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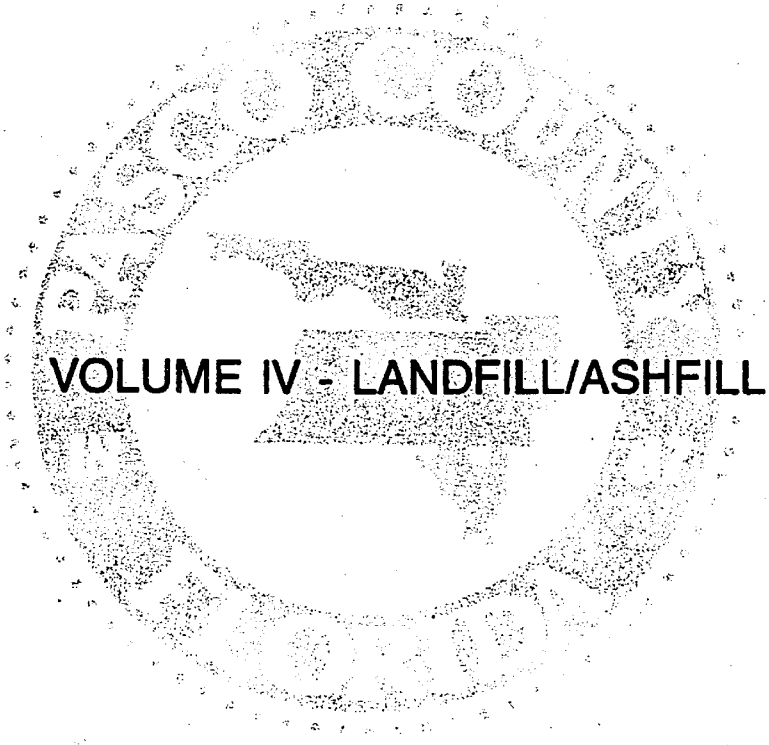
PASCO COUNTY, FLORIDA

SOLID WASTE RESOURCE RECOVERY FACILITY

APPLICATION FOR

POWER PLANT SITE CERTIFICATION



VOLUME IV - LANDFILL/ASHFILL

SUBMITTED BY
THE PASCO COUNTY
BOARD OF COUNTY COMMISSIONERS

NOVEMBER 1987

PREPARED BY
CAMP DRESSER & McKEE INC.

environmental engineers, scientists, planners & management consultants CDM

[redacted]

FDEP- Siting Coordination

Memo

To: Robert Butera

From: Erica Herring

CC: Kim Ford

Date: 12/28/00

Re: Pasco County RRF Site Certification Application Volume IV

Return Receipt Requested by Jan. 22, 2001

Please copy and return the enclosed site certification application to my office on or before Jan. 22, 2001. This is an original and the **only copy** that I have. My mailing address is: 2600 Blair Stone Road MS 48, Tallahassee, Florida 32399-2400.

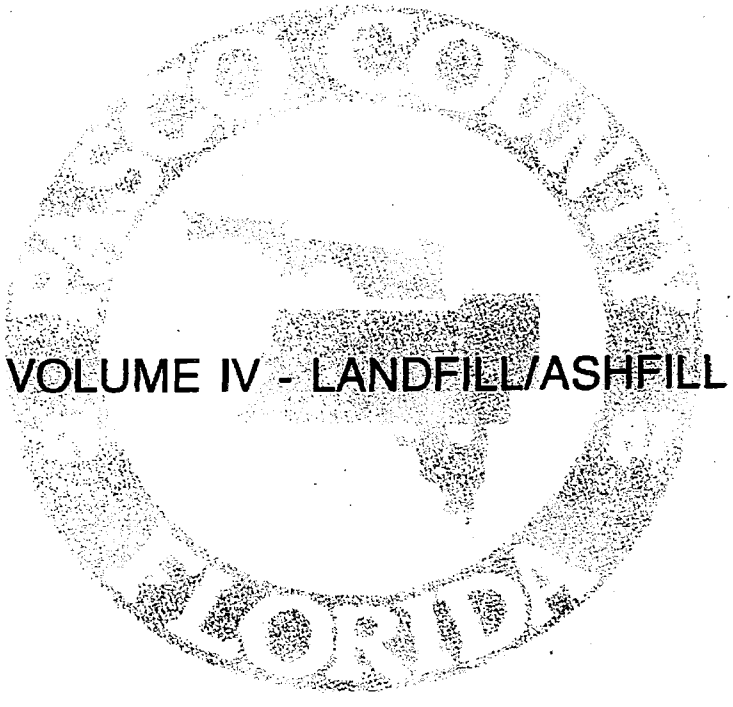
If you need additional information please feel free to contact Hamilton Oven at 850-487-0472.

