

4009 C00086

WACSID # 39859 CL3

GAS MIGRATION INVESTIGATION OF 2-8-93

The installation of permanent monitoring points around the perimeter of the site was completed Friday, February 5, 1993. The first sampling of these points was conducted on Monday, February 8, 1993 in the following manner; The permanent caps were removed at each test point and a reading was taken with a Gastech Model # GP-204 combustible gas indicator. The maximum levels determined at each test point, as indicated by the meter, are noted in % LEL.

Results of this sampling indicate that no gas migration was detected on the northern boundary; and the maximum level detected on the southern boundary was 35% of the lower explosive level (LEL) of gas at GS-E3S. On the west boundary, the detected levels were within acceptable parameters except at GS-I3W where 100% LEL was recorded. On the east boundary of the 60 acre site, at GS-F3E, gas levels of 100% were recorded. High levels were also recorded at most of the deeper wells which were installed to investigate gas migration to the treatment plant and scale buildings adjacent to this boundary.

D. E. R.

FEB 18 1993

SOUTHWEST DISTRICT  
TAMPA

*Michael D Moore*

2-15-93

**GAS SAMPLING RESULTS**

**60 ACRE SITE**

**FEBRUARY 8, 1993**

**1:30 P.M.**

**GAS SAMPLING POINTS**

**RESULTS**

**SOUTH BOUNDARY:**

GS-A3S	0%
GS-B3S	0%
GS-C3S	10%
GS-D3S	0%
GS-E3S	35%
GS-F3S	10%
GS-G3S	0%
GS-H3S	0%

**NORTH BOUNDARY:**

GS-A3N	0%
GS-B3N	0%
GS-C3N	0%
GS-D3N	0%
GS-E3N	0%
GS-F3N	0%
GS-G3N	0%
GS-H3N	0%

GAS SAMPLING RESULTS  
PAGE TWO

GAS SAMPLING POINTS

RESULTS

WEST BOUNDARY:

GS-A3W	0%
GS-B3W	0%
GS-C3W	0%
GS-D3W	0%
GS-E3W	60%
GS-F3W	0%
GS-G3W	35%
GS-H3W	25%
GS-I3W	100%
GS-J3W	0%
GS-K3W	0%
GS-L3W	0%

GAS SAMPLING RESULTS  
PAGE THREE

GAS SAMPLING POINTS

RESULTS

EAST BOUNDARY:

GS-A3E	0%
GS-B3E	28%
GS-C3E	15%
GS-D3E	65%
GS-E3E	60%
GS-F3E	100%
GS-G3E	0%
GS-H6E	50%
GS-I3E	28%
GS-J6E	35%
GS-K6E	60%
GS-L3E	0%
GS-M10E	NOT INSTALLED
GS-M15E	NOT INSTALLED
GS-M25E	NOT INSTALLED
GS-N6E	100%
GS-O3E	0%
GS-P10E	NOT INSTALLED
GS-P15E	NOT INSTALLED
GS-Q6E	100%
GS-R3E	0%

