POST,
BUCKLEY,
SCHUH &
JERNIGAN, INC.

ENGINEERING
PLANNING
ARCHITECTURE

November 6, 1990

Mr. C. H. Fancy, P.E.
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

Re: FDER Request for Additional Information
East Duval Sanitary Landfill Flare
Construction Permit Application No. AC 16-186047

Dear Mr. Fancy:

Post, Buckley, Schuh & Jernigan, Inc. (PBS&J) is finalizing responses to the Request for Additional Information (dated October 2, 1990) on the East Duval Sanitary Landfill Flare Construction Permit Application. These responses will be submitted to you not later than November 21, 1990.

If we can be of any assistance in this matter, please do not hesitate to call.

Sincerely,

Gordon Threlkeld, P.E.
Project Manager
Solid Waste/Resource Recovery Division

cc: George Knecht, City of Jacksonville
Jerome Guidrey, PBS&J, ELD
M. Baig

cla/58/030
22-092.10/3.0

SOLID WASTE/RESOURCE RECOVERY DIVISION
WINTER PARK PLAZA, 1560 ORANGE AVENUE, SUITE 700, WINTER PARK, FLORIDA 32789
TEL: 407/647-7275 · FAX: 407/740-8958

RECEIVED
DEC 24 1990
DER - BAQM

Response to FDER Comments
Dated October 2, 1990
Regarding the City of Jacksonville
East Duval Sanitary Landfill
Application to Construct Air
Pollution Source
(Landfill Gas Flare)
Application No. AC 16-186047

PBS&J
POST,
BUCKLEY,
SCHUH &
JERNIGAN, INC.

ENGINEERING
PLANNING
ARCHITECTURE

RECEIVED
DEC 24 1990
DER - BAQM

December 21, 1990

Mr. C.H. Fancy, P.E.
Chief, Bureau of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

Re: Response to Request for Additional Information
East Duval Sanitary Landfill Flare
Construction Permit Application No. AC 16-186047

Dear Mr. Fancy:

Enclosed are responses to your letter of October 2, 1990 regarding the above referenced permit application.

For ease of review we have included your statement (in bold type) followed by our response. If you have any questions or need additional information, please contact me.

Very truly yours,

PBS&J ENVIRONMENTAL LABORATORIES

Jerome J. Guidry, P.E.
Vice President

JJG/jdm/MISC II 044

Encls.

cc: G. Knecht, City of Jacksonville
G. Threlkeld, PBS&J

22-087.00

M. Bilag
A. Katyna, NEDist
R. Roberson, BESD

EAST DUVAL SANITARY LANDFILL FLARE
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

The following are responses to Mr. C. H. Fancy's request for additional information dated October 2, 1990 (included in Attachment 1) regarding the East Duval Sanitary Landfill Application to construct Air Pollution source (Landfill Gas Flare), Application No. AC 16-186047.

1. **Complete Item B(1), Section III of the permit application (tons/day of Class I & III wastes this facility is designed to handle).**

   The East Duval Sanitary Landfill is currently accepting approximately 1,200 tons per day of municipal solid waste. There will not be any material accepted once the facility is closed, in which time the flare will be constructed. The landfill is expected to reach its capacity within 1 to 2 years. Upon closure, the landfill will contain approximately 6,207,000 cubic yards of municipal solid waste.

2. **Submit a calculation sheet for Item C, Section III, for all contaminants which must include H_2S emissions, along with Item H, Section III calculations.**

   Section III, Item C has been revised, and is included in Attachment 2. The estimated component qualities and stack information were provided by IT-McGill, a flare manufacturer. Any background data can be obtained by contacting Mr. Kyle Schotts at (918) 748-0700.