PASCO COUNTY, FLORIDA

SOLID WASTE RESOURCE RECOVERY FACILITY

APPLICATION FOR

POWER PLANT SITE CERTIFICATION



VOLUME IV - LANDFILL/ASHFILL

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PASCO COUNTY, FLORIDA

SOLID WASTE RESOURCE RECOVERY FACILITY
APPLICATION FOR POWER PLANT SITE CERTIFICATION

VOLUME IV - LANDFILL/ASHFILL

PERMIT APPLICATION FORM

GENERAL

1. LETTER OF TRANSMITTAL
2. TABLE OF CONTENTS
3. PERMIT FEE
4. COPIES
5. ENGINEER SEAL
6. ENGINEER'S LETTER OF APPOINTMENT
7. OPERATOR/OWNER AGREEMENT
8. PROOF OF PUBLICATION OF NOTICE

SPECIFICATION ATTACHMENT ITEMS

1. FOUNDATION ANALYSIS
2. ZONING CONFORMANCE
3. FACILITY DESIGN
4. LANDFILL PERFORMANCE AND DESIGN STANDARDS
5. OPERATIONS PLAN
6. WATER QUALITY STANDARDS
7. CLOSURE
8. SOLID WASTE DISPOSAL FACILITY DATA FORM
9. SOLID WASTE VOLUME REDUCTION AND RESOURCE RECOVERY FACILITY DATA FORM (not applicable)
10. CERTIFICATION OF COMPLETION FORM (submitted following preparation of landfill to accept solid waste/ash)
11. PROHIBITIONS

TECHNICAL APPENDICES

Technical Appendix A	Engineer's Letter of Appointment
Technical Appendix B	Warranty Deed and Order of Taking
Technical Appendix C	Evidence of Local Zoning Conformance
Technical Appendix D	Pasco County Solid Waste Quantity Projections and Anticipated Landfill Volume
Technical Appendix E	Groundwater Monitoring Plan Supplement
Technical Appendix F	Liner Specifications
Technical Appendix G	Leachate Depth Calculations

ATTACHMENTS

Attachment 1	Permit Drawings
Attachment 2	Soils and Geotechnical Report

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
CONSTRUCTION/OPERATIONS PERMIT APPLICATION
FOR THE PASCO COUNTY
HAYS ROAD SANITARY LANDFILL/ASHFILL

Prepared for:

PASCO COUNTY BOARD OF COUNTY COMMISSIONERS
7530 Little Road
New Port Richey, Florida 33553

Prepared by:

CAMP DRESSER & McKEE INC.
One Tampa City Center, Suite 1750
Tampa, Florida 33602

SEPTEMBER 1987

between operator and property owner by which the closing and long-term care of the facility may be affected.

Response:
Long-term maintenance and closure will be performed by the current owner (Pasco County, Florida). No agreement for lease or transfer of property is necessary since the county intends to retain possession beyond the closure period. Proof of county ownership is evidenced by the Warranty Deed and Order of Taking found in Technical Appendix B.

8. **Proof of publication of notice of application for the proposed activity in a newspaper of general circulation.**

Response:
This permit will be included in the publication of Notice of Application for the Power Plant Site Certification Application.