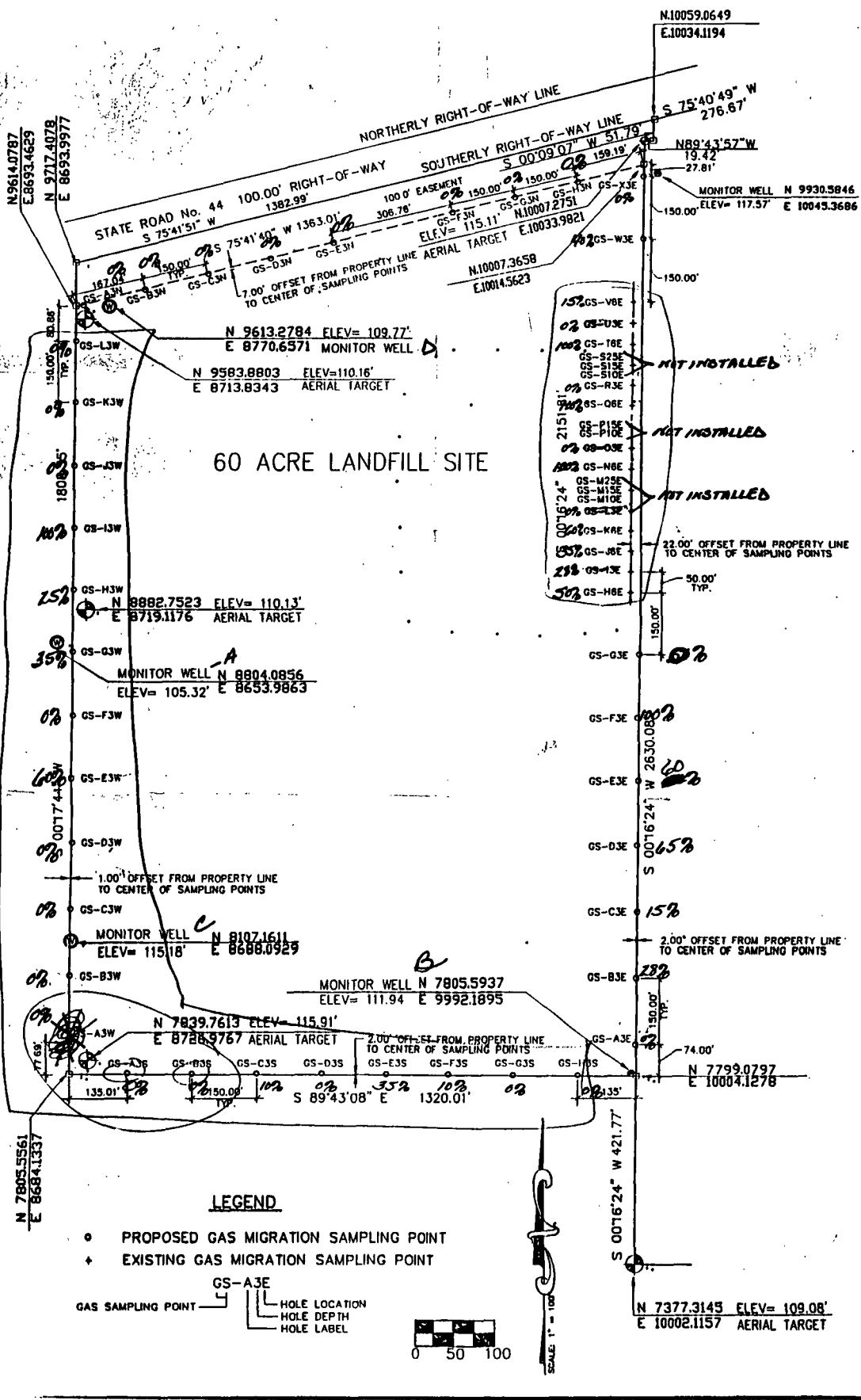
GAS SAMPLING RESULTS  
PAGE FOUR

GAS SAMPLING POINTS

RESULTS

EAST BOUNDARY CONTINUED:

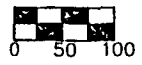
GS-S10E	NOT INSTALLED
GS-S15E	NOT INSTALLED
GS-S25E	NOT INSTALLED
GS-T6E	100%
GS-U3E	0%
GS-V6E	15%
GS-W3E	40%
GS-X3E	0%



60 ACRE LANDFILL SITE

LEGEND

- PROPOSED GAS MIGRATION SAMPLING POINT
- ⊕ EXISTING GAS MIGRATION SAMPLING POINT
- GS-A3E
- GAS SAMPLING POINT
- HOLE LOCATION
- HOLE DEPTH
- HOLE LABEL



PROJECT NUMBER	DATE	BY	CHKD
88-003	11/15/88	WJL	WJL
PROJECT NAME	SECTION	DATE	
CITRUS COUNTY CENTRAL LANDFILL			
PERMANENT AND PROPOSED GAS MIGRATION SAMPLING POINTS			
60 ACRE LANDFILL SITE			
APPROVED BY	DATE		
CITRUS COUNTY			
DEPARTMENT OF TECHNICAL SERVICES			
DIVISION OF ENGINEERING			
WALTER W. WILSON, P.E.			
PROJECT NUMBER	DATE	BY	CHKD
88-003	11/15/88	WJL	WJL
PROJECT NAME	SECTION	DATE	
CITRUS COUNTY CENTRAL LANDFILL			
PERMANENT AND PROPOSED GAS MIGRATION SAMPLING POINTS			
60 ACRE LANDFILL SITE			

GAS MIGRATION INVESTIGATION  
AT SITE BUILDINGS

Gas migration is most problematic along the east boundary of the site adjacent to the scale building and the treatment plant. On December 11, 1992, dangerous levels were first detected in the treatment plant when vapors were accidentally ignited inside an electrical panel. The building was carefully monitored with a hand-held detection device, and explosive levels of gas were detected coming from the electrical conduits that connect to the lift station pumps at the seven acre cell.

All underground conduits at the treatment plant were subsequently sealed with urethane foam. The plant was monitored again for gas and found to be safe.

The scale building and office trailers were also monitored for gas levels. The office trailers were determined to be safe, but the scale building contained unacceptable levels of gas on Monday morning, December 14, 1992, after being closed for the weekend.

Electrical conduits and plumbing block outs were sealed, and a vent fan in the restroom was used to control the gas accumulation. Further monitoring of the scale building has demonstrated these measures were effective.

Natural gas alarms have been installed in the scale house building and in the leachate treatment plant. These alarms are designed to detect methane at concentrations in excess of 0.95%. These alarms, operated on household current (no batteries), sound when gas is detected and continue to sound as long as gas is present. A red alarm light stays on after an alarm to alert staff if gas is detected during their absence.

As an additional precaution, a portable gas monitor is used to ensure that the buildings are free of methane. No methane has been detected in these buildings since the buildings were sealed.

Gas detection points GS-HGE, GS-I3E, GS-J6E, GS-K6E, GS-N6E, GS-O3E, GS-Q6E, GS-R3E, GS-T6E, GS-U3E, and GS-V6E were installed to monitor gas migration from the 60 acre site to the treatment plant and scale buildings. Investigations indicate that gas migration in this area is more prevalent at a 6 foot depth than at a 3 foot depth.

Mike Schlaudraff, Citrus County Hazardous Material Coordinator, conducted a gas investigation of the existing building on the 60 acre site and reported no detectable concentrations of gas.