3. **The control device, according to Item D, Section III of the application is McGill Environmental Systems, Inc., Model EGF-60 Flare (or equivalent). When do you expect to finalize the type and model of flare that will be installed. Please submit a manufacturer's brochure including the design specification sheet.**

The type and model of flare will be finalized during the award of bid to perform the landfill closure construction. This will enable the City of Jacksonville to obtain the most cost effective flare unit. A copy of the manufacturers brochure including the design specification sheet is included in Attachment 3.

4. **Is this flare steam-assisted or air-assisted? What is the net heating value of the gas being combusted?**

The flare is neither steam nor air-assisted; it is a totally natural draft system. The net heating value of the gas being combusted ranges from 300 BTU/SCF to 520 BTU/SCF.

5. **How is the presence of the flare pilot flame, exit gas temperature and gas flow rate monitored?**

The flare pilot flame is sensed with a UV flame detector. The exit gas temperature is monitored with a thermocouple. The exit gas flow rate is not measured.

6. **According to Section II "A" Attachment, the East Landfill is expected to achieve a final height of 132 feet while the flare stack height is only 40 feet. Do you plan to install the flare stack at the highest elevation at the landfill?**

The top of the stack will not be installed at the highest elevation at the landfill. The flare will be installed on the east side of the landfill. The final elevation of the landfill is expected to be 132 feet National Geodetic Vertical Datum (NGVD), and the top of the stack is anticipated to be at elevation 51 NGVD.

7. **Submit a process flow diagram showing the location of all extraction wells in the collection system along with gas flow rates (ACFM) for each well that will be routed to the flare.**

A process flow diagram and a collection system layout with the location of all extraction wells in the collection system is shown in Attachment 4. The gas flow was estimated to be 150 CFM for each well.

ATTACHMENT 1

FDER REQUEST FOR ADDITIONAL INFORMATION

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

October 2, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. George R. Knecht, P.E.
Manager of Disposal
City of Jacksonville
Solid Waste Disposal Division
1931 East Beaver Street
Jacksonville, Florida 32202

Re: Duval County - A.P.
City of Jacksonville, East Duval
Sanitary Landfill-Flare
AC 16-186047

Dear Mr. Knecht:

The Department has received a permit application to construct a flare at the above referenced facility on September 4, 1990 and deemed it incomplete. Please provide the following information:

1. Complete Item B(1), Section III of the permit application (tons/day of Class I & III wastes this facility is designed to handle).

2. Submit a calculation sheet for Item C, Section III, for all contaminants which must include H_2S emissions, along with item H, Section III calculations.

3. The control device, according to Item D, Section III of the application is McGill Environmental Systems, Inc. Model EGF-60 Flare (or equivalent). When do you expect to finalize the type and model of flare that will be installed. Please submit a manufacturer's brochure including the design specification sheet.

4. Is this flare steam-assisted or air-assisted? What is the net heating value of the gas being combusted?

5. How is the presence of the flare pilot flame, exit gas temperature and gas flow rate monitored?

6. According to Section II "A" Attachment, the East Landfill is expected to achieve a final height of 132 feet while the flare stack height is only 40 feet. Do you plan to install the flare stack at the highest elevation at the landfill?

7. Submit a process flow diagram showing the location of all extraction wells in the collection system along with gas flow rates (ACFM) for each well that will be routed to the flare.

Processing of this application will continue as soon as the above referenced information has been received.

If you have any questions, please contact Mr. Mirza P. Baig at (904) 488-1344.

Sincerely,

Barry D. Andrews

for C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/MB/plm

c: J. J. Guidry, P.E.
R. Roberson, BESD
A. Kutyna, Northeast District

ATTACHMENT 2

PAGE 4 OF 12 OF AIR POLLUTION SOURCE PERMIT
Revised December, 1990

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: N/A

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): N/A

2. Product Weight (lbs/hr): N/A

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
N2	88,168	386,176			See Section		
O2	15,632,	68,468			III C Attachment		
CO2	14,621	64,040					
H20	7,188	31,483					
CH4	55.4	242.7					
CO	23.84	104.42					
NOX	5.36	23.48					
H2S	0.013	0.057					