III. SPECIFICATION ATTACHMENT ITEMS

Items will be presented as they appear in FDER Form 17-7.130(1).

SECTION 1 - FOUNDATION ANALYSIS

Response:
An analysis of the geological stratification of the Pasco County Hays Road Landfill/Ashfill was performed by Jammal & Associates. This foundation analysis can be found in Attachment 2, Section 5.4, page 38. As part of the hydrogeological investigation, 92 SPT borings, 4 deep and 4 shallow groundwater monitoring wells, and 57 piezometers were installed. Over 7.5 miles of ground surface was investigated using ground penetrating radar (GPR) and was also evaluated in the grid pattern indicated on sheet numbers 2 and 3 of the boring location plan in Attachment 2.

SECTION 2 - EVIDENCE THAT THE FACILITY IS IN CONFORMANCE WITH LOCAL ZONING

Response:
Technical Appendix C contains a letter from the Pasco County Zoning Director indicating that the proposed facility is exempt from local zoning.

SECTION 3 - FACILITY DESIGN

3A. Map or aerial photograph of the area not more than one year old showing land use and zoning within one mile of the facility.

Response:
Aerials of the site are provided on Sheets, 2, 3, 4, and 5 in Attachment 1, including topographic contours for the site and the area within one mile of the Hays Road Landfill site boundary. The aerial on Sheet 2 was flown in November 1986 and has a 1-inch equals 1,000-foot scale. The aerial on Sheets 3, 4, and 5 was flown in September 1986 and has a 1-inch equals 200-foot scale. Land use and zoning designations within one mile of the Hays Road Landfill are delineated on Sheet 2.

3B. Plot Plan.

3B(1) Dimensions and Legal Description of the Site.

Response:
The dimensions and legal description of the site are shown on Sheet 6 in Attachment 1. The legal description indicates the entire site acreage to be 810.26 acres, more or less. Approximately 59.23 acres have been designated for a Class III landfill. Approximately 751.03 acres are included in the power plant siting act submittal for the Class I landfill/ashfill and the resource recovery facility. The Class III landfill will be permitted separately at a later date.

3B(2) Location and Depth of Soil Borings.

Response:
The location and depth of the soil borings are presented on Sheet 7 of Attachment 1.

3B(3) Plan for Disposal Areas.

Response:
Sheet 9 of Attachment 1 shows the plan for disposal areas. The minimum elevation of the secondary liner is 48 feet msl. As can be seen on Sheet 7, the existing ground surface is located near 48 feet msl over most of the area to be landfilled.

3B(4) Fencing or Other Measures to Restrict Access.

Response:
Access will be controlled at all times. Vehicles entering the landfill will be required to stop at the scale house for weighing or approval before proceeding. Access or containment barriers will include a locking access gate at the Hays Road entrance to the landfill, and an eight-foot high chain link fence with two strands of barbed wire along the top completely enclosing the Class I landfill area as shown on Sheet 8 of Attachment 1.

3B(5) Cross Sections Showing Original and Proposed Fill Elevations.

Response:
Original and proposed final fill elevations are identified on the landfill cross sections shown on Sheet 15 of Attachment 1.

SECTION 4 - LANDFILL PERFORMANCE AND DESIGN STANDARDS

4A Liner Performance.

4A(1) Material Type (soil synthetic, other).

Response:
The design concept proposed employs a double liner/leachate collection system. The secondary liner/leachate collection system acts as a backup to the primary liner as well as providing a means of leak detection of the primary liner.

A geotechnical/hydrogeologic study over the site was performed relating to implementation of a Class I sanitary landfill/ashfill. Because of the site's topographic, geologic, and hydrogeologic conditions, the study addressed in detail the potential for sinkhole activity over the project sites.

Both the primary and the secondary liner will be a 60 mil thick high density polyethylene material or equivalent that meets the minimum requirements of the National Sanitation Foundation Standard Number 54, Flexible Membrane Liners (November 1983). High density polyethylene (HDPE) was selected as the liner material for several reasons. HDPE contains no additives or fillers which can leach out and cause deterioration over time. Most importantly, HDPE is resistant to a wide range of chemicals including acids, bases, salts, alcohols, amines, oils, heavy metals and hydrocarbons.

