetted housing: Polypropylene Check valves: Teflon Diaphragms: Teflon (Other materials Available)
LEVEL CONTROL	Floatless pneumatic level control, normally closed, 10" differential Pressure range: 40-125 psig Temperature range: 35° - 180° F Valve: Air pilot operated 3 way Vacuum balancing line PVC Sensing Tube Buna N (standard) Diaphragm
INLET AIR	1/2" Bulkhead mounted MIPT Built in filter and regulator
WASTE WATER DISCHARGE	1/2" Bulkhead mounted MIPT
SUMP	High Density Polyethylene (HDPE) sump 12" x 8', 2" inlet, fused connection, maximum capacity 35 gallons.
VACUUM BALANCE	1/2" Bulkhead mounted MIPT
VAULT	17"W x 30"L x 24"D Fiberglass reinforced plastic (FRP) body with reinforced plastic mortar (RPM) lid and base rated for 20,000 lbs loading capacity (incidental traffic).
DOCUMENTATION	Instruction manual and flow rates verses air consumption chart.

Custom configurations and applications available.



ELEVATION

PNEU-PUMP™
 Condensate & Leachate Recovery System



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 9855 Prospect, Santee, CA 92071

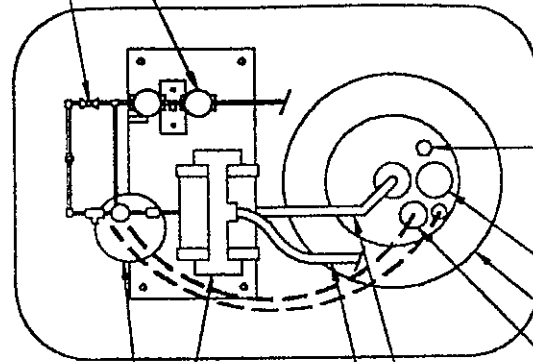
DRAWING #: PP-CS-**
 DISTRIBUTED BY:

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FILTER/REGULATOR/LUBRICATOR

MANUAL START BYPASS

BALANCING TYPE
DIAPHRAM STARTER
PUMP ASSEMBLY



BALANCE LINE

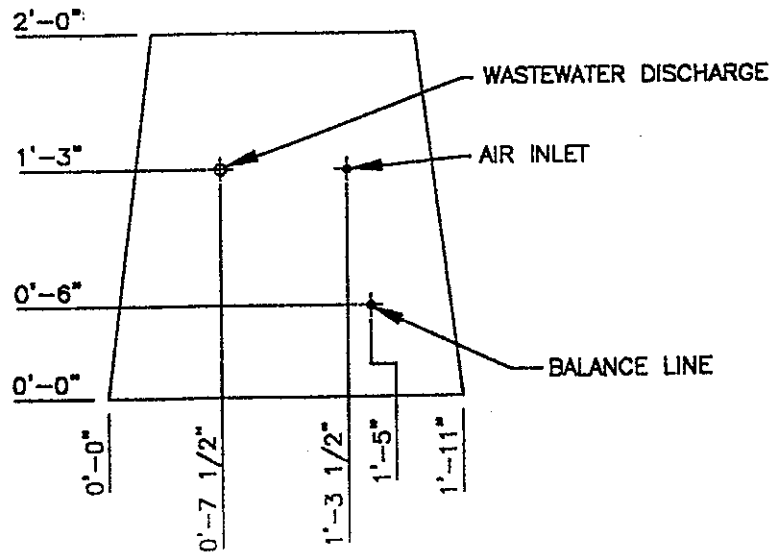
VIEW PORT

SUMP

PNEUMATIC
LEVEL CONTROL

SUCTION LINE WITH WYE STRAINER

DISCHARGE LINE



PNEU-PUMP™

Condensate & Leachate Recovery System



LFG & E

Landfill Gas & Environmental Products, Inc.

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9855 Prospect, Santee, CA 92071

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GUARANTEE

LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC. GUARANTEES THAT THE EQUIPMENT OWNER WILL BE SATISFIED WITH THE EQUIPMENT FOR A PERIOD OF 1 YEAR AFTER SHIPMENT. IF THE OWNER IS NOT SATISFIED LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC. WILL REPAIR, REPLACE, OR REFUND, AT SELLERS OPTION, THE FULL PURCHASE PRICE OF THE EQUIPMENT, WHICH IS FOUND TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP, RETURNED F.O.B FACTORY. ALL TECHNICAL ADVICE, RECOMMENDATIONS AND SERVICES ARE BASED ON TECHNICAL DATA AND INFORMATION THE SELLER BELIEVES TO BE RELIABLE AND ARE INTENDED FOR USE BY PERSONS HAVING SKILL AND KNOWLEDGE OF THE BUSINESS, AT THEIR OWN DISCRETION. IN NO CASE IS THE SELLER LIABLE BEYOND REPLACEMENT OF THE EQUIPMENT F.O.B. FACTORY OR THE FULL PURCHASE PRICE. THIS GUARANTEE DOES NOT APPLY IF THE INSTRUMENT OR EQUIPMENT IS ABUSED, ALTERED, USED AT RATINGS ABOVE THE MAXIMUM SPECIFIED, OR OTHERWISE MISUSED IN ANY WAY.

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BUYERS REMEDIES: THE BUYERS EXCLUSIVE AND SOLE REMEDY ON ACCOUNT OF OR IN RESPECT TO THE FURNISHING OF NON-CONFORMING OR DEFECTIVE GOODS, PRODUCTS, PARTS AND/OR COMPONENTS MATERIAL SHALL BE TO SECURE REPLACEMENT THEREOF AS AFORESAID. THE SELLER SHALL NOT IN ANY EVENT BE LIABLE ANY SPECIAL, CONSEQUENTIAL, DIRECT, COLLATERAL, OR INCIDENTAL DAMAGES (INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS, BUSINESS, OR GOODWILL, OR ANY LABOR EXPENDED) ON ANY SUCH MATERIAL TO ANYONE BY REASON OF THE FACT THAT IT SHALL HAVE BEEN NON-CONFORMING OR DEFECTIVE OR OTHERWISE ARISES OUT OF OR IS CONNECTED WITH THIS AGREEMENT..