1 REFER TO FIGURE 1

FIGURE 1  
 GAS ALARM INSTALLED  
 IN SCALE AND TREATMENT PLANT BUILDINGS

**WARRANTY**

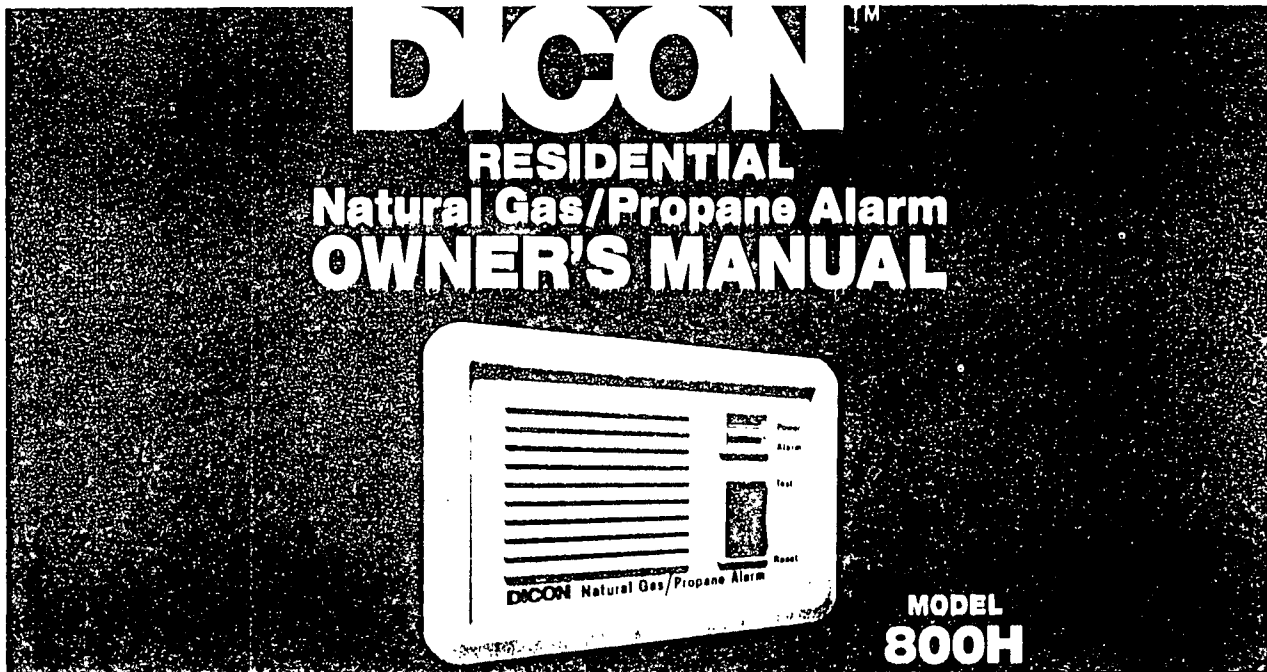
Your Dicon gas detector is warranted for one year from date of purchase against defects in material and workmanship. Units returned to Dicon during this period as a result of such defects will be repaired, or replaced at Dicon's option without charge. This warranty only covers defects in material or workmanship in normal residential use. This warranty does not cover damage resulting from negligent handling, misuse or lack of reasonable care. This warranty is in lieu of any other warranty either expressed or implied.

DICON SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE OR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND RESULTING FROM A GAS LEAK. THE EXCLUSIVE REMEDY FOR BREACH OF THE LIMITED WARRANTY CONTAINED HEREIN IS THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT AT DICON'S OPTION. IN NO CASE SHALL DICON'S LIABILITY BE GREATER THAN THE PURCHASE PRICE OF THE PRODUCT. YOUR GAS DETECTOR IS NOT A SUBSTITUTE FOR PROPERTY, LIABILITY LIFE OR OTHER REPAIRS OR ANY KIND APPROPRIATE INSURANCE COVERAGE. FOR YOUR AS A RESULT OF A GAS LEAK IS YOUR RESPONSIBILITY. CONTACT YOUR HEALTH OFFICE AGENT TODAY.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

For repair, return this product (postage or freight prepaid) to Dicon. Please enclose a note stating the nature of the difficulty. In the event you have any questions concerning the use and care of the product or concerning service please write:

DICON SYSTEMS INC. 631 Executive Drive Willowbrook, Illinois U.S.A. 60521	Head Office 715 Clayson Rd Toronto (Weston) Ontario M9M 2H4
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READ CAREFULLY BEFORE USING GAS ALARM 800H

DICON SYSTEMS INC.  
631 Executive Drive





## INTRODUCTION

The Dicon 800H Natural Gas/Propane Residential Gas Detector is a technologically advanced device, engineered to provide early warning of the presence of specific combustible gases. The unit is designed to detect both natural (methane) and propane gas at concentrations in excess of 25% of the Lower Explosive Limit (LEL). The Lower Explosive Limit (LEL) is the level of gas in the air at which an air-gas mixture becomes explosive. Natural gas (methane) has an LEL of 3.8%; if 3.8% of the air-gas mixture is natural gas (methane) then that air-gas mixture is explosive. Propane has an LEL of 2.1%. The Dicon 800H is designed to detect natural gas (methane) at concentrations in excess of 0.95% and concentrations of propane in excess of 0.52%.

These LEL are taken directly from UL 1484 Standard for Safety — Residential Gas Detectors.

The Dicon 800H is also suitable for use in Recreational Vehicles when the Recreational Vehicle is not in motion. For installation in Recreational Vehicles, follow the instructions set out for home installation in this manual.

Please read the following bulletin carefully to ensure that you and your family receive maximum benefit from the Dicon 800H residential gas detector.

## SUPERIOR FEATURES

### Easy to Install:

With the Dicon 800H Gas Alarm there are no batteries to replace and no special wiring to be done. The Dicon 800H comes complete with an AC adaptor which is simply plugged into the alarm and into an AC outlet.

### Easy to Mount:

Template and screws are included.

### Loud Audible Alarm:

The Dicon 800H 85 db alarm is designed to sound when gas concentrations above the calibrated threshold are detected.

### Automatic Alarm Shut Off:

When the level of gas concentration drops below the calibrated threshold the alarm automatically turns itself off.

### Warning Indicator:

The red "alarm" light stays on after an alarm to alert you that the unit had alarmed during your absence.

### Precise Sensitivity:

No adjustments necessary. The Dicon 800H's sensitivity level is preset and factory sealed for your convenience and protection.

### Supervised Sensor:

If the heater element or the sensor is open a trouble signal will indicate that the unit is not functioning — an indispensable safety feature.

### Power On Light:

The green "power" light confirms that the Dicon 800H is powered.

### Ready Beep:

At the end of the warmup period the Dicon 800H will beep once to indicate that it is ready for operation.

### Test Switch:

Test switch tests alarm circuitry and horn.