4A(2) Adequate Base Support.

Response:
A clay layer 5 to 10 feet below the ground surface and 5 to 15 feet thick was identified by Jammal & Associates over about 250 acres of the 810-acre site (See Sheets 2 and 3 in Attachment 2). The proposed landfill was configured to stay

within this area of a subsurface clay layer. The clay layer adds support and mitigates the degree of differential settlement. Section 5.4 of Attachment 2 discusses this and other advantages of limiting the landfill to the area found to contain this subsurface clay layer.

Landfill settlement considerations are discussed in Section 5.4 of the Jammal & Associates report (1987, Attachment 2). Consolidation test results are recorded on Plates 9-16 and settlement estimates are shown on Sheet 1 in Appendix B of the report. Total settlement of the landfill under the maximum landfill height of 100 feet is anticipated to be 13 to 15 inches. Under the height of 75 feet, distortion plus consolidation is estimated to be 11 to 13 inches. Total settlement at the toe of the slope is estimated at 2 to 3 inches. The critical area for differential settlement is between the toe and the high point of the 1V:4H slope (330 feet). The maximum differential settlements over this distance should be 10 to 12 inches. Given a tolerance of 10 percent material elongation, the liner can withstand a 12-inch deflection if the radius is equal to or greater than 2.2 feet. The 330-foot radius between the toe and the high point of the slope is much greater than 2.2 feet, thus the liner settlement design is very conservative.

As part of the Jammal & Associates report (Attachment 2), the future sinkhole potential over the landfill/ashfill area was investigated. Study of the existing site conditions and the various factors associated with sinkhole formation showed the potential for sinkhole formation over the landfill area to be slight. See Section 5.9 of Attachment 2 for further details.

4A(3) Planned Installation Adequate to Cover All Surrounding Earth.

Response:

Sheet 8 of Attachment 1 illustrates the extent of the synthetic liner placement. As shown on Sheet 9, the installation of this

liner will be in phases. All seams will be hot welded with parent materials to prevent the introduction of foreign adhesives. Corners will be constructed with separate side pieces, rather than wrapped around. Disposal waste will be contained in each cell by surrounding berms. The liner in each cell will completely cover the base of the cell and the inside slope of the berm. The liner will be anchored at the top of the berms. See Sheet 16 of Attachment 1 for a liner anchor detail. Any penetration of the liner by the leachate collection system will be wrapped, with protective liner boots constructed of the liner material. Boots will be seamed to the liner to assure a contiguous surface.

4A(4) Equivalency to Design Standards.

Response:
The synthetic liner material will meet the specifications for permability and strength as required in FDER 17-7.050(4)(a). The proposed liner material (HDPE) is highly chemically resistant to leachate degradation. Performance in a leachate environment will be tested using the EPA 9090 materials test for chemical degradation. Additional materials test data will be provided by the manufacturer including tensile strength, burst strength, impact puncture strength, friction pullout and permeability.

4B Liner Quality Control Plan.

4B(1) Specifications.

Response:
Liner specifications are provided in Technical Appendix F including a Liner Quality Control Plan.

TECHNICAL APPENDIX E

GROUNDWATER MONITORING PLAN SUPPLEMENT

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
BRANCH OFFICE

WIN TOWERS OFFICE BUILDING
500 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION FOR MONITORING PLAN APPROVAL
(Existing Sources)

INSTRUCTIONS: Submit four copies of this application and four copies of supporting information such as laboratory reports, maps and other documents to the appropriate District Office.

PART I - General Information

In compliance with Florida Administrative Code Rule 17-4.245(6)(c)2., the undersigned installation owner applies for approval from the Department for the monitoring criteria on the following property owned by:

Pasco County
Corporation or Owner's Name

Permit No.

Hays Road Landfill Monitoring Wells
Installation Name

SIC Code

Nearest City: Port Richey
Street Address City Zip County

82°33'30"N 28°22'05"W
Latitude Longitude

___1/4 ___1/4 ___1/4 of 24,25,26 T24S R17E
Section, Township, Range

OWNER OR AUTHORIZED REPRESENTATIVE (If representative, attach letter of authorization.)

Pasco County
Name and Official Title (Print or Type)

7530 Little Road, New Port Richey, Florida 33553 (813) 847-6132
Street City State Zip Telephone Number

Signature: George W. Ellsworth Date: _____

PART II - Content of Monitoring Plan

Pursuant to Rule 17-4.245(6)(d), the plan shall contain findings, recommendations and plans for ground water monitoring derived from site specific information. For the type of information to be considered in the development and assessment of the plan, see page two of this form. In any case, the following items must be included:

1. Location(s) of proposed well(s) to sample natural unaffected background water quality and the intermediate and compliance well(s) in the down gradient direction.

2. Construction details of the monitor well(s), including type of casing material, diameter of casing, depth of casing and location of screens.

3. A water sampling and chemical analysis procedure which can determine the natural unaffected background quality of the ground water, and the quality of the receiving ground water in the downgradient intermediate and compliance wells.

The following information is the type generally required for detailed assessment of the most complex plans, with less complex cases not needing this degree of evaluation:

1. Hydrogeological, physical and chemical data for the site, including:

   a. Direction and rate of ground water flow, and background ground water quality;

   b. Porosity, horizontal and vertical permeability for the aquifer(s) and the depth to, and lithology of, the first confining bed(s);

   c. Vertical permeability, thickness, and extent of any confining beds;

   d. Topography, soil information and surface water drainage systems surrounding the site;

2. Waste disposal rate and frequency, chemical composition, method of discharge, pond volume, spray-field dimension, or other applicable site specific information;

3. Toxicity of waste;

4. Present and anticipated wastewater volume, seepage rate to the receiving ground water, physical, chemical, microbiological (whichever is applicable) characteristics of the leachate;

5. Disposal system water balance;

6. Present and reasonably expected future pollution sources located within one mile radius of the site;

7. Inventory depth, construction details, and cones of depression of water supply wells and monitor wells located within one mile radius of the site or potentially affected by the discharge;

8. Site specific economic and feasibility considerations;

9. Chronological information on water levels in the monitor wells and water quality data on water supplies collected from the water supply and monitor wells;

10. Type and number of waste disposal facilities within the installation;

11. Chronological information on surface water flows and water quality upstream and downstream from the site;

12. Construction and operation details of disposal facilities;

13. History of construction and land development in the vicinity of the site.

A monitoring program instituted under some other state, federal, or local government regulation or permit may be substituted (or referenced if contained in an existing department permit) if such program is in substantial compliance with Part II.

APPLICATION FOR MONITORING PLAN APPROVAL (SUPPLEMENT)

FOR THE

HAYS ROAD LANDFILL
PASCO COUNTY, FLORIDA

CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

The existing landfill serving the western part of Pasco County is near capacity. Favorable portions of the Hays Road Site are being developed into a Class I sanitary/ash landfill to serve the future needs of Western Pasco County. A resource recovery plant is being constructed in the southern portion of the site. It is anticipated that both raw refuse and ash from the resource recovery plant will be disposed at the lined landfill. The landfill height is anticipated to be about 75 feet.

1.2 PURPOSE AND SCOPE

This report is in support of an Application for Monitoring Plan Approval [DER Form 17-1.216(1)] for the Hays Road Class I Landfill site. Chapter 2.424(b), Florida Administrative Code (FAC), requires groundwater monitoring for facilities which discharge to the groundwater. The information requested is presented in a configuration and numbering system similar to page 2 of the form. The majority of information is contained in Attachment 2, Geotechnical and Hydrogeologic Investigation Proposed Landfill Site - Hays Road, Pasco County, Florida (Jammal & Associates, April 1987) and the answers are referenced therein.