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

ATTACHMENT 3

MANUFACTURER'S DESIGN SPECIFICATIONS

SECTION ONE - PROCESS SUMMARY

DESIGN BASIS

Gas Composition (Vol. %)

CH4	52% max.
CO2, Air, Inerts	48%
	100%
LHV	473 Btu/SCF
Temperature	100°F (45 - 120°F)
Mole Weight	29.46

Flare Gas

Type:	Landfill Gas
Max. Flow Rate:	2100 scfm
Waste Heat Release:	59.6 MMBtu/hr (Design Basis)
Min. Flow Rate:	10% of max. flow
Smokeless Flow:	100%
Pressure Drop:	12" WG

Unit Design

Operating Temp:	1600 - 2000°F (2100°F shutdown)
Retention Time:	1600°F .66 Seconds
	1800°F .69 Seconds
	2000°F .72 Seconds
Overall Unit Turndown:	6:1 (to hold 2000°F)
Flame Stability Turndown:	20:1 minimum
Fired Fuel Req'd:	None (pilot only)

UTILITIES

Pilot Gas	22 SCFH propane (intermittent)
Compressed Air	Not required
Electricity	460V/3Ph/60 Hz (McGill will step down to 110V for control usage.)

MECHANICAL DESIGN

Design Wind Speed	90 mph
Ambient Temp	-20 to 120°F
Electrical Area	Non-hazardous

FLAME STABILITY

Low methane concentrations may require auxiliary fuel to initiate combustion and maintain temperature.

Flashback will not occur if the landfill gas 02 level is 6% or less.

SECTION TWO - EQUIPMENT DESCRIPTION

ITEM I - ENCLOSED FLARE SYSTEM

A. Enclosed Flare Stack

One McGill Landfill Gas Flare System, with:

.. 2" layer A.P. Green (or equal) ceramic fiber refractory on Inconel pins and keepers. (2600°F hot face refractory).

.. A-36 carbon steel shell (1/4" nom.).

.. Stainless steel gas burner(s) with flame stabilizers for high temperature corrosion resistance.

.. 12" flanged flare gas inlet.

.. One (1) pilot assembly designed for 60,000 Btu/hr propane with electric spark ignitor. The pilot only operates during start-up.

.. Heavy duty, galvanized, opposed blade combustion air dampers. Opposed blade design provides a 6:1 air turndown control. Galvanized finish and stainless steel press-fit bearings ensure smooth, long term operation.

.. Four 3" NPT sample ports at 90° located 1/2 diameter from the top for accurate emission testing.

.. Inorganic zinc primer coat for superior corrosion protection and 600°F temperature resistance.

.. Continuous base plate for high wind stability.

.. Lift lugs to assist in erection.

B. Control System Operation

The following is a brief outline of the control system start-up and operating sequence:

System start-up would begin with a timed air purge cycle to evacuate any fugitive hydrocarbons from the flare enclosure. After purge is completed, the pilot will be lit. Upon proving the pilot flame by the flame scanner, the landfill gas valve will be opened and the landfill gas blower (by others) will be started allowing landfill gas to flow to the flare enclosure. This allows use of the landfill gas for system warm-up.

Upon proving a flame on the pilot, the system will continue its warm-up sequence. The landfill gas valve will be opened allowing normal operation of the unit.

After the landfill gas valve has been opened, the pilot gas will then shut off to limit propane gas usage. If a flame is still sensed on the main burner the system will continue operation, if not it will shutdown on flame failure.

The unit temperature is set by adjusting the air dampers (manually or optional automatic). Opening the dampers will reduce the flue gas temperature by adding quench air. In the manual system, the operating temperature is set at 1800-2000°F at the maximum design flow and will fluctuate between 600-2100°F at variable gas flows.

Due to the presence of an open flame, the ground flare should be located in a "non-hazardous" electrical area.

C. Base Case Control Features - Manual Operation

.. Manually operated combustion air dampers to control the operating temperature.