## ONE YEAR WARRANTY

## SPECIFICATIONS

Operating Voltage:	12V DC with an AC Adaptor for 120V residential use.
Standby Current:	1/5 amp
Gas Detection Level:	25% of the Lower Explosive Limit of both natural (methane) and propane gases.
Audible Alarm:	85db at 10 feet

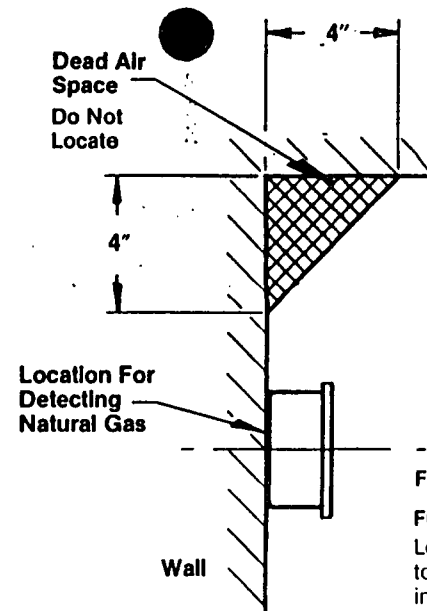
## ELECTRICAL REQUIREMENTS

The Dicon 800H requires a 120V AC power source for use with the 120V AC adaptor supplied. Do not use any other adaptor with this unit.

## FOR DETECTION OF NATURAL GAS (METHANE) — LOCATION OF GAS DETECTORS

The Dicon 800H is designed to detect natural gas (methane) at concentrations in excess of 25% of the Lower Explosive Limit (LEL).

1. Locate gas detectors next to all gas appliances (see figure 1).
2. For best protection gas detectors should be installed on every level of your home.
3. Natural Gas (methane) is lighter than air and will rise to the highest point in the room. The greatest concentrations of gas will first appear near the ceiling. For flat, horizontal ceilings, the gas detector should be mounted on a wall between 6-12 inches from ceiling (see figure 1).
4. For ceilings that are higher than 8 feet, sloped, peaked, gabled, cathedral or some style other than a flat, horizontal ceiling, consult your local gas authority on the best location of your gas detector.
5. Closed doors and other obstructions may interfere with the path of gas to the gas detector, and may prevent occupants on one side of a closed door from hearing an alarm on the other side of the door. Install sufficient detectors to compensate for closed doors and other obstacles. Read "LIMITATIONS OF GAS DETECTORS" in this manual.



NOTE: Ensure

## FOR DETECTION OF PROPANE GAS — LOCATION OF GAS DETECTORS

The Dicon 800H is designed to detect propane gas at concentrations in excess of 25% of the Lower Explosive Limit (LEL).

1. Locate gas detectors next to all gas appliances (see figure 2).
2. As propane gases are heavier than air and will settle to the lowest point in the room, the greatest concentrations will first appear at floor level. The center of the detector should be mounted between 3-4 inches above the lowest point in the

## GAS MIGRATION INVESTIGATION CONCLUSIONS

Gas migration studies at the Citrus County landfill have been conducted three times: October 4, 1988 (Attach. A); May 20 & 21, 1992 (Attach. B); and February 9, 1993. Based on the findings of these studies the following conclusions can be made:

1. The 1992 and 1993 studies indicate gas migration along the east boundary adjacent to the closed Class 1 landfill, where none was detected during the 1988 study when the facility was in operation. This would seem to indicate that gas migration in this area began with the closure (HDPE and soil cap) of that cell, and that the seven acre cell is the source of the gas at that location.
2. Gas migration has never been detected along the north boundary.
3. Since the 1988 investigation, gas migration along the southern boundary appears to have been controlled to acceptable levels.
4. Gas migration along the west boundary has been detected consistently adjacent to the closed trenches.

Gas migration along the northern boundary does not seem to be a problem at this site. Along the southern boundary gas has been detected, but the concentrations do not appear to be near explosive levels. Along the western boundary, explosive levels were detected at GS-13W, but other monitoring points remain at acceptable levels.

Both the southern and western boundaries abut the Withlacoochee State Forest. No hazard to human life is present, but excessive gas migration could be detrimental to vegetation.

The eastern boundary is of the greatest concern, because the migrating gas tends to follow buried utility lines and enter the buildings at penetrations. The gas is trapped once it enters an enclosed building unless the building is adequately ventilated. It is at these buildings that precautions must be taken.

## RECOMMENDATIONS

The following recommendations are made to protect life and property from gas migration at the 60 acre site:

1. The perimeter gas points should be sampled for  $\frac{1}{2}$  LEL of gas on a quarterly basis except at the western boundary, adjacent to the scale and treatment buildings, where sampling should be on a monthly basis.

2. Nested gas monitoring points should be installed in three places in locations and to depths indicated on the enclosed plan. These points should be monitored on a monthly basis until the depth and degree of gas migration can be established.
3. Continuous monitoring of gas levels in the scale and treatment plant buildings by gas alarms should continue indefinitely until it can be demonstrated that they are no longer needed.
4. A safety procedure for these buildings should be established by the Citrus County Hazardous Material Coordinator, and training programs implemented for staff.
5. Based on additional monitoring, the need for an additional gas vent near GS-13W should be investigated.

ATTACHMENT "A"