2.0 HYDROGEOLOGY

2.1 HYDROGEOLOGIC FRAMEWORK

The principal formations in Pasco County are a series of limestones and dolostones mantled by relatively thin sand and clay deposits. The surficial sands and clays are undifferentiated with the lower portion of the deposits generally assigned to the Hawthorn Formation. The Hawthorn Formation, which is generally composed of clays, sand and dolosilt, is relatively thin in the eastern part of the county and may be absent in some areas, particularly in the northern part of Pasco County.

The uppermost limestone in northwest Pasco County is the Tampa Limestone, or in areas where not present, the Suwannee Limestone. Most domestic and many irrigation wells produce from the lower Suwannee Limestone. The Ocala Group and the Avon Park Formation are composed of limestone and dolostone with dolostone becoming more prevailing with depth. Most large production wells produce from the lower Ocala Group and/or the dolostone of the Avon Park Formation.

In general, the soil materials at the Hays Road site consist of a varying thickness of sand (less than 10% fines) overlying clayey materials also of varying thickness and consistency, which in turn overlie either significantly weathered limestone with clay or more intact weathered limestone. The preferred area for the landfill shows at least 5 feet of intact and nearly continuous clayey semi-confining unit material separating the surficial aquifer from the limestone of the Floridan aquifer. Detailed site specific information is contained in Chapters 4 and 5 of the Jammal report (April, 1987), Attachment 2.

2.2 AQUIFER SYSTEMS

Two distinct water-bearing geologic units, or aquifer systems, capable of supplying economical quantities of water to wells, occur in the western portion of Pasco County. The uppermost of the two is the surficial aquifer

system, comprised of the permeable portions of the unconsolidated deposits overlying the limestones. The limestone formations form the deeper Floridan aquifer, an artesian and sometimes unconfined aquifer system which underlies most of central Florida.

The surficial aquifer system is apparently relatively thin in western Pasco County and may be absent or discontinuous in some areas. The transmissivity, or ability to transmit water, of the water table aquifer is dependent upon the permeability of the aquifer deposits and the saturated thickness. In areas where the surficial sand deposits are thin, the transmissivity of the unit typically is comparatively less than in areas where the deposits are thicker. The surficial aquifer system in western Pasco County is seldom used for a water supply source primarily because the deeper Floridan aquifer supplies greater quantities of higher quality water to wells.

The surficial or water table aquifer system is recharged primarily by precipitation and subsequent infiltration to the saturated zone. Water is discharged from the aquifer by evapotranspiration, seepage to lakes and streams and by vertical leakance to underlying aquifers.

The top of the Floridan aquifer system in Pasco County is represented by either the Miocene Tampa Limestone or where absent, the Oligocene Suwannee Limestone. The top of the Floridan aquifer occurs at an altitude of near mean sea level (msl) in northwest Pasco County. The aquifer becomes progressively more deeply buried beneath the surficial clastic deposits southward.

The Suwannee Limestone is a very permeable, productive zone of the Floridan aquifer. Most domestic and many irrigation wells produce from the lower part of the Suwannee Limestone. The Ocala Group is highly permeable over much of the area and yields large quantities of water to wells. The underlying Avon Park Formation contains a fractured, cavernous zone near the top which yields large quantities of water to wells.

Groundwater flow in the Floridan aquifer system in Pasco County moves generally westward toward the Gulf of Mexico from the "Pasco High" centered in the eastern part of the county. The "Pasco High" represents an area of highest altitude in the vicinity of the potentiometric surface of the Floridan aquifer.

Based on available publications, the transmissivity of the Floridan aquifer in this area of Pasco County is highly variable; varying from about 40,000 to 130,000 $ft.^2/day$. The natural leakance rate through the semi-confining clayey unit in this area of Pasco County varies from about 5×10^{-3} to $5 \times 10^{-4}/day^{-1}$.

3.0 DISPOSAL SYSTEM ASSESSMENT

The following information is presented in the same numerical order as the items contained on page 2 of the Application for Monitoring Plan Approval.