ACCEPTANCE: ALL ORDERS SHALL BE SUBJECT TO THE TERMS AND CONDITIONS CONTAINED OR REFERRED TO IN THE SELLER'S QUOTATION, ACKNOWLEDGMENT, AND TO THOSE LISTED HERE AND TO NO OTHERS WHATSOEVER. NO WAIVER ALTERATION OR MODIFICATION OF THESE TERMS AND CONDITIONS SHALL BE BINDING UNLESS IN WRITING AND SIGNED BY AN EXECUTIVE OFFICER OF THE SELLER. ALL ORDERS ARE SUBJECT TO WRITTEN ACCEPTANCE BY LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC..

IF ANY COMPLICATIONS OCCUR DURING THE INSTALLATION, OPERATION, OR MAINTENANCE OF ANY OF YOUR LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC. EQUIPMENT PLEASE CALL, WE ARE AVAILABLE TO ANSWER YOUR QUESTIONS, 619-596-9083.

PNEU-PUMP™

Automated Condensate Recovery System Installation Instructions

The PNEU-PUMP Condensate & Leachate Recovery System has been designed for maximum efficiency with minimum maintenance. Our standard PNEU-PUMP system is completely assembled and factory tested prior to delivery making installation and start up very easy. The general maintenance of the system is very simple (see O & M Manual) and the frequency is dependent on the conditions at the site. General maintenance consists of simply checking the oil level in the automatic lubricator (if required) and checking (cleaning or replacing) of the inlet air filter.

The PNEU-PUMP system was designed to provide many years of uninterrupted reliable service. It also comes with a full one year warranty.

OVERVIEW OF INSTALLATION

- STEP 1: Unloading and storage of equipment.
- STEP 2: Preparation of installation area.
- STEP 3: Connection of waste water inlet.
- STEP 4: Setting and burial of Sump
- STEP 5: Connection of air inlet and waste water discharge.
- STEP 6: Burial and finish grade around vault.
- STEP 7: Inlet air preparation and adjustment

STEP 1 - Unloading and storage of equipment.

Although the PNEU-PUMP is extremely durable when installed it can be easily damaged with improper handling prior to the installation. When unloading the equipment from the delivery vehicle take caution not to apply pressure to the sides of the FRP Vault, they may puncture or crack. Also avoid applying pressure to a single point on the HDPE sump, this could compromise the integrity of the sump. Also avoid using potentially sharp or pointed objects that may cut or puncture the equipment.

The proper handling of the equipment involves lifting the PNEU-PUMP from the bottom of the vault therefore up-righting the PNEU-PUMP with the lid facing upwards, utilizing straps or equipment capable of this function

The sumps should be stored on their side as they were when delivered, take care that the weight rests on the side of the base of the vault and not on the actual side of the vault.

STEP 2: Preparation of the installation area.

To install the PNEU-PUMP either drilling or excavation of the sump hole is required. If drilling, the diameter of the hole must be at least 30", if excavating the size of the hole has to be large enough to accept the diameter of the sump plus the additional width of the 2" waste water inlet. The depth of the boring or excavation for the standard PNEU-PUMP is 11' overall, this allows for 2' deep vault, 8' deep sump, and 1' for bedding. The top 2' of the excavation should be configured to accept the depth and width of the vault (standard 17"W x 30"L x 24"D). Be sure to follow all OSHA guidelines when excavating any location.

Once the hole is ready there must be a minimum of 1' of 3/4" gravel placed in the bottom of the hole to create a solid bottom for the PNEU-PUMP to be placed on. The rock elevation should be adjusted so the top of the PNEU-PUMP vault is slightly higher than the surrounding finish elevations.

STEP 3: Connection of Waste Water Inlet.

The standard PNEU-PUMP has a 2" HDPE inlet 6" from the bottom of the sump. The inlet should be connected to the collection or drain line utilizing methods or procedures specified by the HDPE

manufacturer or supplier. If the sump is being connected to a stationary or very rigid line an Ultraflex™ flexible connector should be utilized (available from Landfill Gas & Environmental Products, Inc.).

Please note that it is easier to connect a 10' to 15' piece of 2" HDPE to the inlet, then to connect the stub to the collection line after the sump is buried.

STEP 4: Setting and burial of Sump

After the inlet line is connected, it is time to vertically set the PNEU-PUMP into the excavation. Be careful to utilize the same lifting techniques as specified in Step 1 so not to damage the vault or sump. Slowly set the vault down into the excavated hole being careful to avoid kinking the 2" inlet. It is important to note that it is not necessary to have the 2" line excavated prior to the sump installation. The 10' to 15' piece can be pulled up beside the sump then re-excavated and connected at the proper level at a later time. Once the sump is in place it is recommended that it is backfilled with approximately 2' of 3/4" rock, enough to cover the 2" inlet and hold the PNEU-PUMP in place. It is not important for the sump to be exactly level but it should be close enough to allow for a proper finish at its final elevation.

After the sump is leveled and the rock backfill is in place the balance of the backfill should be placed. The backfill should be completed under the direction of the project engineer to meet proper compaction requirements and or to prevent gas leakage around the boring, if placed in the fill. Finally the backfill should be brought up to the connection point of the bulkhead mounted air inlet and waste water discharge elevations.

STEP 5: Connection of air inlet and waste water discharge.

The standard PNEU-PUMP has a 1/2" stainless steel MIPT for the air inlet connection and a 1/2" stainless steel MIPT for the waste water discharge outlet, both extend through the vault wall. If the field piping is HDPE it is recommended that these connections be made with HDPE to stainless steel transition fittings and stainless steel unions (available from Landfill Gas & Environmental Products, Inc.). It is important to leave some excess pipe behind the transition fitting to allow for settlement or shifting of the PNEU-PUMP, especially if it is located in the fill area. When connecting these fittings make sure the ball valves on the inside of the vault are turned off and the lines to be connected have been purged and cleaned. Make sure that a backup wrench is used when connecting any fittings to the bulkhead mounted fittings so not to break the seal between the vault and the stainless steel nipples. Also use some kind of sealing compound such as Teflon tape and carefully thread the fitting onto the nipple being careful not to mar the threads. Tighten firmly and test for leaks.

STEP 6: Burial and finish grade around vault.