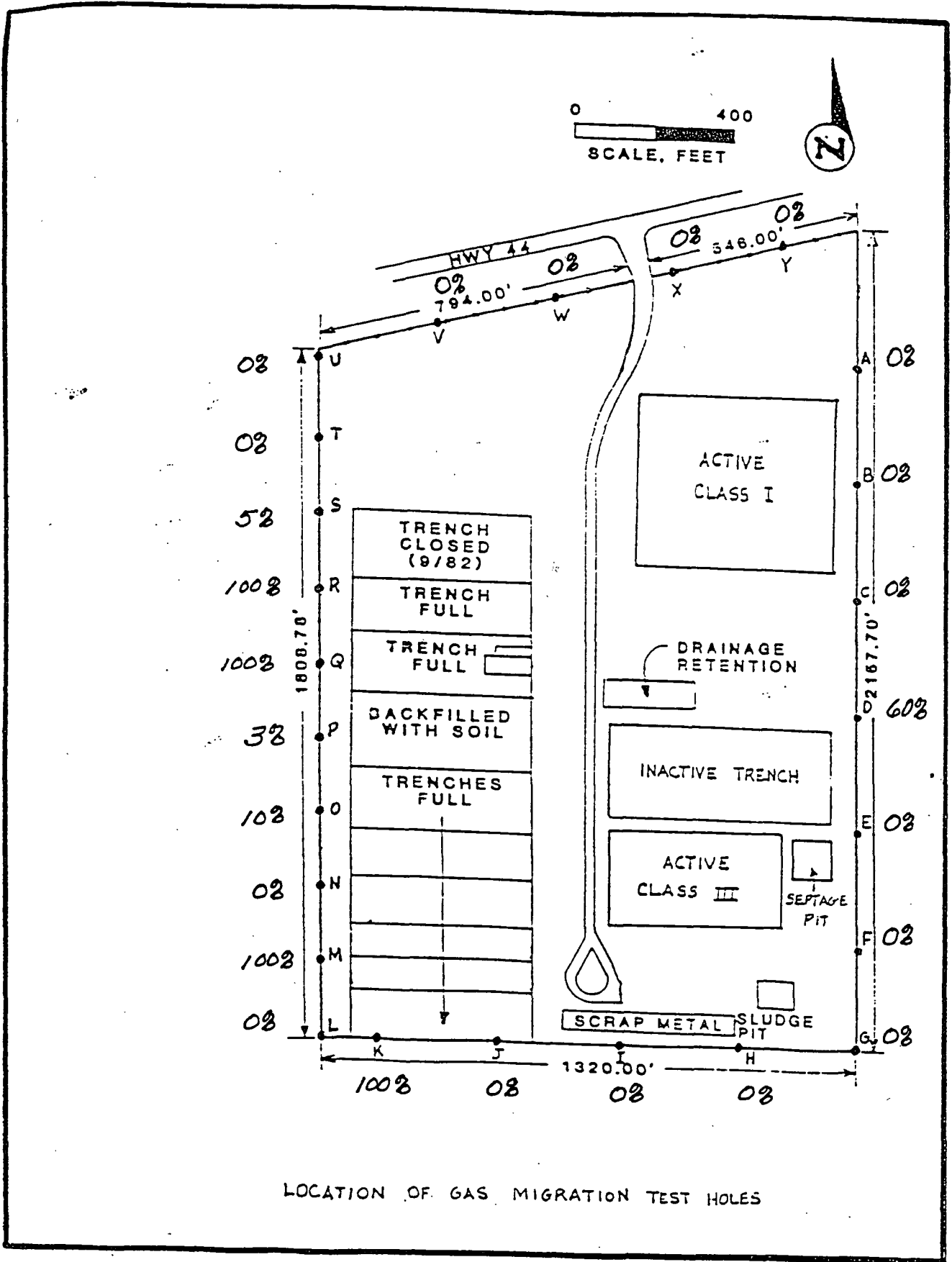
GAS MIGRATION INVESTIGATION

Tests were conducted on October 4, 1988 at the Citrus County Central Landfill (60 Acre Site) to determine the extent and concentration of methane gas migration. The tests were conducted at 300 +/- foot intervals along the perimeter of the property, except for the west boundary which was tested at 200 +/- foot intervals due to the proximity of numerous inactive trenches.

A 3/4 inch hole at least three feet deep was plugged from the ground at each of the test points. A cover was positioned over each hole and allowed to stand undisturbed for a minimum of fifteen minutes. Readings were taken at each test point, as indicated on the attached sheet, with a Gastech Model #GP-204 combustible gas indicator. The maximum levels determined at each test point, as indicated by the meter, are noted in %LEL and are as follows:

<u>TEST POINT</u>	<u>READING (%LEL)</u>
A	0
B	0
C	0
D	60
E	0
F	0
G	0
H	0
I	0
J	0
K	100
L	0
M	100
N	0
O	10
P	3
Q	100
R	100
S	5
T	0
U	0
V	0
W	0
X	0
Y	0

The presence of methane gas along the perimeter of the landfill has indicated the need for gas vents. A total of 24 vents will be installed during the first phase of closure, and they will be placed in a grid pattern at approximately 190 foot intervals. Please refer to the closure Plan for proposed specific locations.