1. Hydrogeological, physical and chemical data for the site.

   a. The altitude of the surficial aquifer is shown at the end of the wet season for September 6, 1986, and for the dryer period of November 13, 1986 in Figures 2-20 and 2-21, respectively (Volume I). The direction of groundwater flow is from the higher water table elevations toward lower water table elevations. Groundwater conditions in the surficial aquifer are discussed in Section 4.2 of the Jammal & Associates report (April, 1987), Attachment 2. It appears that the water table is from 5 to 18 feet below land surface in the favorable landfill area with the water table being 10 to 12 feet below present surface over the majority of the above area.

   The lowest measured points on the water table surface occurred along the north and northeast margin of the site. Water table elevations of less than +30 feet above msl were measured in wells in these areas. Geologic data, discussed above, suggests that the clay deposits covering the limestone may be missing in areas along the northern site boundary.

   Water levels in wells at the site indicate that the water table surface above the Hawthorn clay deposits ranged in altitude from about +30 to +40 feet above msl. Based on the potentiometric surface maps of the underlying Floridan aquifer prepared by SWFWMD (Plate 2, Appendix A, Jammal & Associates, April 1987, Attachment 2), the difference in head between the Floridan and overlying water table aquifer is relatively small, approximately 5 feet on an average.

No tests of the surficial aquifer at the site were performed. The upper fine sands are expected to have a permeability of about 10 to 20 feet/day.

The average linear velocity (seepage velocity) for the Floridan aquifer was calculated using the following formula (Freeze and Cherry, 1979; Fetter, 1980).

$$\bar{v} = \frac{-Kdh}{ndl} \qquad K = \frac{T}{b}$$

where:

$\bar{v}$ = average linear velocity (ft/day)
K = hydraulic conductivity (ft/day)
$\frac{dh}{dl}$ = hydraulic gradient (ft/day)
n = effective porosity
T = transmissivity (ft^2/day)
b = thickness of aquifer (ft)

The steepest hydraulic gradient perpendicular to the September 6, 1986 groundwater contours was about 1 foot decline in 50 feet. Assuming an effective porosity of N = 0.20, the average linear velocity is:

$$\bar{v} = \frac{20}{0.20} \frac{1}{50} = 2 \text{ feet/day}$$

The hydraulic gradient of the Floridan aquifer determined from the potentiometric surface (water level) in the monitor wells at the site was 1 foot in 826 feet from readings taken on November 13, 1986 (Jammal & Associates, April 1987, Table 4, Attachment 2). This compares favorably with the gradient interpreted from USGS potentiometric surface maps for the area. The direction of groundwater flow in the upper Floridan aquifer at the site is to the northwest.

The nearest pump test sites were 5 miles to the east at the Cross Bar Ranch Well Field where transmissivity values ranged from 50,000 to 115,000 ft^2/day (Hutchinson, 1985, Figure 5). Jammal & Associates (April 1987, Attachment 2) state that the transmissivity in this area is highly variable, varying from about 40,000 to 130,000 ft^2/day. A transmissivity of 150,000 ft^2/day is used in calculations for the Hays Road site for a worst case velocity determination.

No values for the effective porosity of the upper Floridan aquifer in the vicinity of the site could be found. An effective porosity of 0.05 for the Floridan aquifer is used in the G-1 Rule as adopted by the Florida Department of Environmental Regulation. The thickness of the upper Floridan aquifer in the vicinity of the site is estimated to be about 800 feet (Ryder, 1985, Figure 10). Therefore:

$$K = \frac{T}{b} = \frac{150{,}000}{800} = 187.5 \text{ ft/day}$$

and:

$$v = \frac{-Kdh}{ndl} = \frac{187.5}{.05} \times \frac{1}{826} = 4.54 \text{ ft/day}$$

Water quality analyses have been performed for the onsite monitor wells. The results of the analyses (Appendix A) show no violation of primary and secondary drinking water standards (Chapter 17-22.104, FAC). The surficial aquifer water may be slightly acidic, high in dissolved iron, and have a high color.