.. High temperature shutdown switch with panel mounted temperature indicator.

.. Pilot gas control system including pressure regulator, fail-closed shutdown valves, manual block valve and pressure indicator.

.. Ignition system including ignition transformer, pilot spark electrode and ignition timer.

.. Flame safeguard controls including self-checking flame scanner and panel mounted flame relay.

.. Purge air blower with pressure proved switch and motor starter.

.. All high voltage (440/220V) items are enclosed in a separate panel for electrical safety including:

Main power supply disconnect.

Power transformer. Client will supply 220-460V/3Ph/60 Hz electricity. McGill will stepdown to 110V/1 Ph for use as required.

Motor starter for client's landfill gas blower motor. (Client to specify horsepower).

Amp meter for waste gas blower motor (200% scale).

.. "Manual-Off-Auto" blower selector switch.

.. The following indicating lights:

a. Panel Power ON
b. Purging
c. Purge Complete
d. Pilot Gas ON
e. Flame Proved
f. High Stack Temperature (SD)
g Flame Failure (SD)

.. Contacts for control room monitoring of the system.

.. 15A convenience outlet (duplex) with weatherproof cover.

.. 100W high pressure sodium security light with manual switch and photocell (shipped loose).

.. Additional relays, timers, controllers, etc. required for system operation.

.. The appropriate items will be enclosed in a weatherproof (NEMA 4) panel.

.. Controls and valving are prepiped and wired onto a support rack.

The control system will be given a functional test simulating actual operation in our shop to ensure that it is properly wired and will perform as designed.

Units can be operated in the manual mode which requires an operator at the flare to start and restart the system using a pushbutton sequence. If the units shutdown for any reason, operator assisted restart is required.

The flare operating temperature is set by manually adjusting the air dampers.

The base case is recommended for sites with stable gas flow and constant electrical supply.

OPTION I: AUTOMATIC START/RESTART

In the automatic mode, the unit will automatically start when power is applied. If the unit shuts down for any reason except high stack temperature, the auto mode will allow the unit to attempt to purge and restart for a specified time period. A remote signal is sent if the unit fails to restart.

OPTION II: INLET FLAME ARRESTOR

Varec 12" flame arrestor (or equal). Aluminum housing and aluminum internals. Internal elements can be cleaned without removing the flame arrestor body from the pipe.

OPTION III: INLET BLOCK VALVE WITH PNEUMATIC ACTUATOR

12" Pliaxseal high performance butterfly valve, ANSI 150# with carbon steel body, 316 stainless steel disk, PTFE seal with Bettis pneumatic, fail-closed actuator, 3-way solenoid valve, speed control valves and Bettis Auxiliary switches. (Nitrogen bottles supplied by others).

Although nitrogen cylinders are required to be installed, the advantage of this option is that the actuator is a highly reliable standard industrial actuator that will have less maintenance than an electric fail-closed actuator.

OPTION V: AUTOMATIC TEMPERATURE CONTROL (AIR)

Flue gas temperature would be automatically controlled by adjusting the air flow into the unit. Lower waste gas flows or lower methane concentrations would automatically close the inlet air louvers. The control loop consists of a thermocouple and temperature indicator/controller and two electric operated actuators on the air louvers.

OTHER ENCLOSED FLARE OPTIONS

McGill will design the Enclosed Flare system to meet most requirements or restrictions that our client's may have. Following are a number of optional features provided on previous projects:

.. Temperature recorder for the flue gas. May be required for some local authorities.

.. Landfill gas blower with explosion-proof motor (Arrg. 8).

.. Caged access ladder to 30' elevation for access to thermocouples and flame scanner.

.. 360° platform for access to sample connections. McGill does not recommend this option due to the proximity to the hot exit flue gas.

.. Hinged manway (18") for access into the flare base. Normal access is through the air dampers, however, this option should be considered if automatic louvers are used.