Now that the inlet air and the waste water discharge piping is connected you can bury the void around the vault. Be sure to use clean fill with no large rocks or sharp objects that could puncture the side of the vault. Also take precaution not to apply excessive pressure on the inlet and the discharge connections. The backfill should be completed under the direction of the project engineer to meet proper compaction requirements and or to prevent gas leakage around the boring, if place in the fill. Once completed the vault should be slightly higher than the surrounding elevations to prevent ponding over the vault and to prevent water from leaking into the vault through the lid. If the vault should settle over time or additional vault depth is required upon installation Vault Lid Extensions are available from Landfill Gas & Environmental Products, Inc..

STEP 7: Inlet air preparation and adjustment

Remove the lid of the PNEU-PUMP vault by removing the two locking bolts on the lid and pulling upward and toward you on the pull handle, utilizing a manhole puller or other appropriate tool. Prior to testing or operation fill the oiler with 10 weight. Next the 1/4" inlet air line inside the vault should be disconnected and purged prior to operating the pump. Once completed reconnect the air line. Then open the 1/2" waste water discharge ball valve, then slowly open the 1/2" air inlet ball valve. Be especially careful to open the 1/2" air inlet ball valve slowly. Once the air valve is wide open you can adjust the air regulator to the appropriate PSI setting based on the flow rates versus air consumption chart included in the Operation and Maintenance Manual. Remember never to exceed 110 PSI at the pump, it could

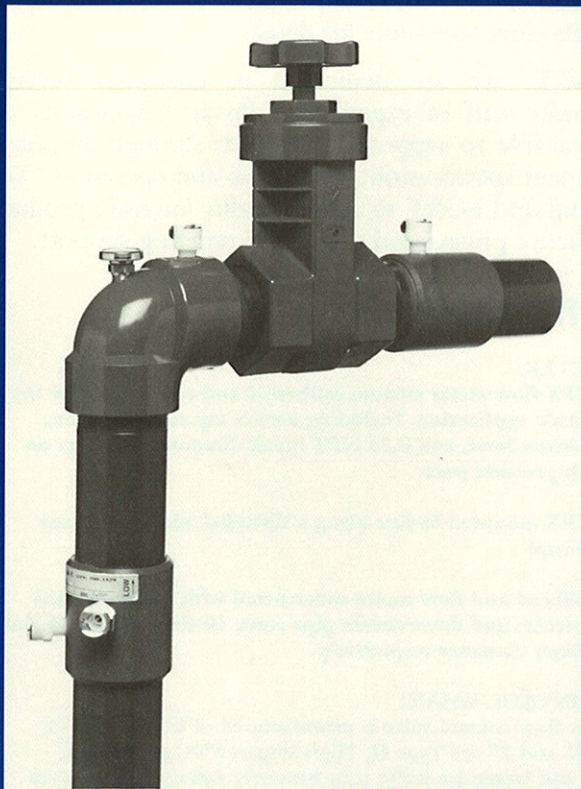
damage the internal workings on the pump equipment. To extend the life of the pump diaphragms and check valves it is important not to overwork the pump. Adjust the pump according to the minimum requirements of that particular PNEU-PUMP location and elevation in respect to the liquid destination.

The PNEU-PUMP has been factory tested prior to delivery and the oiler was set for approximately 60 SCFM, but it is best for the life of the system to test and check the system prior to operation to be certain none of the components have been disturbed or damaged during shipping or installation. To do this, first remove the view port plate and fill the sump up with water to the top of the level control, located in the sump. At this point the pump will come on and discharge the liquid, the remaining liquid level will be approximately the bottom of the level control. If oiler adjustment is required, it will be easier to adjust while the pump is continuously running. This can be accomplished by disconnecting the 1/2" discharge hose from the union located at the 1/2" ball valve and inserting the discharge hose into the view port so the discharge goes back into the sump. This will allow the pump to continuously cycle until the lubricator can be set per its instructions, typically one drop per minute for every 10 SCFM of air flow. If freezing conditions exist, the oil can be replaced with ethylene glycol antifreeze or other de-icing agent such as Tannergas. Reconnect the 1/2" discharge hose and replace the view port. The PNEU-PUMP is now ready for operation.

If any complications occur during the installation, operation, or maintenance of any of your Landfill Gas & Environmental Products, Inc. Equipment please call, we are available to answer your questions.

Landfill Gas & Environmental Products Inc. Tel: (619) 596-9083 Fax: (619) 596-9088

LFG&E PC 1000FX Wellhead Precise Control Wellhead



Features

- ▲ PCFX Orifice Plate Flow Meter
 - Design prevents plugging
 - Wide flow range capability
 - Accurate even at low flow rates
- ▲ High Impact PVC flow control valve
- ▲ Rugged SCH 80 PVC construction
- ▲ Built-in stainless steel temperature probe
- ▲ Quick disconnect fittings on all ports
- ▲ Sliding compression fitting allows for wellhead elevation adjustment (optional)

Benefits

- ▲ Reduces life cycle cost of ownership
- ▲ Provides superior flow meter accuracy and reliability
- ▲ Uses durable materials to guard against harsh landfill conditions
- ▲ Maximizes system efficiency
- ▲ Maintenance free

Landfill Gas and Environmental Products' (LFG&E) PC 1000FX Precise Control Wellhead is a key element in modern landfill gas (LFG) collection systems. Created to assist in the control of landfill gas for regulatory and energy production requirements, the PC 1000FX is a quality intensive, cost effective alternative to field fabricated wellheads. The primary function of the PC 1000FX is to control landfill gas that is extracted or vented from landfill gas wells. The PC 1000FX also aids in the required data collection for well control and monitoring. Numerous sizes and models are available for vertical well connections, horizontal well connections, and retrofit applications for both above and below ground systems. With the PC 1000FX we've combined accuracy and reliability with low life-cycle costs to produce the perfect choice for any landfill.

Superior Design & Performance

The PC 1000FX provides uninterrupted, maintenance free operation. It incorporates the PCFX Orifice Plate Flow Meter, a unitized flow meter with no moving parts, which was designed specifically for LFG metering. The PC 1000FX is constructed of rugged SCH 80 PVC and uses a High Impact PVC flow control valve to throttle the LFG flow, as well as quick disconnect fittings on all monitoring ports. In addition, the PC 1000FX uses a unique sliding compression fitting between the wellhead and the well casing, producing a leak-proof seal while allowing easy adjustment of the wellhead elevation. The PC 1000FX is available for all flow ranges, and will provide the most accurate and reliable flow control and metering for your LFG application.