LOCATION OF GAS MIGRATION TEST HOLES

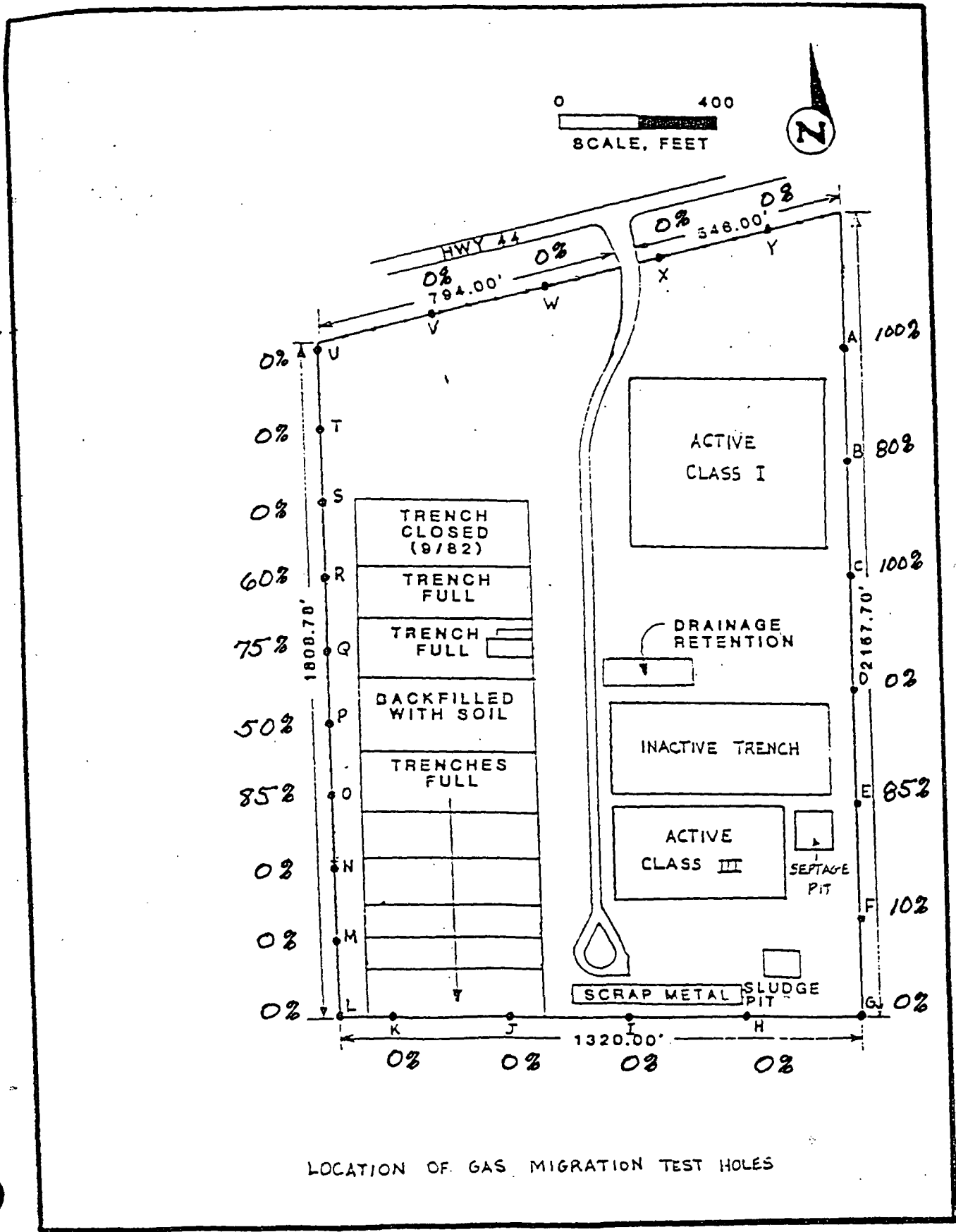
ATTACHMENT "B"

GAS MIGRATION INVESTIGATION

Tests were conducted on May 20 and 21, 1992 at the Citrus County Central Landfill (60 Acre Site) to determine the extent and concentration of methane gas migration. The tests were conducted at 300 +/- foot intervals along the perimeter of the property, except for the west boundary which was tested at 180 +/- foot intervals due to the proximity of numerous inactive trenches.

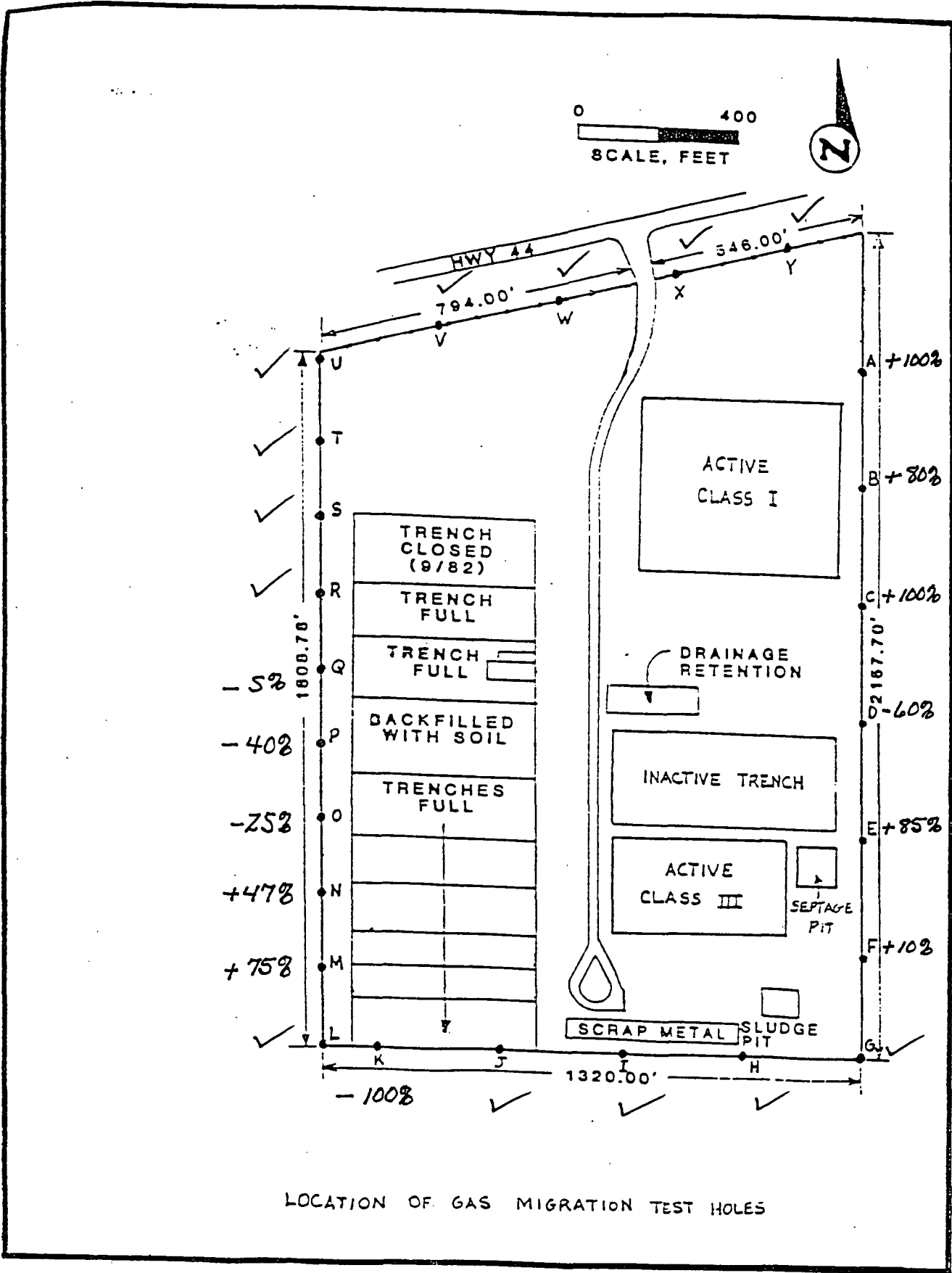
A one (1) foot hole at least three feet deep was plugged from the ground at each of the test points. A cover was positioned over each hole and allowed to stand undisturbed for a minimum of fifteen minutes. Readings were taken at each test point, as indicated on the attached sheet, with a Gastech Model #GP-204 combustible gas indicator. The maximum levels determined at each test point, as indicated by the meter, are noted in %LEL. Also, a comparison of change since the October 4, 1988 investigation has been provided.