.. Inconel mesh cover for the ceramic fiber refractory. The mesh provides additional mechanical strength. If the unit is not used for extended periods, the mesh will extend the refractory life.

.. Visual alarm beacon or audible alarm horn.

.. Automatic telephone dialing system (requires phone line at flare).

.. Finish coat of high temperature paint (aluminum color).

.. Service agreement for a McGill technician to periodically check the operating characteristics and safety shutdown points.

Safety Controls and Other Features

We are providing "self-checking" type flame scanners and relay system, which affords a fail-safe shutdown. Without this feature an unsafe failure mode may occur. A normal scanner may be substituted at a substantial cost deduct, but all liability resulting from such a change must be borne by the purchaser.

Heat Tracing

It is not necessary to heat trace the piping between the blower and the flare.

McGILL FLARE MANUFACTURING STANDARDS

Following is a summary of our fabrication standards as they apply to the supply of this equipment.

The McGill shop is qualified to meet ASME boiler and pressure vessel codes and maintains quality control documentation and welder's qualifications which are available for our client's review. Inspectors have access to our company and subcontractors upon short notice.

McGill regularly uses local subcontract shops to assist in fabrication and assembly of our products. These shops work under McGill direction and project management and will meet our fabrication quality control standards.

1. General Industry Standards

Welding - Gas Piping:	ASME IX	Electrical Wiring:	NEC
- Burners:	AWS	Pipe Flanges:	150 lb. ANSI
- Structural:	AWS	Pipe Threads:	NPT
Weld Inspection:	ASME V	Structural Design:	AISC A58.1
Drawing Dimensions:	English		

2. Nondestructive Testing

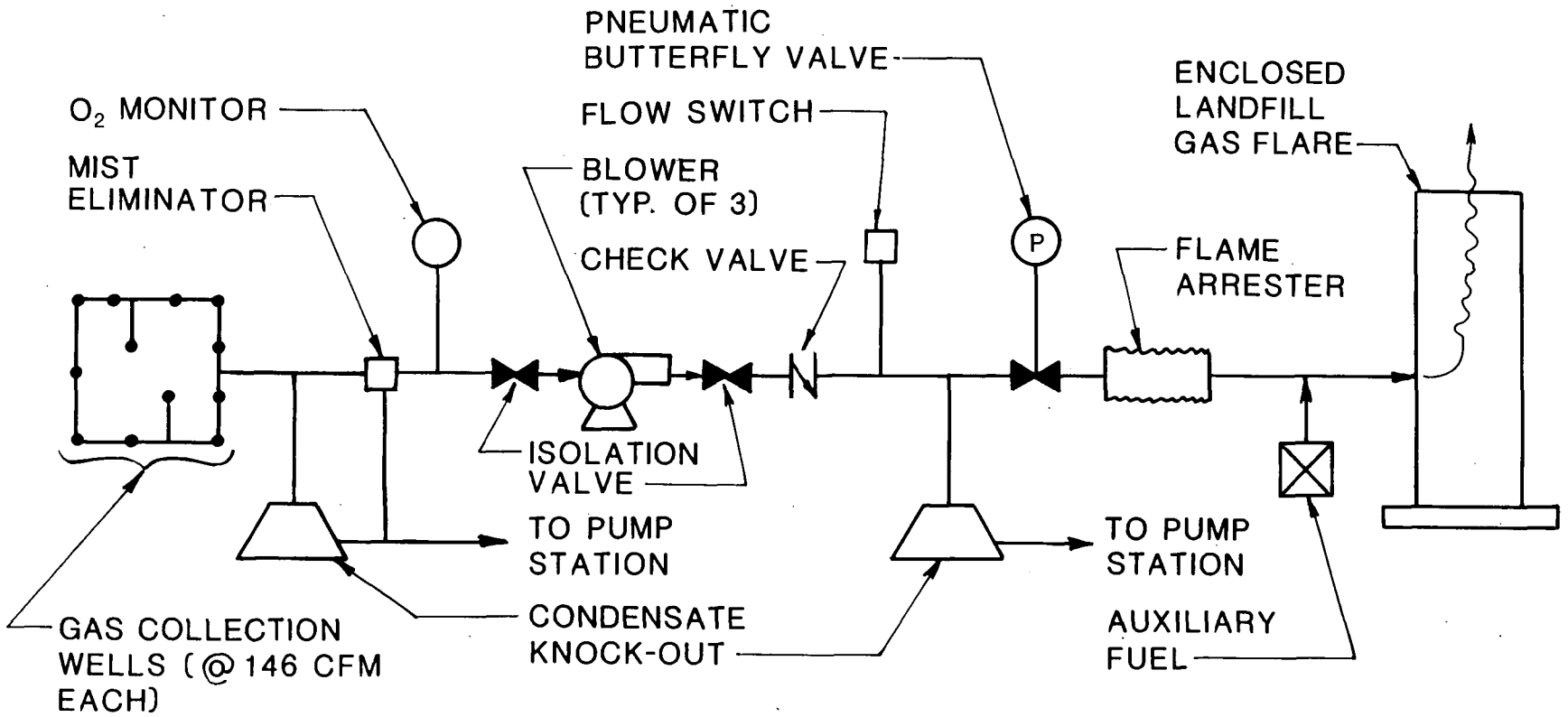
X	Dimensional Check:	All exterior and mounting dimensions
X	All Welds:	100% Visual Inspection
X	Ignition Transformers:	Functional Check
X	Control System:	Function Check