PCFX® Model 4150-P

At the heart of the PC 1000FX is the PCFX Orifice Plate Flow Meter. Specifically designed for the landfill gas industry, it provides accurate flow metering with no maintenance. The PCFX offers unitized PVC construction incorporating the orifice plate with a unique carrier coupling containing the metering taps, as configured it also incorporates the recommended upstream and downstream pipe runs. This one-piece construction eliminates any moving parts and prevents plugging by placing the metering taps outside the inside diameter of the pipe where particulates and moisture migration are minimized. Additionally, the orifice bore is configured to prevent damming of fluid within the unit and to minimize headloss. Due to its design and its reliable ($\pm 2\%$) accuracy at full scale, the PCFX provides the PC 1000FX with the best accuracy, the best flow range, and the most reliable flow meter available for landfill gas applications.



LFG&E

Landfill Gas & Environmental Products, Inc.

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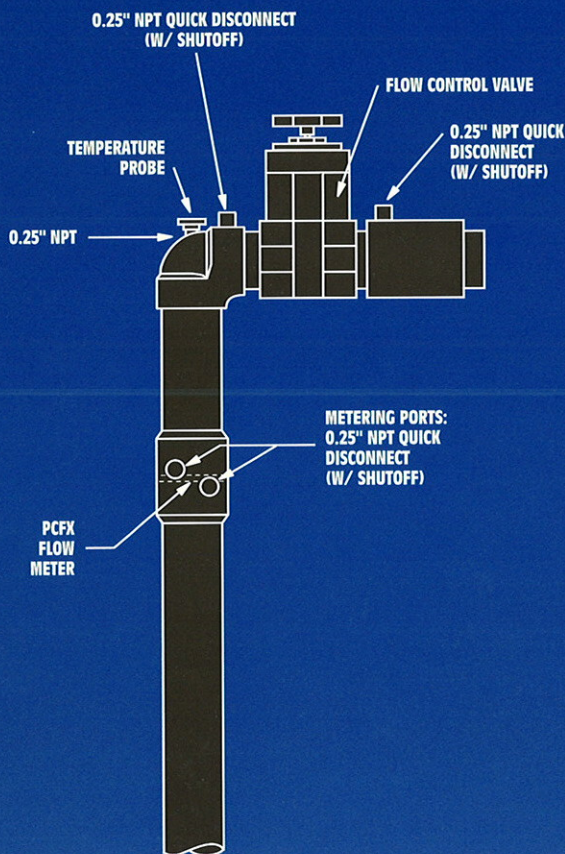
LFG&E PC 1000FX Precise Control Wellhead

Options

- ▲ Available sizes: 1.5", 2", 3" standard, and custom sizes
- ▲ Remote sensing port locations
- ▲ Built-in flow instrumentation
- ▲ Custom configurations

Optional Equipment

- ▲ Sliding compression adapter fitting
- ▲ Remote sensing port kits
- ▲ Ultra Flex™ flexible connectors and hoses
- ▲ FRP (fiberglass reinforced plastic) vaults with RPM (reinforced plastic mortar) meter reading lids rated for 20,000 lbs. loading capacity
- ▲ Computerized data collection and logging equipment



Performance Guarantee

Landfill Gas and Environmental Products, Inc. provides a full line of landfill specific equipment designed to be accurate, rugged, reliable, and cost-effective. In fact, we're so confident that you'll be completely satisfied with the quality and performance of our equipment that we back all our products with a unique **100% PERFORMANCE GUARANTEE**. Call one of our Landfill Product Specialists for details.

At LFG&E, we are dedicated to customer service. Our friendly staff of experienced Product Specialists are always available to support your needs through all phases of equipment specification, installation and operation. You can depend on LFG&E to deliver quality intensive products with attractive pricing and responsive ongoing support.

Specifications

FLOW METER:

PCFX flow meter custom calibrated and configured for the specific application. Including corner tap configuration, eccentric bore, and 0.25 NPT quick disconnect fittings on each pressure port

PCFX mounted in-line using a threaded adapter for easy removal

Wellhead and flow meter constructed with recommended upstream and downstream pipe runs, 10 times diameter and 3 times diameter respectively

FLOW CONTROL VALVE:

The flow control valve is manufactured of SCH 80 PVC; 1.5" and 2" are Type II, High Impact PVC gate valves; 3" and larger are wafer style butterfly valves or gate valves

TEMPERATURE PROBE:

Range 0°-200°F stainless steel construction, 0.25" NPT connection

SAMPLING PORTS:

0.25" NPT quick disconnect fittings

PIPE & FITTINGS:

Schedule 80 PVC

OPTIONAL SLIDING COMPRESSION FITTING

Sliding compression adapter rated for 150 psi at 70° F with flange or coupling for connection to well casing

DOCUMENTATION

Calculation data for each custom calibrated PCFX; d/p vs. flow graph; conversion formula; accuracy statement

Custom configurations and applications available.



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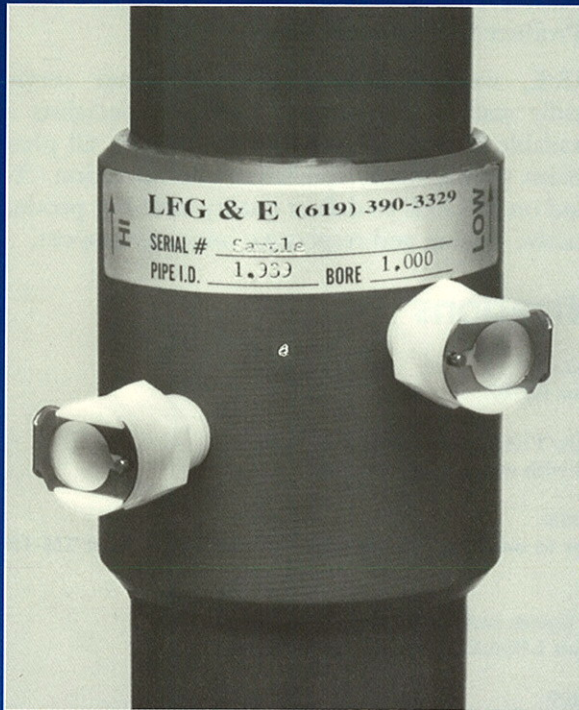