TEST POINT	READING (% LEL)	% CHANGE
A	100	+100
B	80	+ 80
C	100	+100
D	0	- 60
E	85	+ 85
F	10	+ 10
G	0	0
H	0	0
I	0	0
J	0	0
K	0	-100
L	0	0
M	0	-100
N	0	0
O	85	+ 75
P	50	+ 47
Q	75	- 25
R	60	- 40
S	0	- 5
T	0	0
U	0	0
V	0	0
W	0	0
X	0	0
Y	0	0



LOCATION OF GAS MIGRATION TEST HOLES

PERCENTAGE OF CHANGE BETWEEN 10-4-88 AND 5-20/21-92

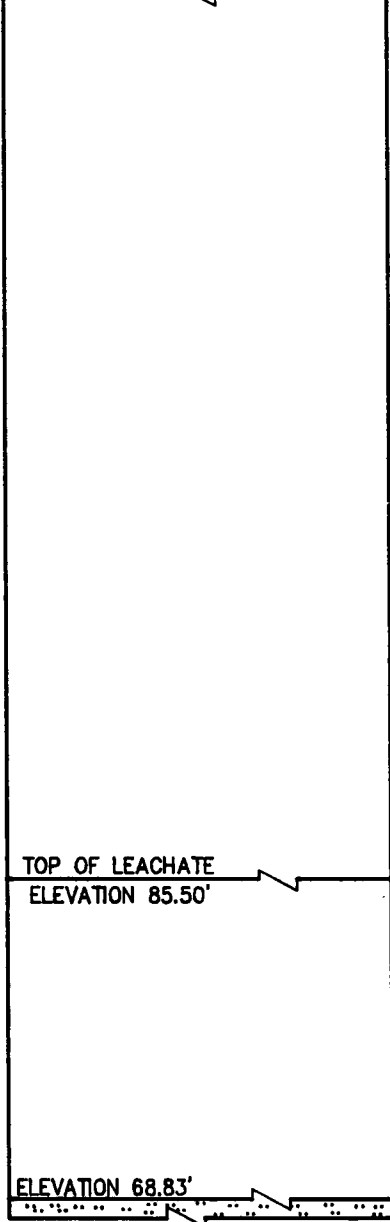


LOCATION OF GAS MIGRATION TEST HOLES



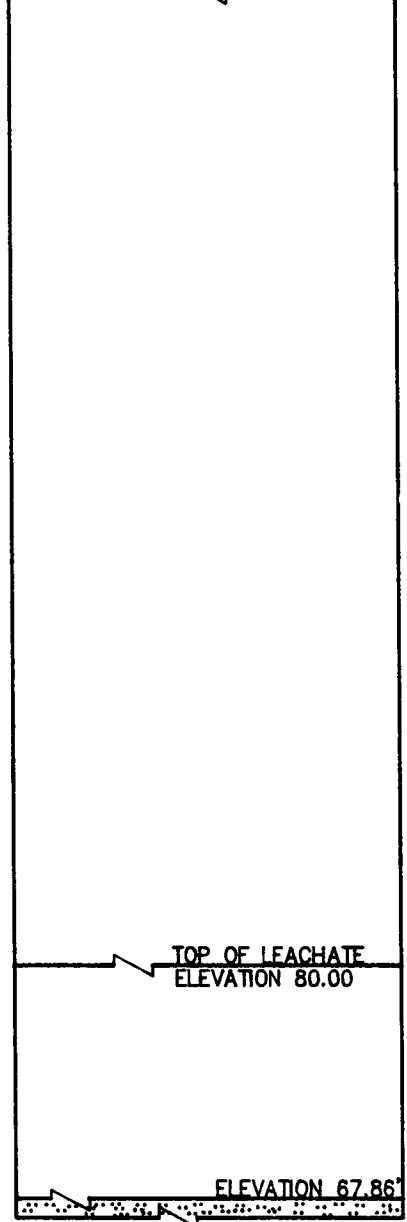
**EAST LIFT STATION**

TOP OF STATION ELEVATION 132.48'



**WEST LIFT STATION**

TOP OF STATION ELEVATION 133.21'



**REFERENCE BENCHMARK**

BENCHMARK No. TT6CH 31.36' RIGHT OF FLORIDA DEPARTMENT OF TRANSPORTATION CENTERLINE OF STATE ROAD No. 44 STATION 593+17.75. A 6"x6" CONCRETE U.S. GEOLOGICAL SURVEY BENCHMARK MONUMENT. ELEVATION 142.224'

**SURVEYOR'S CERTIFICATION**

I hereby certify to the best of my knowledge, information and belief and my professional opinion, that the herein described land survey and plan are true and correct and was prepared under my direction and supervision and conforms to the minimum technical standards set forth by the Florida Board of Professional Land Surveyors in Chapter 21H1-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes

Dated this 8th day of FEBRUARY 1993

Patrick L. Hanson, Florida Registered Surveyor's No. 4547  
Not valid without original signature and seal.