3. Quality Control Documentation

- X Welder Qualifications (on request)
- X Welding Procedures (on request)
- X Instrument Data Sheet/Catalog Sheet
- X Other Standard McGill Inspection Reports
- X Review Drawings (1R/3P)
- X As Built Drawings (1R/3P)
- X Operating & Maintenance Manual (3)

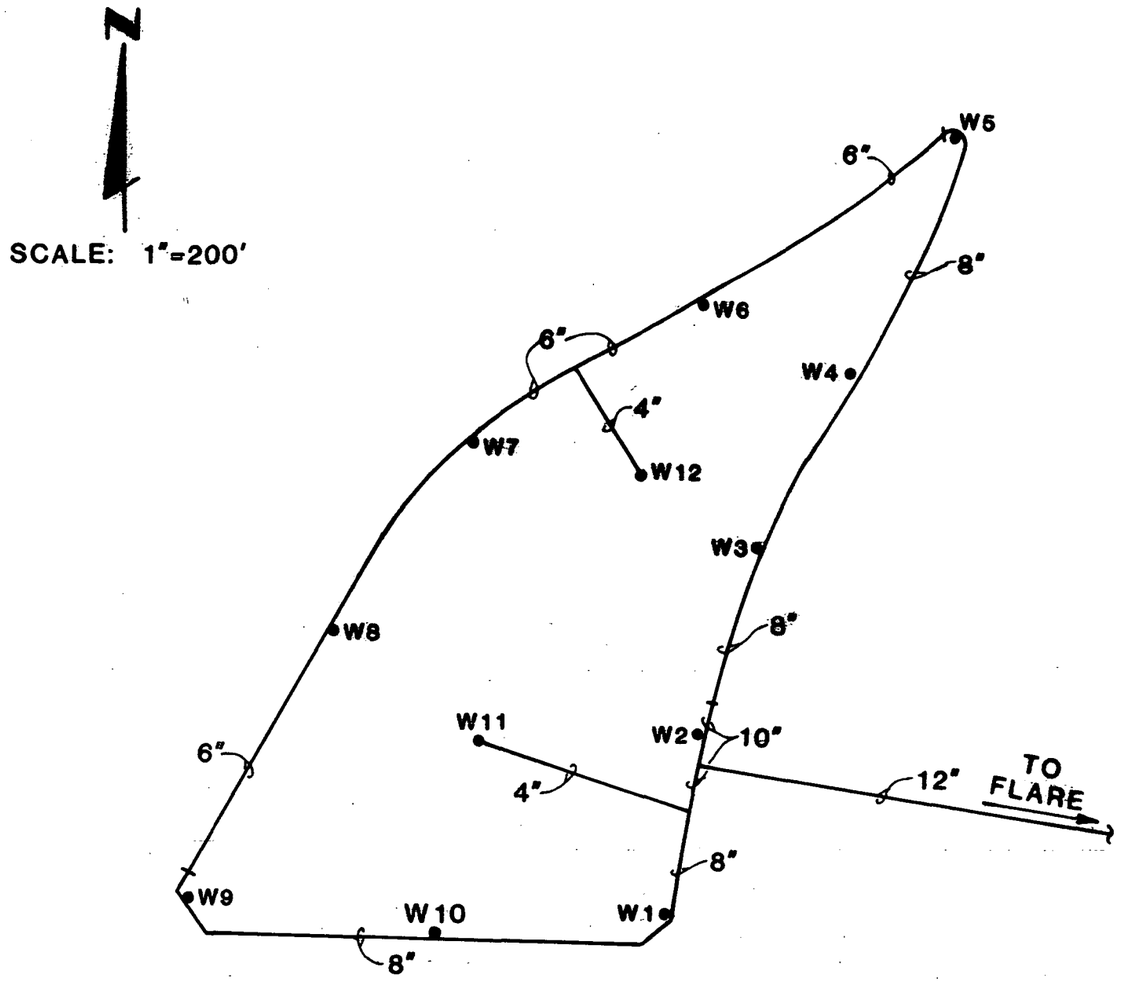
ATTACHMENT 4

GAS MANAGEMENT SYSTEM PLANS



EAST DUVAL LANDFILL GAS FLARE
PROCESS FLOW DIAGRAM

N69174



EAST LANDFILL
GAS COLLECTION PIPE LAYOUT

ASSUMPTIONS

Maximum Allowable Velocity (V):	40 FT/SEC
Maximum Gas Generation Rate per Well:	150 CFM
Perimeter Header Pipe Length:	3,300 LF

50/50 Split in Flow Rate Half-Way Around Perimeter Header System

CALCULATIONS

Cross Sectional Area (A) of 12" Pipe:	0.785 SF
Cross Sectional Area (A) of 10" Pipe:	0.545 SF
Cross Sectional Area (A) of 8" Pipe:	0.349 SF