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LFG&E PCFX FLOW METER

Orifice Plate Flow Meter



Features

- ▲ Unitized construction
- ▲ No moving parts
- ▲ Built-in metering taps (0.25" Female NPT)
- ▲ Corner tap configuration
- ▲ Custom calibration
- ▲ Wide flow range capability

Benefits

- ▲ Simplifies installation by ensuring concentricity in the flow pipe
- ▲ Eliminates costly flanges and bolts, installs with a standard coupling or threaded adapter
- ▲ Precludes potential alignment difficulties
- ▲ Ensures superior accuracy and long term reliability
- ▲ Prevents damming of fluids
- ▲ Prevents plugging
- ▲ Uses corrosion resistant materials
- ▲ Accurate even at low flow rates

Landfill Gas and Environmental Products' (LFG&E) PCFX Orifice Plate Flow Meter is a complete, one-piece flow metering package with no moving parts, combining accuracy of measurement with easy installation. Specifically designed for the landfill gas (LFG) industry, it provides accurate flow metering with no maintenance. It offers unitized PVC construction incorporating the orifice plate with a unique coupling that also contains the metering taps. This design places the metering taps outside the inside diameter of the pipe where particulates and moisture migration are minimized, thus eliminating potential plugging. The orifice bore configuration prevents damming of fluid within the system and minimizes headloss. Due to its design, the PCFX provides the best accuracy, the widest flow range, and the most reliable flow metering available for landfill gas applications.

Superior Design & Performance

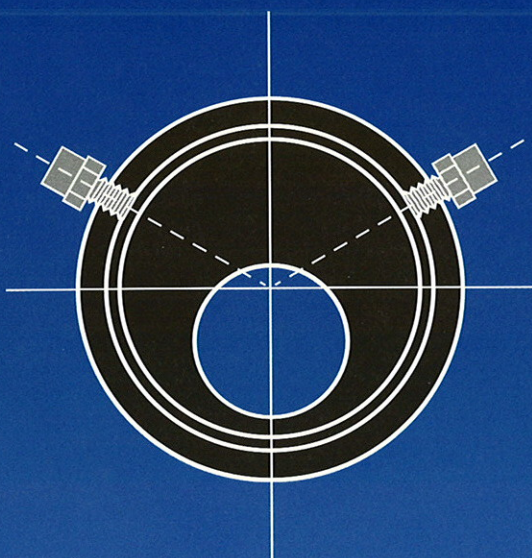
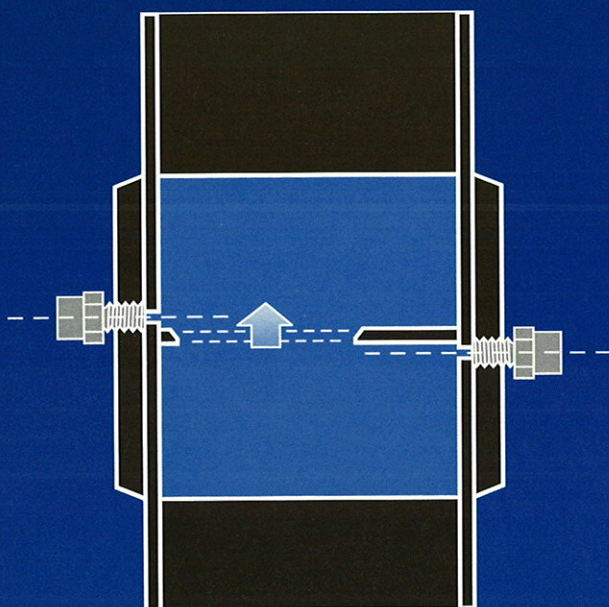
Combining efficient accuracy with uninterrupted, maintenance free operation, the PCFX is the most reliable flow meter available for LFG flow metering. Designed and developed by LFG Specialists, it can be used wherever a conventional orifice plate is required, or to replace other primary d/p producers, such as pitot tubes. The PCFX requires no alignment and is installed simply by gluing, threading or fusing in a landfill gas collection line or wellhead. It comes configured with recommended upstream and downstream runs included thus eliminating the possibility of improper installation. Manufactured using corrosion resistant materials, it also provides an installed and sustained accuracy beyond that of the normal flange or radius tap orifice plate installation. The PCFX is available for most line sizes and meets or exceeds ASME and ISO standards.

LFG&E PCFX FLOW METER

Orifice Plate Flow Meter

Options

- ▲ Built-in flow instrumentation
- ▲ Concentric or eccentric bore available
- ▲ Special sizes
- ▲ Sliding Compression Adapter for easy installation



Performance Guarantee

Landfill Gas and Environmental Products, Inc. provides a full line of landfill specific equipment designed to be accurate, rugged, reliable, and cost-effective. In fact, we're so confident that you'll be completely satisfied with the quality and performance of our equipment that we back all our products with a unique **100% PERFORMANCE GUARANTEE**. Call one of our Landfill Product Specialists for details.

At LFG&E, we are dedicated to customer service. Our friendly staff of experienced Product Specialists are always available to support your needs through all phases of equipment specification, installation and operation. You can depend on LFG&E to deliver quality intensive products with attractive pricing and responsive ongoing support.

Specifications

MATERIAL:

PVC or HDPE

PRESSURE/TEMPERATURE/WEIGHT:

Varies with material and line size

HEAD LOSS:

Similar to standard orifice plates (refer to reference sheet TM-100)

FLUIDS:

Most liquids and gases, including steam
(consult LFG&E for specific applications)

LINE SIZES:

Standard pipe sizes

ACCURACY:

±2% of flow at full scale (refer to reference sheet TM-110)

METERING TAPS:

0.25" NPT Female, taps straddle horizontal axis

BORE:

Eccentric standard, Concentric available, eccentric available, sharp bevel for single direction flow applications

INSTALLATION:

Installed with standard couplings or threaded adapters. Drilling and tapping of pipe or use of orifice flanges eliminated. Orifice precision bored by Landfill Gas & Environmental Products, Inc. and calculated to ISO 5167.

Custom configurations and applications available.



LFG&E

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PC 1000FX™ Precise Control Wellhead Technical Data & Specifications

Package includes:

*Specification sheet
PC 1000FX Drawings
PC 1000FX Installation Instructions
Flow Meter Specifications
Flow Meter Accuracy
Flow Meter Comparison
Sample Calculations
Guarantee*

PC 1000FX™ Precise Control Wellhead Specifications

The PC 1000FX as shown on the enclosed plan consists of the following:

FLOW METER	PCFX Orifice Plate Flow Meter custom calibrated and configured for the specific application. Including 1/4" NPT quick disconnect fittings on each pressure port. Wellhead shall be constructed with a minimum of 10 diameters of unobstructed upstream run from the PCFX and a minimum of 3 diameters unobstructed downstream run.
FLOW CONTROL GATE VALVE	The gate valve shall be manufactured of HI-IMPACT PVC type II, SCH 80, and shall contain a polypropylene wedge
TEMPERATURE PROBE	Range 0 ^o -200 ^o F, stainless steel construction.
SAMPLING PORTS	1/4" NPT Quick disconnect fittings
SLIDING COMPRESSION FITTING	Sliding compression adaptor rated for 150 psi at 70 ^o F and reducer bushing, for connection to well casing.
PIPE & FITTINGS	SCH 80 PVC
DOCUMENTATION	Calculation data for each custom calibrated PCFX, conversion formula, accuracy statement, and installation instructions.

Custom configurations and applications available.

PC 1000FX PRECISE CONTROL WELLHEAD INSTALLATION INSTRUCTIONS

The PC 1000FX Precise Control Wellhead has been designed for maximum efficiency with virtually no maintenance. Our standard PC 1000FX Wellhead is completely assembled prior to delivery making installation and start up very easy. It is extremely accurate and durable and it comes with a full one year warranty.

OVERVIEW OF INSTALLATION

- STEP 1: Unloading and storage of equipment.
- STEP 2: Wellhead to well casing connection and adjustment.
- STEP 3: Connection wellhead to LFG collection piping.

STEP 1: Unloading and storage of equipment.

Although the PC 1000FX is extremely durable when installed it can be easily damaged with improper handling prior to the installation. When unloading the equipment from the delivery vehicle take caution not to strike or bang the equipment together or against any other objects, the thermometer or quick disconnect fittings may be damaged. Also avoid using potentially sharp or pointed objects that may cut or puncture the equipment.

The PC 1000FX Wellheads should be stored in the boxes they were delivered in, take care not to over stack the boxes.

STEP 2: Wellhead to well casing connection and adjustment.

To install the PC 1000FX Wellhead onto the existing well casing an adapter fitting must be utilized to allow the wellhead piping to slide down into the well casing. **DO NOT CUT THE WELLHEAD PIPING**, the proper down stream and upstream runs for the flow meter are figured into the assembly and the accuracy and reliability will be compromised if cut. The recommended adapters fittings are manufactured by Landfill Gas & Environmental Products Inc. (888) 533-LFGE, they are configured as a wellhead size sliding compression fitting by a well casing size adapter bushing.

Loosen the adapter bushing top by unscrewing, apply an even coat of silicon grease or some other non destructive grease to the inner gasket. Slide the fitting onto the base of the wellhead assembly then up about half way to the coupling. Re-tighten the adapter bushing by hand, do not over tighten it may cause damage to the gasket. Then glue the proper fitting for well casing connection to the adapter bushing (either a flange or a coupling, well casing size) utilizing methods recommended by PVC fitting supplier. Now attach the entire wellhead assembly to the well casing (with the flange or coupling).

The assembly can be easily adjusted for height simply by loosening the compression adapter screw, sliding the wellhead up or down then re-tightening the assembly.

STEP 3: Connection wellhead to LFG collection piping.

It is recommended that this connection be made with a flexible fitting to allow for movement between the wellhead and the gas collection piping. Recommended flexible connector is a Ultra-Flex Landfill Connector as manufactured by Landfill Gas & Environmental Products Inc. (888) 533-LFGE. Attach the connector to the LFG collection piping utilizing clamps recommended by the connector manufacturer, then attach the other end to the stub on the wellhead utilizing the same process. There should be enough slack in the connector to allow for substantial movement between the wellhead and the LFG collection piping without excessive force being applied to the connector.

If any complications occur during the installation, operation, or maintenance of any of your Landfill Gas & Environmental Products, Inc. Equipment please call, we are available to answer your questions.

Landfill Gas & Environmental Products Inc.
Toll Free Tel: (888) 533-LFGE (5343)
Fax: (619) 596-9088

PCFX™ ACCURACY

PCFX utilizes the corner tap proportions as defined in ISO 5167. While this code may not be referred to as International Standard until accepted by ISO Council, the ASME Fluid Meter Research Committee has suggested that the dimensionless coefficient equation developed by the International Standards Organization (ISO) and presented in ISO 5167 is significantly better for the broad spectrum of flow measurement applications throughout process industries.

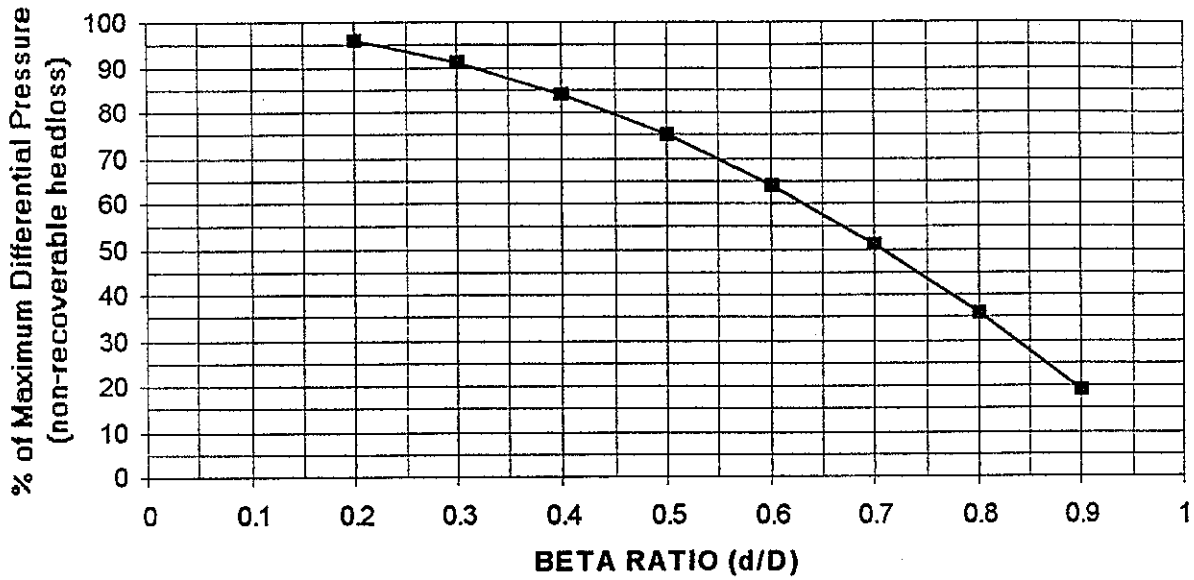
The coefficient values used in the PCFX bore calculations represent the same confidence level assigned to the flange and radius taps widely accepted in fluid flow measurement.

The accuracy assigned to the coefficient values is $\pm 0.6\%$ for d/D (Beta) values 0.2 to 0.6 and $\pm 0.7\%$ for Beta values 0.6 to 0.75 (i.e. a β of 0.7 would have an uncertainty value of $\pm 0.7\%$).

Accuracy of the differential signal produced by the PCFX equals that of a properly manufactured and installed flange or radius tap orifice meter.

The elimination of errors caused by poor installation practices plus the fact that all critical PCFX dimensions are manufactured in corrosion resistant materials gives the PCFX an installed and sustained accuracy beyond that of the normal flange or radius tap orifice plate installation.

OVERALL PRESSURE LOSS ACROSS THIN-PLATE ORIFICES



The above curved graph shows pressure loss through the flow meter. For example, a 0.6 Beta Ratio (d/D) would show a loss of 64%. As a quick reference, you can use the following formula: Headloss = $1 - \text{Beta Ratio}^2$, e.g.: $1 - .6^2 = 64\%$

Source: ASME Research Report on Fluid Meters

DIFFERENTIAL PRESSURE

	ORIFICE	PITOT
Service:	Liquids and gases including steam	Liquids and gases
Design Pressure:	Determined by transmitter	Determined by transmitter
Design Temperature:	Determined by materials	Determined by materials
Flow Range:	From 0.1 cc/min up or gas equivalent	Determined by pipe size
Scale:	Square root	Square root
Signal:	Analog electronic or pneumatic	Analog electronic or pneumatic
Accuracy:	+/- 0.6% of max flow uncalibrated and includes transmitter; sizes smaller than 2" usually calibrated	+/- 5% full scale or better including transmitter
Rangeability:	4:1 for given transmitter span setting	4:1 for given transmitter span setting
End Connections:	Mounts between flanges	Insert probe
Sizes:	Determined by pipe size	Unlimited probe length
Advantages:	Easy to install; uses one transmitter regardless of pipe size; low cost; wide variety of types and materials available; easy-to-change capacity. Versions available that do not require power.	Very low cost; uses one transmitter regardless of pipe size. Averaging types available

Limitations:

Use eccentric orifices or segmental plates for very dirty fluids or slurries; quadrant orifice for viscous liquids; venturi, flow tube, pitot, or elbow taps to reduce energy consumption; straight run of upstream and downstream piping required. Some fluid must leave pipe except when chemical seal protectors are used.

Doesn't sample full stream; limited accuracy. Low differential for given flow rate.

Source: *Fisher & Porter, Wall Guide to Flow Meters*

GUARANTEE

LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC. GUARANTEES THAT THE EQUIPMENT OWNER WILL BE SATISFIED WITH THE EQUIPMENT FOR A PERIOD OF 1 YEAR AFTER SHIPMENT. IF THE OWNER IS NOT SATISFIED LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC. WILL REPAIR, REPLACE, OR REFUND, AT SELLERS OPTION, THE FULL PURCHASE PRICE OF THE EQUIPMENT, WHICH IS FOUND TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP, RETURNED F.O.B FACTORY. ALL TECHNICAL ADVICE, RECOMMENDATIONS AND SERVICES ARE BASED ON TECHNICAL DATA AND INFORMATION THE SELLER BELIEVES TO BE RELIABLE AND ARE INTENDED FOR USE BY PERSONS HAVING SKILL AND KNOWLEDGE OF THE BUSINESS, AT THEIR OWN DISCRETION. IN NO CASE IS THE SELLER LIABLE BEYOND REPLACEMENT OF THE EQUIPMENT F.O.B. FACTORY OR THE FULL PURCHASE PRICE. THIS GUARANTEE DOES NOT APPLY IF THE INSTRUMENT OR EQUIPMENT IS ABUSED, ALTERED, USED AT RATINGS ABOVE THE MAXIMUM SPECIFIED, OR OTHERWISE MISUSED IN ANY WAY.

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BUYERS REMEDIES: THE BUYERS EXCLUSIVE AND SOLE REMEDY ON ACCOUNT OF OR IN RESPECT TO THE FURNISHING OF NON-CONFORMING OR DEFECTIVE GOODS, PRODUCTS, PARTS AND/OR COMPONENTS MATERIAL SHALL BE TO SECURE REPLACEMENT THEREOF AS AFORESAID. THE SELLER SHALL NOT IN ANY EVENT BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, DIRECT, COLLATERAL, OR INCIDENTAL DAMAGES (INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS, BUSINESS, OR GOODWILL, OR ANY LABOR EXPENDED) ON ANY SUCH MATERIAL TO ANYONE BY REASON OF THE FACT THAT IT SHALL HAVE BEEN NON-CONFORMING OR DEFECTIVE OR OTHERWISE ARISES OUT OF OR IS CONNECTED WITH THIS AGREEMENT..

ACCEPTANCE: ALL ORDERS SHALL BE SUBJECT TO THE TERMS AND CONDITIONS CONTAINED OR REFERRED TO IN THE SELLER'S QUOTATION, ACKNOWLEDGMENT, AND TO THOSE LISTED HERE AND TO NO OTHERS WHATSOEVER. NO WAIVER ALTERATION OR MODIFICATION OF THESE TERMS AND CONDITIONS SHALL BE BINDING UNLESS IN WRITING AND SIGNED BY AN EXECUTIVE OFFICER OF THE SELLER. ALL ORDERS ARE SUBJECT TO WRITTEN ACCEPTANCE BY LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC..

IF ANY COMPLICATIONS OCCUR DURING THE INSTALLATION, OPERATION, OR MAINTENANCE OF ANY OF YOUR LANDFILL GAS & ENVIRONMENTAL PRODUCTS, INC. EQUIPMENT PLEASE CALL, WE ARE AVAILABLE TO ANSWER YOUR QUESTIONS, 619-596-9083.

LFG&E Ultra Flex™ Flexible Connectors and Hoses



Features

- ▲ Extreme flexibility in all conditions
- ▲ Factory tested to rigorous standards
- ▲ Field proven under harsh landfill conditions
- ▲ Unequaled abrasion, tear, and puncture resistance
- ▲ UV (ultraviolet) and ozone resistant
- ▲ Sealed, nonporous material
- ▲ Superior expansion and contraction properties

Benefits

- ▲ Lowers life cycle costs
- ▲ Conforms to landfill expansion and contraction requirements
- ▲ Highly resistant to abrasion, puncturing, or tearing
- ▲ Withstands temperature extremes
- ▲ Works in numerous applications
- ▲ Long life in above or below ground systems
- ▲ Flexibility prevents costly line shears, cracks or breaks

Landfill Gas and Environmental Products' (LFG&E) **ULTRA FLEX™** flexible connectors and hoses add **cost-effective flexibility** to your landfill piping system. They are designed to provide a joint or connection point where flexibility is critical to protect the integrity of the landfill gas, condensate, or leachate piping systems. **ULTRA FLEX** insures against unnecessary costs due to cracking or shearing of rigid piping caused by expansion, contraction, or landfill settlement. These costs may include leak location, replacement, flare or energy production shut down, and regulatory fines. **ULTRA FLEX** can be used at wellheads, header and lateral pipes, condensate sumps or knockouts, mainline connections and other connection points where flexibility is crucial. Numerous sizes are available to fit any of your landfill piping requirements. **ULTRA FLEX** combines extreme durability, flexibility, and cost-effectiveness to produce the perfect choice for your landfill connector requirements.

Superior Design & Performance

ULTRA FLEX is ideally suited to withstand the harsh landfill environment. Constructed from high quality Polyurethane film using a unique fusion bond process, it is built to withstand the high vacuum requirements of landfill gas systems. An ASTM-227 hard drawn steel wire is encapsulated between three continuous spiral wound plies of Polyurethane. Soft cuffs are then permanently attached to each end to provide a positive seal over the pipes being connected. **ULTRA FLEX** is connected by using 304 stainless steel band clamps at each end, with an optional PVC collar to provide additional slip resistance.

ULTRA FLEX outlasts conventional landfill flexible connectors. **ULTRA FLEX** maintains a bend radius of approximately 1.25 times its diameter and provides unequalled abrasion, tear, and puncture resistance. Its UV (ultraviolet), ozone, and chemical resistance will extend the life of your landfill connectors in both above and below ground piping systems. The Polyurethane film far exceeds the expansion and contraction capabilities of other flexible connector materials, with an elongation percentage of over 400%. Excellent memory characteristics also allow **ULTRA FLEX** to maintain its original shape. The temperature range of **ULTRA FLEX** is -60° F to 200° F. It remains flexible across the entire temperature range and through complete expansion or contraction. In addition, **ULTRA FLEX**'s Polyurethane film is a sealed, nonporous material that will not absorb vapors or moisture, thus extending the life of the flexible connector. Feature for feature, **ULTRA FLEX** is the most cost-effective alternative for landfill flexible connectors and hoses.



LFG&E

Landfill Gas & Environmental Products, Inc.

619/596-9083

LFG&E Ultra Flex™ Flexible Connectors and Hoses

Nominal Pipe Diameter (inches)	Connector I.D. (inches)	Length (inches)	Vacuum (Inches of Water Column)
1.5	1.900	12, 18, 24, 36	380
2	2.375	12, 18, 24, 36	375
3	3.500	12, 18, 24, 36	360
4	4.500	12, 18, 24, 36	340
6	6.625	12, 18, 24, 36	190
8	8.625	12, 18, 24, 36	137
10	10.750	12, 18, 24, 36	80
12	12.750	12, 18, 24, 36	80
14	14.000	12, 18, 24, 36	80
16	16.000	12, 18, 24, 36	80
18	18.000	12, 18, 24, 36	80

Performance Guarantee

Landfill Gas and Environmental Products, Inc. provides a full line of landfill specific equipment designed to be accurate, rugged, reliable, and cost-effective. In fact, we're so confident that you'll be completely satisfied with the quality and performance of our equipment that we back all our products with a unique **100% PERFORMANCE GUARANTEE**. Call one of our Landfill Product Specialists for details.

At LFG&E, we are dedicated to customer service. Our friendly staff of experienced Product Specialists are always available to support your needs through all phases of equipment specification, installation and operation. You can depend on LFG&E to deliver quality intensive products with attractive pricing and responsive ongoing support.

Specifications

CONSTRUCTION:

ULTRA FLEX is constructed from a high quality Polyurethane film, manufactured in a unique fusion bond process. An ASTM-227 hard drawn spring steel wire is encapsulated between three continuous spiral wound plies of Polyurethane material. A soft cuff is added to each end and is sealed on the inside by a high quality Urethane sealer. Cuffs are permanently attached

CHARACTERISTICS:

UV and ozone resistant. Very high abrasion, tear, and puncture resistance. Sealed nonporous material. Superior aging resistance

TEMPERATURE RANGE:

-60°F to +200°F; 240°F Intermittent.
Remains flexible over full temperature range

BEND RADIUS:

Approximately 1.25 times diameter

EXPANSION/CONTRACTION:

Polyurethane maintains over 400% elongation percentage with excellent memory retention. **ULTRA FLEX** maintains 60% contraction with 40+% expansion and remains flexible over entire range

CONNECTION:

304 Stainless steel band clamp

OPTIONAL: PVC Collar.

The collar is glued to the pipe, then the Ultra Flex Connector slides over the collar and is clamped to the pipe

Custom configurations and applications available.



LFG&E

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