**Citrus  
County**

Department of  
Technical Services  
Division of  
Engineering

**ELEVATION SURVEY FOR CITRUS COUNTY**

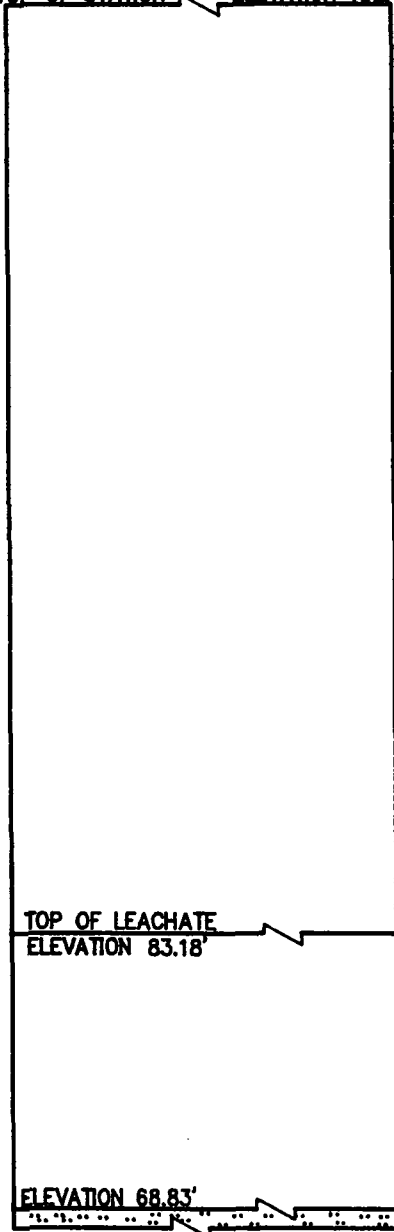
EAST LIFT STATION AND WEST LIFT STATION  
SEVEN ACRE TRENCH SIXTY ACRE LANDFILL  
SECTION 1, TOWNSHIP 19 SOUTH, RANGE 18 EAST

Drawn by: P.L.H.	Field Book: 8-B
Approved by: P.L.H.	Pages: 31
Field Date: 2-5-93	Proj. No. 89-615
Scale: 1"=10'	Sheet
Sec. 1 Twp. 19 S. Rng. 18 E	No. 1 OF 1

P.O. BOX 440 Lecanto, FL. 32661  
Phone: (904)746-2694

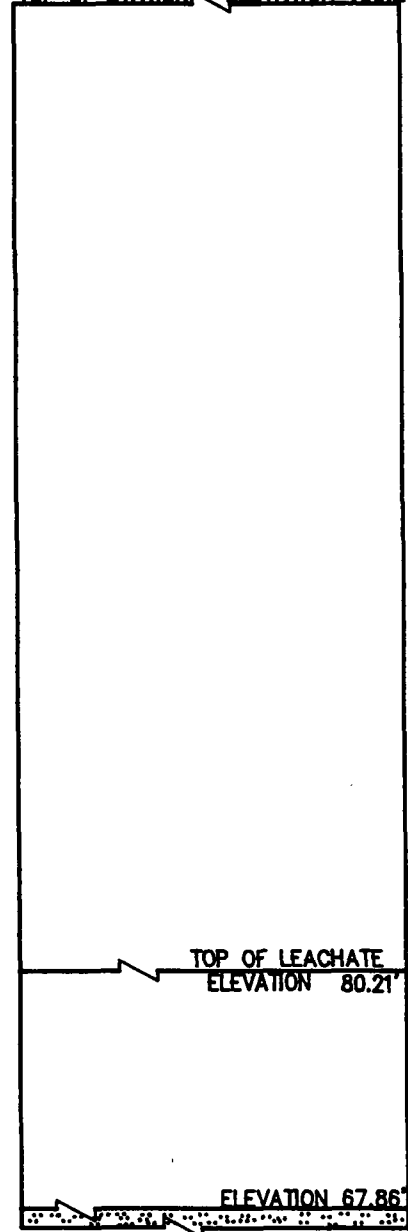
**EAST LIFT STATION**

TOP OF STATION ELEVATION 132.48'



**WEST LIFT STATION**

TOP OF STATION ELEVATION 133.21'



**REFERENCE BENCHMARK**

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**SURVEYOR'S CERTIFICATION**

I hereby certify to the best of my knowledge, information and belief and my professional opinion, that the herein described land survey and plot are true and correct and was prepared under my direction and supervision and conforms to the minimum technical standards set forth by the Florida Board of Professional Land Surveyors Chapter 441-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes

Dated this 12<sup>th</sup> day of FEBRUARY 1993

*Patrick L. Henson*  
 Patrick L. Henson Florida Registered Surveyor's No. 4547  
 Not valid without an original signature and seal.

**Citrus  
 County**

Department of  
 Technical Services  
 Division of  
 Engineering

**ELEVATION SURVEY FOR CITRUS COUNTY**

EAST LIFT STATION AND WEST LIFT STATION  
 SEVEN ACRE TRENCH SIXTY ACRE LANDFILL  
 SECTION 1, TOWNSHIP 19 SOUTH, RANGE 18 EAST

Drawn by: P.L.H.	Field Book: 8-B
Approved by: P.L.H.	Pages: 31
Field Date: 2-12-93	Proj. No. 89-615
Scale: 1"=10'	Sheet
Sec. 1 Twp. 19 S. Rng. 18 E	No. 1 OF 1

P.O. BOX 440 Lecanto, FL. 32661  
 Phone: (904)746-2694