Cross Sectional Area (A) of 6" Pipe:	0.196 SF
Cross Sectional Area (A) of 4" Pipe:	0.087 SF

Pipe Section From	Pipe Section To	Diameter (Inches)	Flow (Q=VA) (CFM)
W12	W12's Node	4	150
W12's Node	W6	6	150
W6	W5	6	300
W6	W5	8	300
W5	W4	8	450
W4	W3	8	600
W3	W2	8	750
W3	W2	10	750
W2	Exit Pipe	10	900
W7	W8	6	150
W8	W9	6	300
W8	W9	8	300
W9	W10	8	450
W10	W1	8	600
W1	W11's Node	8	750
W11	W11's Node	4	150
W11's Node	Exit Pipe	10	900

Total Flow to Gas Flare (12" Exit Pipe) = 900 + 900 = 1,800 CFM
Check: 12 x 150 = 1,800 CFM

PBS&J

EAST DUVAL SANITARY LANDFILL
EXTRACTION WELL LOCATIONS AND GAS FLOW RATES

N69174

BEST AVAILABLE COPY

FIRST CLASS

PBSJ ENVIRONMENTAL LABORATORIES
6635 EAST COLONIAL DRIVE
ORLANDO, FLORIDA 32807

TO: Mr. C.H. Fancy,P.E.
Chief, Bureau of Air Regulation
Florida Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

ATTENTION: