

SUMMARY OF TESTIMONY TO BE PRESENTED  
ON GARDINIER'S PROPOSED NEW  
GYPSUM DISPOSAL SITE AND ITS EFFECTS  
ON FLUORIDE EMISSIONS

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Gardinier is proposing to construct and operate a new gypsum field on the east side of SR 41, northeast of the existing gypsum field. The existing gypsum field will be inactivated when the new field begins operation (Ref. 1).

Concern has been expressed about fluoride emissions from various parts of the Gardinier operations, the effect of closing the present phosphogypsum stack and start of another gypsum stack across Route 41 on ambient fluoride concentrations and especially its effect on the citizens of Progress Village and the students of Progress Village Elementary School. In addition, questions have been raised about particulate matter arising from the Gardinier operation and the effect of both gaseous fluoride and particulate fluoride on vegetation and animals.

Rock phosphate, as dug from the ground consists of a complex compound of calcium, fluoride and phosphate mixed with other materials such as silica. To make it more available as a fertilizer, it is treated with sulfuric acid. This produces phosphoric acid plus gypsum (calcium sulfate) and other compounds including silicon tetrafluoride, hydrogen fluoride, fluosilicic acid, calcium fluoride and other compounds. Hydrogen fluoride is volatile, and it is the principal compound which is emitted from various fertilizer manufacturing processes. Most of the HF is removed by scrubbers, but small amounts escape, and small amounts are emitted from the water used in the scrubbing operation, as well as from the slurry which is pumped to the pond on top of the gypsum stack. Much of the fluoride is precipitated in the gypsum pond as calcium fluoride.

Fluoride emissions from the gypsum field, and associated plant cooling ponds, cannot be accurately estimated based upon current knowledge.

However, fluoride emissions are believed to be primarily hydrogen fluoride (HF) and a function of the concentration of fluorides in the water as well as the temperature of the water.

Gaseous fluoride that is emitted from the gypsum pond escapes to the air. HF is lighter than air, and it diffuses very rapidly. This diffusion causes the concentration of fluoride to diminish rapidly as air moves away from the pond.

In view of the difficulty of estimating accurately the emissions of fluoride, a few recent measurements of ambient fluoride have been made. One set of measurements was made by the Hillsborough County Environmental Protection Commission (Ref. 2). They used fluoride plates (called passive fluoride monitors), which consist of a cellulose pad soaked in a solution of calcium oxide. These were exposed for one month, taken to the HCEPC laboratory and analyzed for fluoride. The results obtained at a station near the Gardiner plant for 13 months from January 1983 through January 1984 (with 2 months of missing data) are shown in Table 1. Fluoride ranged from 121 to 475 nanograms of fluoride per square centimeter per day (a nanogram is one billionth of a gram). This resulted in an average of 344 nanograms per square centimeter per day. Using a conversion chart developed by HCEPC, this is equivalent to approximately 3.2 parts per billion of fluoride in air. This method of measurement of fluoride gives data for 1 month, needs further correlation with other methods of analysis to calibrate it, and is primarily useful as a tool for field surveys.

It should be noted that people get fluoride from other sources besides through the air. For example, people receive fluoride daily in their food and water. The National Academy of Sciences report (Ref. 8) on fluorides estimates that people ingest approximately 1,200 micrograms of

Table 1 (Ref. 2). 1983-1984 Plate Results

Station/O	ng F/cm <sup>2</sup> /day
12/15 to 1/13	355
01/13 to 2/15	---
02/15 to 3/14	---
03/14 to 4/14	370
04/14 to 5/12	475
05/12 to 6/16	419
06/16 to 7/18	313
07/18 to 8/15	367
08/15 to 9/15	371
09/15 to 10/17	354
10/17 to 11/15	121
11/15 to 12/15	299
12/15 to 01/15/84	341
Average	344

Station 10 is located at Gardinier Park.

fluoride per day--if a person breathes 3.2 parts per billion in ambient air (equal to about 2.5 micrograms per cubic meter), he or she would receive about 47 micrograms of fluoride, or about 1/25th of that received from other sources.

Many municipalities use fluoride in the water supply to reduce dental cavities. A concentration of about 1 ppm is used. It has been shown to be helpful in this usage. Also fluoride is used in toothpaste and also sometimes used by dentists on children's teeth. Both of these uses have been shown to be helpful in reducing cavities. In my opinion, fluoride is an essential trace element for people.

No ambient air standard for fluoride has been established by EPA or DER. At the same time OSHA (Occupational Safety and Health Administration) has established a standard of 3 ppm for industrial workers. This is approximately 1000 times the concentration reported by HCEPC.

Historical meteorological data from Tampa International Airport show that winds predominate from the east. Winds from the southwest, or from the proposed gypsum disposal field location toward the Progress Village area, occur only about 10 percent of the time. Thus, the prevalent meteorology of the area will serve to minimize any impacts due to the closer proximity of the new field to this area. A wind rose for a five year (1971-75) Annual Average wind at Tampa International Airport appears as Figure 1.

The EPA has not set health-related ambient air standards or emission limitations for existing fertilizer operations. The reason for this is expressed by the EPA Administrator who "has concluded that fluoride emissions from phosphate fertilizer facilities do not contribute to the endangerment of public health" (Ref.3).

In addition, EPA in its environmental assessment on the entire Gardinier project (which included 5 major modifications and improvements of the

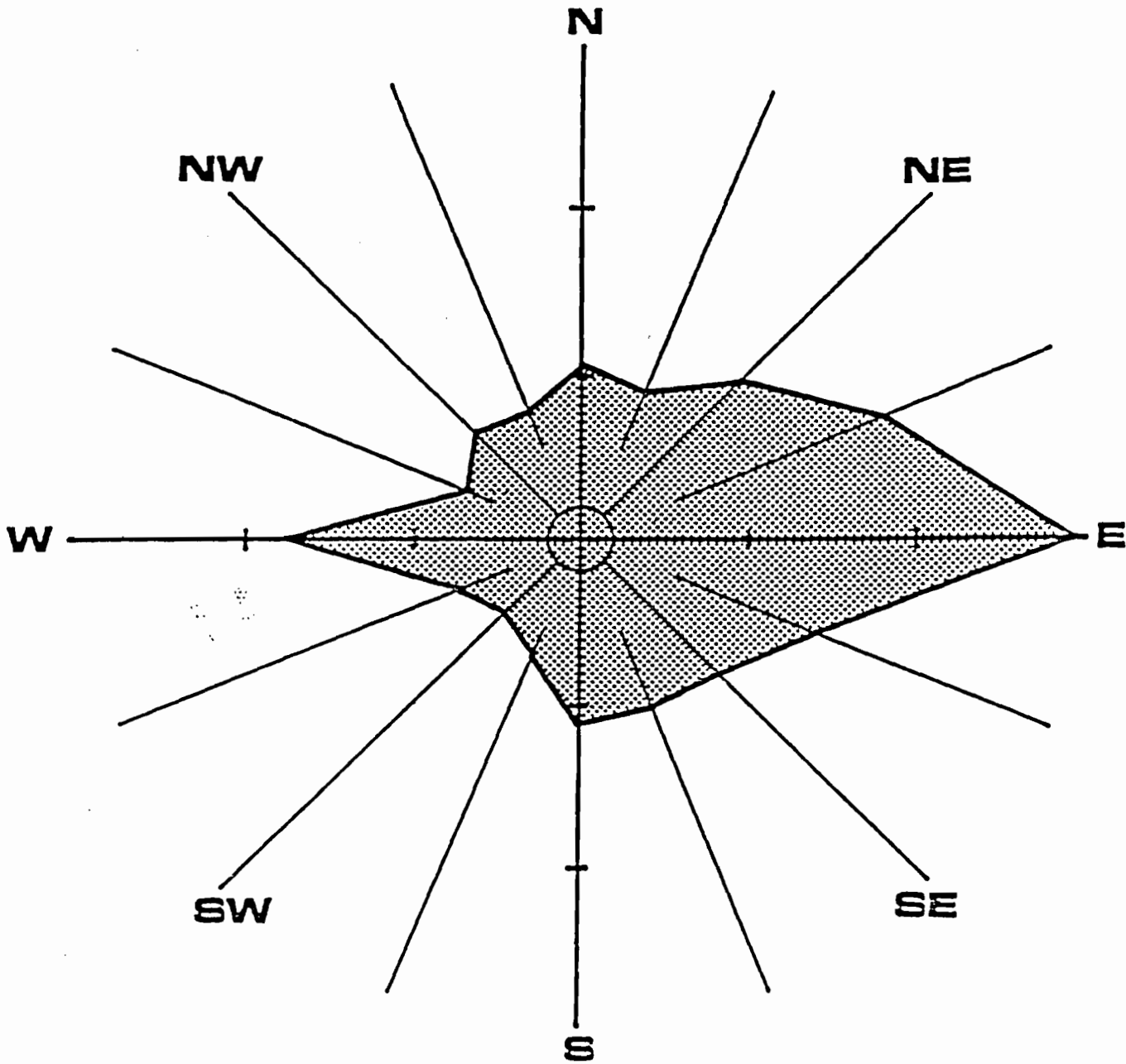


Figure 1. FIVE-YEAR AVERAGED WIND ROSE FOR TAMPA, FLORIDA, 1971-1975  
 SCALE: 1" = 5%, CALM = 4.4%. AVERAGE SPEEDS GIVEN IN KNOTS.

phosphate plant, as well as changing the location of phosphogypsum stack) the following statement is made: "The proposed modifications and replacement of the chemical plant facilities will improve air emissions, resulting in enhancement of air quality for the long term." (Ref. 4).

Turning now to the effect on fluorides on people, vegetation and animals, some fluoride concentrations have adverse effects.

At concentrations of HF varying between 2.5 ppm and 4.7 ppm, people experienced very slight irritation of the eyes and nose and slight cutaneous erythema when they inhaled HF for 6 hours per day, 5 days per week for 15 days.

People who inhaled HF at a concentration of 31 ppm for several minutes experienced mild eye and nose irritation. People who inhaled an HF concentration of 120 ppm experienced irritation of exposed skin, eye and respiratory irritation in less than one minute. Table 2 summarizes these data (Ref. 5).

Effects of fluoride on vegetation are complex. This is because plants' responses are influenced by many factors (species of plant and stage of growth; meteorological factors; cultural factors such as soil and water effects; and length of time and concentration of fluoride exposure). A generalized diagram by Weinstein shows how these factors affect plants and another diagram shows specific crops. It is seen that gladioli are one of the most sensitive plants--leaf injury occurs at 1 ppb fluoride and 10 days exposure. Tomatoes, on the other hand, are less sensitive and show significant effects at about 10 ppb and 10 days exposure. These data are summarized in Figure 2 (Ref. 6) and Table 3.

Animals are affected by some fluoride concentrations. Animals normally ingest small amounts of fluoride in their rations with no harmful effects, but excessive ingestion can be damaging. Cattle have been the species most often affected by fluoride pollution, so I will discuss fluoride toxicity on cattle.

Table 2. Hydrogen Fluoride Exposure-Effect Data; Human Studies (Ref. 5)

Exposure Concentration	Number Exposed	Route of Administration	Effects
2.7 to 4.7 ppm	5	Inhalation of HF 6 hrs/day, 5 days/ week for 15 days	Very slight irritation of eyes and nose, slight reddening of skin
31 ppm	2	Inhalation of HF for several minutes	Mild eye and nose irritation
60 ppm	2	Inhalation of HF for unspecified time	Marked eye and respiratory irritation
120 ppm	2	Inhalation of HF for less than 1 minute	Smarting of exposed skin, marked eye and respiratory irritation

Table 3. Hydrogen Fluoride Exposure-Effect Data; Vegetation (Ref. 6)

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Species	Exposure Concentration	Duration	Effects
Gladiolus	1 ppb	10 days	Significant necrosis of leaf tips
Tomatoes	10 ppb	10 days	Significant necrosis of leaf tips

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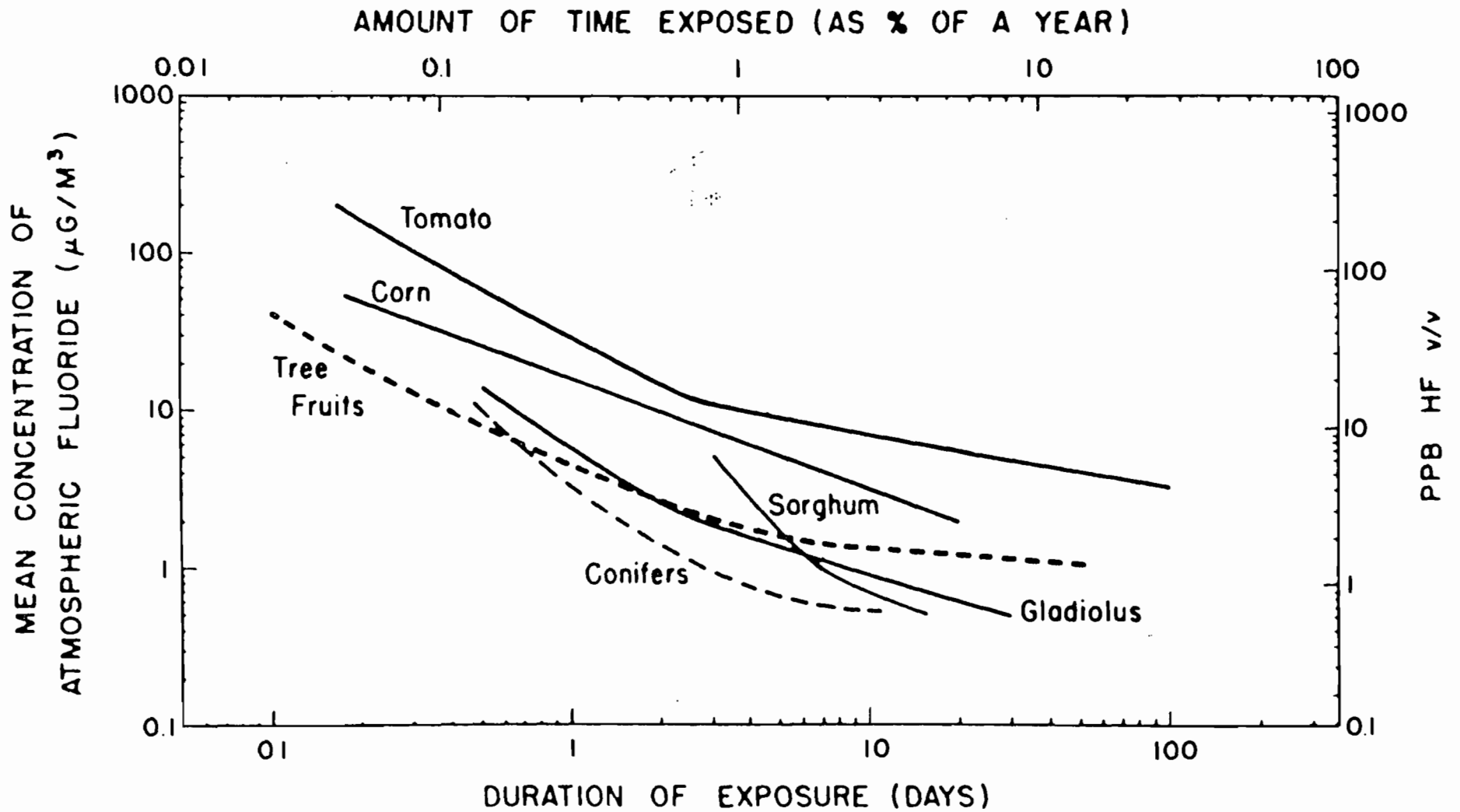


Figure 2. DOSE-RELATIONSHIPS FOR FOLIAR INJURY TO DIFFERENT PLANT SPECIES (REFERENCE 6)

Cattle get fluoride from hay, feed supplements, from the water supply, and from fresh forage which may be contaminated with fluoride fallout. The fluoride content of forage crops in areas subject to atmospheric fluoride pollution is extremely variable. The fluoride content of forage in such a location may vary by as much as tenfold from season to season. In general, the fluoride content is less during the early part of the growing season, when forage is growing rapidly.

There are three general categories of effects on cattle which can be defined: (1) economic effects; (2) severe dental fluorosis; and (3) nondamaging evidence of fluoride ingestion (Ref. 7, 8).

Economic effects: In controlled experiments after 3 to 4 years of exposure at a level of about 50 ppm of fluoride in forage, the lactation of some animals in an experimental group was affected. Lameness is often seen at this concentration.

Severe dental fluorosis: Fluoride concentration of 40-45 ppm in forage will produce substantial fluorosis in the teeth of cattle.

Nondamaging evidence of fluoride ingestion: A trained observer can detect changes in dentition and there will be chemical evidence of an increase in the fluoride content of skeleton, urine and soft tissues at ingestion levels much below that required to produce substantial tooth fluorosis in cattle (Ref. 7, 8).

For these reasons, 40 ppm is often used as a guideline for fluorosis in forage.

Hillsborough County EPC has reported some data on analyses of forage near the Gardinier plant. Sanderson reported results of analyses of pasture grass near Gardinier park for quarterly averages as 34 ppm, 53 ppm and 63 ppm for an annual average of 46 ppm. Other stations in a ten station network had annual averages varying from 13 to 50 ppm (Ref. 2).

With regard to the dust problem, there are three factors to be considered. First, dust is generated by vehicles traveling along Route 41, and by wind blown soil and dust from the field around the site. Second, during construction, some fugitive dust will be generated by land clearing and movement of equipment. This will be short-term and intermittent. Third, with regard to the new gypsum stack, the uppermost, exposed section may become an intermittent source of dust from blowing wind. This new field will not be as large as the present field, since Gardinier will plant grass on the slopes of the new field as it is being developed.

Dames & Moore (an environmental consultant) (Ref. 9) made some calculations of the deposition and concentration of particulate matter at various points near the site of the proposed new gypsum stack. The following excerpt is taken from their report:

Gypsum arrives at the disposal field as a wet slurry, and hence the initial process of adding to the field does not result in fugitive gypsum dust emissions. Only after drying begins, is there a potential for fugitive dust generation. Although portions of the exposed outer slope of the gypsum field may occasionally be disturbed by movement of various types of mechanical equipment, wind erosion is the basic force which might cause fugitive emissions over a large area of the disposal field, on a frequent enough basis to affect long-term averages. Therefore, wind erosion was the only potential fugitive dust producer considered in the modeling analysis.

The new Gardinier gypsum disposal field will occupy a horizontal area of about 387 acres and will ultimately reach a height of 200 feet. Based on a surface slope of 3 horizontal to 1 vertical, the outer surface of the field will eventually reach an area of about 200 acres. To estimate fugitive gypsum emission rates due to wind erosion, however, the area of exposed gypsum should be used. As a result of the vegetation program planned for the project, only about 5 to 10 feet (vertical dimension) of gypsum should be exposed at any given time. A

strip 10 feet high around the entire outer surface of the pile will expose an area of about 12 acres initially, diminishing to an area of about 9 acres, as the field tapers to its ultimate height. An average value of 10 acres was used to estimate suspended particle emission rates. Emission rate estimates and other source characteristics used in the modeling analysis are listed in Table 4.

Deposition and concentration calculations were made at selected points near the site of the proposed gypsum disposal field, as shown in Figure 3. These points represent nearest off-site structures. Location Number 14 is Progress Village Elementary School.

Modeling results are shown in Table 5 on an annual average basis. For comparison, the Florida annual average ambient standard for particulate matter concentration is  $60 \text{ ug/m}^3$ . The values predicted by the modeling analysis therefore represent a negligible addition to existing concentrations.

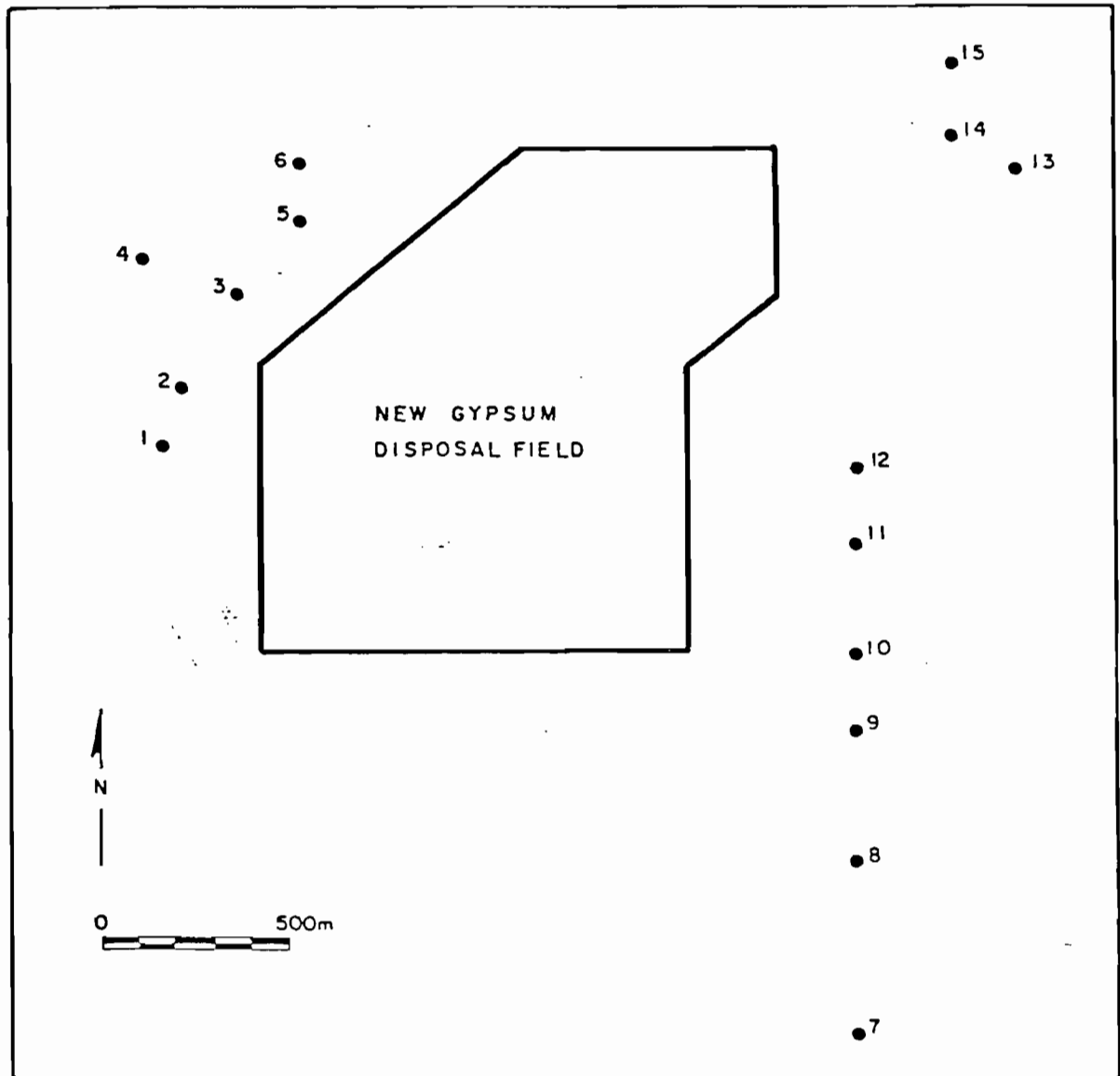


Figure 3. Location of Receptor Points Used For Modeling Purposes.

TABLE 4

EMISSION SOURCE CHARACTERISTICS USED FOR MODELING PURPOSES

1. General Characteristics

Emission rate range -	1 to 2 ton/acre-year
Total area of exposed gypsum -	10 acres
Number of square areas used to represent total exposed gypsum area -	20
Emission rate range per individual area sq.-	0.05 to 0.1 ton/year
Average emission height -	20 m

2. Particle Characteristics

	<u>Particle Diameter Size Range (µm)</u>		
	<u>Less than 10</u>	<u>10-20</u>	<u>20-30</u>
Mass Mean Diameter (µm)	6.30	15.54	25.33
Mass Fraction	0.13	0.29	0.58
Particle Density (g/cm <sup>3</sup> )	2.35	2.35	2.35
Settling Velocity (m/s)	0.0028	0.017	0.045
Reflection Coefficient	0.88	0.70	0.60
(0 = Total retention, 1 = Total reflection)			

TABLE 5

MODELING RESULTS

RECEPTOR POINT	ANNUAL AVERAGE GYPSUM DUST CONCENTRATION RANGE ATTRIBUTABLE TO PROPOSED GYPSUM DISPOSAL FIELD ( $\mu\text{g}/\text{m}^3$ )	ANNUAL GYPSUM DUST DEPOSITION RANGE ATTRIBUTABLE TO PROPOSED GYPSUM DISPOSAL FIELD <sup>a</sup> ( $\text{g}/\text{m}^2\text{-year}$ )
1	0.005 - 0.01	0.004 - 0.008
2	0.005 - 0.01	0.004 - 0.008
3	0.005 - 0.01	0.004 - 0.008
4	0.003 - 0.006	0.002 - 0.004
5	0.005 - 0.01	0.005 - 0.01
6	0.005 - 0.009	0.003 - 0.006
7	0.002 - 0.003	0.0005 - 0.001
8	0.003 - 0.005	0.002 - 0.003
9	0.004 - 0.007	0.002 - 0.004
10	0.004 - 0.008	0.003 - 0.006
11	0.005 - 0.009	0.004 - 0.007
12	0.005 - 0.01	0.004 - 0.007
13	0.002 - 0.004	0.002 - 0.003
14	<del>0.003 - 0.005</del>	<del>0.002 - 0.003</del>
15	0.002 - 0.004	0.001 - 0.002

<sup>a</sup> Because of modeling uncertainties, results are rounded to one significant digit only. Note: The Florida annual average ambient<sub>3</sub> standard for particulate matter concentration is  $60\mu\text{g}/\text{m}^3$ .

## BIBLIOGRAPHY

- (1) Good Questions, Good Neighbors: A Guide to Gardinier's Gypsum Project. Cabrina, Gordon, Morrison. Gardinier, Inc. (1983) 28 pp.
- (2) Ambient Fluoride Monitoring in Hillsborough County. Debra Sanderson, Hillsborough County Env. Protection Commission (Sept. 1983). Florida Air Pollution Control Assoc.
- (3) Final Guideline Document: Control of Fluoride Emissions from Existing Phosphate Fertilizer Plants, EPA-450/2-77-005, March 1977, p. 2-10.
- (4) Environmental Assessment, attachment to joint public notice, US EPA, Region 4, October 30, 1980, p. 11 of attachment.
- (5) Criteria for a Recommended Standard; Occupational Exposure to Hydrogen Fluoride. U.S. Dept. of HEW, NIOSH (March 1976). 181 pp.
- (6) Fluoride and Plant Life. L.H. Weinstein. Jour. Occ. Med. 19, #1. pp. 49-78 (Jan. 1977).
- (7) Effects of Fluoride on Livestock. J.W. Suttie. Journ. Occ. Med. 19, #1. pp. 40-48 (Jan. 1977).
- (8) Biologic Effects of Atmospheric Pollutants. Fluorides. Nat. Acad. of Sciences. Washington, D.C. (1971). 295 pp.
- (9) Response to Comments, Tampa Chemical Plant Expansion, Proposed Gypsum Disposal Field for Gardinier, Inc. Feb. 15, 1982. Dames & Moore. Submitted to Tampa Bay Regional Planning Council.



## DEPARTMENT OF ENVIRONMENTAL REGULATION

## PERMIT APPLICATION APPRAISAL

## PART ONE:

9/4/75 and

On site inspection:  Yes ..... No Date of Inspection: 9/29/76 By: Allen G. Burdett, Jr.

Permit Application No. Tampa Port Authority Dated: June 22, 1976

File No. 76-87

If revised, date of revision: .....

Applicants name: Gardinier, Inc. Agent: Walk, Haydal &amp; Associates, Inc.

Address: P. O. Box 3269, Tampa, Fla. 33601 762 Baronne St., New Orleans, La. 70113

Location of project: Section 9, 10, 15, 16, 21, 22 Township 30 South Range 19 East

County Hillsborough Local references The project is located on the east shore of Hillsborough Bay just north of the Alafia River (Gibsonton)

Project water dependent?: ..... Yes  No

Water classification of project area: Class III Water classification of adjacent waters: Class II (5mi)

Purpose of project: To construct a stormwater surge pond and a 102 acre retention pond for the containment and treatment of industrial wastewater.

A. Description of proposed project and construction techniques. Quantify area of project which extends into wetlands and/or waterward of the apparent mean high water line.

The applicant is proposing to construct a surge basin on a 50 acre site and construct a 102 acre wastewater retention pond on a 120 acre site. The surge basin would extend along the north, west and southwest sides of the existing gypsum field. Proposed dike construction along the west side of the gypsum field would affect 5,100 feet of shoreline fronting on Hillsborough Bay and include the filling of approximately 16.5 acres waterward of the mean high water line and 13 to 18 acres of submerged and transitional types of vegetation. (See photographs 1 and 2).

The proposed surge basin dikes would be 71 feet wide at the base and have a crest elevation of 12 feet MSL. The side slope of the dike would be 1:3 (vertical to horizontal) and a berm with a crest elevation of 4.1 feet MSL and a side slope of 1:12 (vertical to horizontal) would be constructed bayward of the proposed dike. The proposed line of mean high water would be located up to 260 feet farther west than the existing mean high water line.

The applicant indicates no dredging is proposed bayward of the surge pond dikes. Approximately 80,000 cubic yards of sandy fill would be used as beach and foundation material in submerged or transitional zones, and approximately 280,000 cubic yards of gypsum fill would be used for basin construction and impoundment dikes.

The proposed 102 acre retention pond would be located on a 120 acre tract located west of U. S. 41 and extending from the applicant's north property line southward to a channelized tidal creek. The west dike would front on 3,700 feet of Hillsborough Bay and the south dike would parallel 1,700 feet of spoil banks located on the north side of a channelized tidal creek. The proposed dike along the bay would have a base width of 70 feet, side slopes of 1:3 (vertical to horizontal), and a crest elevation of 12 feet MSL.

The typical cross sectional drawing of the dike also shows a drainage ditch with a top cut 7 feet to 15 feet wide and a bottom cut 3 feet wide. It is unclear from the

Part A. Continued

conflicting drawings that have been received as to whether this is (1) an existing mosquito control ditch that will remain outside the diked area and undisturbed, (2) an existing mosquito control ditch that will be included in the diked off area and backfilled, or (3) a ditch that Gardinier proposes to dig. (See photograph #3 for view of existing ditch) .

A berm 1 foot to 3 feet above mean high water is shown bayward of the ditch.

The proposed retention pond would result in the impoundment and filling of approximately 15 acres of submerged and transitional wetlands fronting on Hillsborough Bay and located along the north side of the channelized tidal creek. Most of this wetland area (see photograph #4) is located in the southwest corner of the proposed retention pond and a portion of it is waterward of the mean high water line. An additional 6 acres of marine submerged and transitional vegetation are associated with two marsh ponds and their interconnecting mosquito ditches within the applicant's upland property. (See photograph #5).

The applicant proposes to place 15,000 cubic yards of fill in existing mosquito ditches and another 200,000 cubic yards of suitable fill material would be excavated from the interior of the proposed 102 acre retention pond for dike construction.

The applicant has also submitted the following maintenance plan for the surge basin and 102 acre retention pond facilities:

1. Visual inspection by assigned plant maintenance personnel on weekly basis from access road.
2. Complete visual inspection by walking dikes by assigned engineering personnel on semi-annual basis.
3. Contract maintenance for grassing, fertilizing and mowing on semi-annual basis or more often if required.
4. Emergency inspections by maintenance and engineering personnel as required.
5. Repairs as required for items noted during inspection on routine or emergency basis.

B. Biophysical features of general area (include comments concerning extent of development of adjoining properties).

Gardinier, Inc. is a major industrial complex dealing with phosphate products and is located on the east shore of Hillsborough Bay at the mouth of the Alafia River. Except for Port Sutton and the port area of Tampa located to the north and the Big Bend port complex located to the south, the east shore of Hillsborough Bay from approximately 1.5 miles north of the Gardinier plant to approximately 2.5 miles south of the plant is undeveloped tidal marsh or mangrove swamp.

The construction and operation of the Gardinier-U.S. Phosphoric Plant since 1926 has resulted in the filling of an estimated 175 acres of tidal lands including submerged bottoms, mangrove swamp and tidal marsh.

Gardinier is a major discharger of phosphorus, acids and fluorides into the Tampa Bay estuary.

C. Biophysical features of specific project site (and spoil site when appropriate, include identification of bottom types).

The proposed surge pond site includes approximately 16.5 acres of open shallow waters, cordgrass marsh (Spartina alterniflora) and some mangroves. Approximately 13 to 18 acres of submerged and transitional vegetation occur within the proposed pond area landward of the designated line of mean high water. Most of the submerged and transitional types of vegetation occurring within the proposed surge basin are located along the north 3,000 feet of shoreline. The south 2,100 ft. of shoreline have eroded deposits of gypsum fronting on the bay (See photo #6). Established wetland vegetation at the north end of the surge pond site is evidently associated with a segment of the shoreline which has generally remained in its natural condition. The eroded shore at the south end of the site is associated with an unstable bay fill.

Submerged types of vegetation observed in the proposed fill area included smooth cordgrass (Spartina alterniflora), red mangrove (Rhizophora mangle), white mangrove (Laguncularia racemosa), black mangrove (Avicennia germinans) and marine algae. Vegetation occurring in transitional areas included saltgrass (Distichlis spicata), saltmeadow cordgrass (Spartina patens), sea purslane (Sesuvium portulacastrum), sea oxeye (Borrhichia frutescens), buttonwood (Conocarpus erecta), sea lavender (Limonium carolinianum), salt jointgrass (Paspalum vaginatum), Virginia dropseed (Sporobolus virginicus), marsh elder (Iva frutescens) and sea myrtle (Baccharis sp.). A few saw palmettos (Serenoa repens) and cabbage palms (Sabal palmetto) apparently represent relic vegetation which occurred at a natural point (See photo #7).

The tidal marshes near the center of the proposed surge basin were examined on September 4, 1975, and on September 29, 1976. The inspection in 1975 followed generally rainy weather and no living macroscopic marine organisms such as fiddler

Gardinier, Inc.

C. Continued -

crabs, snails, polychaetes or fish were noted. Birds were observed offshore and a dead fish was observed floating in the water. Bottom samples offshore from the proposed surge pond yielded polychaetes. The pH at the time of this inspection was approximately 3.

On September 29, 1976, following several days without rain, an inspection of the same tidal marsh revealed the presence of fiddler crabs (Uca pugilator). Dead barnacles were observed on the stalks of cordgrass and their shells were soft and easily crushed by hand (See photograph #8). Numerous live comb jellies were observed and collected in the turbid yellow-green water of the bay. Insects and bird life appeared to abound in the transitional wetland areas (See photograph #9 of a large green mantis on sea lavender).

Observations in the shallow waters alongshore, including a seine sample, failed to yield any fish or crustaceans. A black organic ooze was also present on the shallow bottoms alongshore when the site was inspected (See photograph #10).

Accumulations of gray silt were observed alongshore in the cordgrass marsh; however, most of the shallow bottoms bayward of the marsh consist of light sand. Several dead patches of smooth cordgrass (See photograph #11) and mangroves were observed along the marshy shoreline particularly adjacent to the north ditch outfall.

The ditch containing treated acid water displayed a thriving growth of salt jointgrass (Paspalum vaginatum) immediately above the outfall (See photo #12). The waters of the wastewater perimeter ditch did not support emergent grasses (See photo #13). The tidal ditch which serves as a common outfall for both treated and untreated water supported blue-green algae but no emergent grasses (See photo #14).

The proposed retention pond, located at the north end of Gardinier's property, would eliminate approximately 21 acres of submerged and transitional vegetation including the 6 acres of marsh ponds and mosquito ditches located within the applicant's upland property. More precise information on the location of the proposed dikes, ditches and fill areas is needed due to conflicting information provided in the drawings received.

Most of the designated 120 acre site consists of uplands supporting natural vegetation such as saw palmetto, live oak (Quercus virginiana) and cabbage palm. The predominant soil type is Ruskin fine sand with some Leon fine sand and Pomello fine sand.

A channelized tidal creek (See photo #15) with spoil banks forms the south boundary of the proposed retention area, and some of the old marshy meanders of the creek (See photo #16) would be included within the retention pond. Vegetation in these isolated marshy areas includes black rush (Juncus roemerianus) and cattails (Typha sp.). The mosquito ditches are vegetated by mangroves and smooth cordgrass.

The southwest corner of the proposed retention pond contains submerged tidal marsh consisting primarily of smooth cordgrass (Spartina alterniflora). Submerged and transitional vegetation observed in the retention pond site included key grass (Monanthocloe littoralis), saltwort (Batis maritima), glasswort (Salicornia virginica),

Gardinier, Inc.

C. Continued -

sand cordgrass (Spartina bakeri), cordgrass (Spartina spartinae) and black rush in addition to the species previously mentioned in reference to the surge basin site. Birds such as the common egret and marsh hen were observed feeding in the area. Fish were observed in the area but not collected. Archie Creek is well known as a feeding area for birds and several fish kills have been observed in the channelized tidal creek in the past.

The tidal marsh west of the proposed retention pond (See photo #17) contained dead ribbed mussels (Geukensia demissa), both dead and live marsh periwinkles (Littorina irrorata), and some ladderhorn snails (Cerithidea scalariformis). Many of the dead periwinkles were juveniles and the shells of the adults were noticeably etched.

D. Impact of project on biological resources. Address long-term impact as well as immediate impact. All aspects of proposal should be assessed in these terms.

The proposed filling would eliminate approximately 50 acres of tidelands including shallow submerged land and areas of submerged and transitional vegetation. This filling of shallow bay bottoms and tidal wetlands would have a significant and irreparable long term adverse effect on marine productivity, established nursery and feeding grounds and on marine soils suitable for the growth of plant life useful to marine life and wildlife.

The proposed locations of the surge pond and retention pond within close proximity to tidal waters could result in the seepage of wastewater and pollutants which would adversely affect marine plant and animal life.

The construction of surge pond dikes primarily of gypsum may fail to provide a stable substrate suitable for revegetation along the shore of the bay. Dikes and/or ditches fronting on the bay would also be subject to storm wave attack. The proposed offshore location of the surge pond dike would create a new shore that would have greater exposure to the open waters of the bay than the present shoreline. This increased exposure may limit the extent to which intertidal vegetation may become established.

The proposed filling would eliminate submerged lands and wetland areas where measures could be implemented to restore the physical and biological integrity of areas which have been adversely affected by the previous discharge of pollutants and fill material. The marine plants and animal life observed in the area have been adversely affected by the discharge of pollutants, but demonstrate a remarkable ability to endure adverse conditions and repopulate the area.

(continued)

E. Recommendation, with justification, concerning application. Include references to statutes, administrative rules, etc..

The proposed filling should not be approved as it would interfere with the conservation of fish, marine and wildlife; and would result in the destruction of marine productivity, including natural marine habitats, grass flats suitable as nursery and feeding grounds for marine life and marine soils suitable for producing plant growth of a type useful as a nursery and feeding grounds for marine life to such an extent as to be contrary to the public interest which would be in violation of Chapter 67-1503, Section 6, Laws of Florida, Chapter 253.124 (2), Florida Statutes, and Chapter 17-4.29 (6) (a), Florida Administrative Code.

Due to the close proximity of the gypsum field, proposed surge basin and proposed retention pond to the receiving body of water, seepage of chemical wastes such as fluorides, acids and/or other substances may occur in sufficient quantities (continued)

F. Suggestion concerning modifications to reduce or minimize impact where appropriate.

The proposed surge pond should be located on uplands landward of submerged and transition zones of the bay. The surge pond or ponds should be designed in a manner that will prevent seepage of pollutants into the bay. The surge pond site on the south side of the gypsum field and the surge pond site on the north side of the gypsum field appear to be in acceptable locations (See sketches 1-A and 1-B). If necessary, the Archie Creek drainage canal located on the north side of the gypsum field could be filled in and the flow diverted northwestward into the tidal marsh.

The proposed retention pond should be realigned as shown on sketches 2-A and 2-B to minimize encroachment into tidal wetlands. The recommended dike alignment shown on sketch 2-A represents the toe of the slope for filling activities and/or the bayward extent of ditching activities. A narrow zone of marginal uplands should be retained along the perimeter of the dike to allow for maintenance and to protect estuarine areas from dike erosion and stormwater runoff.

(continued)

D. Continued -

The existing shallow waters and marshes benefit water quality by providing a diverse ecosystem involved with the assimilation of nutrients into the marine food chain from both sediments and the water column. Studies have shown that the magnitude of marsh production, which ranges from 445-2,883 grams of dry weight per square meter per year, is equal to, if not higher than, the net annual production of a well managed, highly subsidized cropland (E.P. Odum, 1971). Marshes are also useful in the assimilation of suspended material and debris. Bacteria in exposed mud flats can also remove sulfur dioxide from the atmosphere.

The proposed filling would reduce the tidal prism which could reduce tidal circulation and flushing of the area. The construction of the retention pond would also have significant adverse effects on terrestrial wildlife and natural plant communities.

Gardinier, Inc.

Part E. continued

to be classified as pollution under Chapter 403 of the Florida Statutes in that it would be "potentially harmful to human health or welfare, animal or plant life."

Reasonable assurance has not been provided in accordance with Chapter 17-4.07 (1), Florida Administrative Code, that water quality standards specified in Chapter 17-3.05 and Chapter 17-3.09, Florida Administrative Code, would not be violated.

As stated in Chapter 403.021 (2), Florida Statutes, it is declared to be the public policy of the state to conserve the waters of the state and to protect, maintain, and improve the quality thereof for public water supplies, for the propagation of wildlife, fish and other aquatic life, and for domestic, agricultural, industrial, recreational, and other beneficial uses and to provide that no wastes be discharged into any waters of the state without first being given the degree of treatment necessary to protect the beneficial uses of such water.

Part F. continued

The development of surge ponds and retention ponds on upland areas near the bay should be contingent upon design specifications that will provide assurance that water quality, and plant and animal life indigenous to the adjacent and receiving bodies of water will not be adversely affected by pollutants, including those released through seepage.



PART TWO

PROJECT CONSTRUCTION OR OPERATION MAY CAUSE:

- 1. Increased rates of eutrophication in nearby bodies of water.
- 2. Reduced capacity of shellfish propagation and harvesting in receiving bodies of water.
- 3. Interference with the ability of the habitat to successfully support fish and wildlife propagation.
- 4. Interference with the ability of the habitat to successfully support fish and wildlife population.
- 5. Impaired management or feasibility of management of fish and wildlife resources.
- 6. Degradation of local water quality by reducing or eliminating the ability of surrounding wetlands to filter, stabilize or transform nutrients.
- ..... 7. Discharged substances which settle to form putrescent or otherwise objectionable sludge deposits.
- ..... 8. Floating debris, oil scum, and other materials, in amounts sufficient to be deleterious.
- ..... 9. Discharged material in amounts which create a nuisance.
- 10. Discharged substances in concentrations or combinations which could be toxic or harmful to human, animal, or plant life.
- ..... 11. Chlorides to exceed 250 mg/l in bodies of freshwater.
- ..... 12. Chlorides to exceed 250 mg/l in groundwater because of a reduction in percolation due to increased surface runoff rates.
- ..... 13. Chlorides to increase more than 10% above normal in brackish or saline waters
- ..... 14. Copper residues to exceed 0.5 mg/l.
- ..... 15. Zinc residues to exceed 1.0 mg/l
- ..... 16. Chromium residues to exceed: 0.50 mg/l hexavalent; 1.0 mg/l total chromium in effluent discharge; or 0.05 mg/l after reasonable mixing in the receiving waters;
- ..... 17. Phenolic-type compounds, calculated or reported as phenol, to exceed 0.001 mg/l;
- ..... 18. Lead to exceed 0.05 mg/l;
- ..... 19. Iron to exceed 0.30 mg/l;
- ..... 20. Arsenic to exceed 0.05 mg/l;
- ..... 21. Oils and greases in surrounding waters to exceed 15 mg/l.
- ..... 22. Visible iridescent oil, resulting in objectionable odors and tastes which interfere with beneficial uses of the surrounding waters.
- 23. Turbidity to exceed 50 JTU as related to standard candle turbidimeter above background.
- 24. Dissolved oxygen to be artificially depressed below the values of 5 ppm.
- 25. Biological oxygen demand to exceed values which would cause dissolved oxygen to be depressed below 5 ppm or make the biological oxygen demand great enough to produce nuisance conditions.
- 26. Dissolved solids to exceed 500 mg/l as a monthly average, or exceed 1000 mg/l at any time.
- ..... 27. Specific conductance of freshwater streams to be increased more than 100% above background levels or exceed 500 microhms/cm.
- ..... 28. Cyanide or cyanates to be detectable in receiving bodies of water.
- 29. The pH of receiving waters to vary more than one unit above or below normal pH of the waters.
- 30. The lower pH value to be less than 6.0.
- ..... 31. The upper pH value to be more than 8.5.
- ..... 32. Detergent levels in receiving bodies of water to exceed 0.5 mg/l.
- ..... 33. Mercury to be detectable in receiving bodies of water.
- ..... 34. Coliform counts to exceed criteria established (under Chapter 17-3, Florida Statutes) for the existing water classification in the project area.
- 35. Radioactive materials may be discharged.
- 36. Fluorides may exceed 10.0 mg/l.

PART THREE

If certification is approved or waived, PL 92-500 requires that effluent limitations be specified as part of the certification.

When applicable, specify:

1. Monitoring required of the applicant (include frequency).

Not applicable as recommending denial.

2. Effluent limitations (i.e., those limitations established under Chapter 17-3, Florida Statutes, for particular water classifications as well as water quality standards). Be specific.

17-3.02 Minimum Conditions of All Waters: Times and Places;  
17-3.05 Water Quality Standards; Specifics; and  
17-3.09 Criteria: Class III Waters - Recreation - Propagation and  
Management of Fish and Wildlife.

PART FOUR

Recommendations for water quality control during construction.

Not applicable as recommending denial.

Completed by:

*Allen G. Burdett*

signature

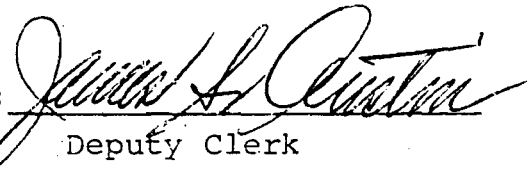
Date: October 7, 1976

STATE OF FLORIDA  
COUNTY OF HILLSBOROUGH

I, RICHARD L. AKE, Clerk of the Circuit Court and Ex Officio Clerk of the Board of County Commissioners of Hillsborough County, Florida, do hereby certify that the above and foregoing is a true and correct copy of Development Order #76, adopted by the Board of County Commissioners of Hillsborough County, Florida, at its regular meeting of August 20, 1984, as the same appears of record in Minute Book 99 of the Public Records of Hillsborough County, Florida.

WITNESS my hand and official seal this 9th day of July, 1986.

RICHARD L. AKE, CLERK

By:   
Deputy Clerk

RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS  
OF HILLSBOROUGH COUNTY, FLORIDA  
DRI PETITION NO. 76  
REZONING PETITION NO. 83-6

DEVELOPMENT ORDER

Upon motion of Commissioner Jetton, seconded by Commissioner Bing, the following resolution was adopted this 20th day of August, 1984:

WHEREAS, on October 30, 1981, Gardinier, Inc., filed an application for development approval ("application") of a development of regional impact with the Hillsborough County Board of County Commissioners pursuant to the provisions of Section 380.06, Florida Statutes; and,

WHEREAS, the application proposed construction of a gypsum storage area located in an unincorporated portion of Hillsborough County; and,

WHEREAS, the Board of County Commissioners as the governing body of the local government having jurisdiction pursuant to Section 380.06, Florida Statutes, is authorized and empowered to consider applications for development approval for developments of regional impact; and,

WHEREAS, the public notice requirements of Section 380.06, Florida Statutes, and Section 125.66, Florida Statutes, have been satisfied; and,

WHEREAS, the Board of County Commissioners has held duly noticed public hearings on said application for development approval on December 12 and 21, 1983; February 20, 22, 29, March 1, 12, 14, 27, 28, April 2, 4, 17, June 5, July 23, August 16 and 20, 1984, and has heard and considered testimony and documents received thereon; and,

WHEREAS, the Board of County Commissioners has received and considered the report and recommendations of the Tampa Bay Regional Planning Council; and,

WHEREAS, Hillsborough County has solicited, received, and considered reports, comments, and recommendations from interested citizens and from city, county, and state agencies, including the review and report of the Hillsborough County Administration.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF HILLSBOROUGH COUNTY, FLORIDA:

## I. FINDINGS OF FACT

### Introduction

On October 30, 1981, Gardinier, Inc., submitted an application for development approval ("application") to the Board for a proposed gypsum storage area. Pursuant to Chapter 380.06, Florida Statutes, the application was reviewed by the Tampa Bay Regional Planning Council (TBRPC). On November 14, 1983, the TBRPC issued a report to the Board and recommended that the proposed gypsum storage area be approved, subject to certain conditions and limitations. In 1982, Gardinier also asked the Board to rezone the site of the proposed gypsum storage area. In accordance with Section 380.06, Florida Statutes, the rezoning is being considered by the Board together with the application.

The issue in this case is whether the Board should grant Gardinier's requests for development approval and rezoning.

### Chronology of Events

On December 12, 1983, the Board held a public hearing to consider Gardinier's requests for development approval and rezoning. It was impossible to conduct the hearing, however, because the meeting room was too small to hold all of the citizens who wanted to attend. The Board reconvened the hearing on December 21, 1983, at Curtis Hixon Auditorium in Tampa, Florida. The second hearing was attended by 600-800 people. At that time,

the Board heard the testimony of approximately 60 citizens who wished to comment on Gardinier's proposal.

In light of the public interest and controversy involved in this case, the Board adopted a more formal hearing procedure than is normally used in Hillsborough County land use proceedings. To the extent possible, the Board followed the procedures established by the Florida Administrative Procedures Act, Chapter 120, Florida Statutes (1983). In this format, the Progress Village Civic Council and Manasota-88 were allowed to intervene and participate in this proceeding. These parties were represented by counsel. Outside counsel also was retained by the Board to assist the Hillsborough County staff with its evaluation of Gardinier's proposal.

The parties were given the right to fully conduct discovery. The parties exercised their right to discovery by inter alia filing interrogatories, requesting the production of documents, exchanging exhibits, and taking approximately 30 depositions. The public hearing was held in abeyance until the parties had a reasonable opportunity to complete discovery.

The Board also asked various state and regional agencies to participate in the hearing, including the Department of Community Affairs, Department of Environmental Regulation ("DER"), Department of Health and Rehabilitative Services ("HRS"), Tampa Bay Regional Planning Council, and Southwest Florida Water Management District. The TBRPC, HRS, and DER sent representatives to testify at the hearing, but none of the agencies intervened or otherwise formally participated as parties to the hearing.

The public hearing reconvened on February 20, 1984, and was continued on February 22, February 29, March 1, March 12, March 14, March 27, March 28, April 2, April 4, April 17, June 5, July 23, August 16 and 20, 1984. All of the hearings started at 5:30 or 6:00 p.m. so that the general public could attend. The testimony presented at these hearings was recorded by a court reporter who prepared a written transcript of the proceedings.

During the public hearings, Gardinier called 13 witnesses and introduced 56 exhibits into evidence. Hillsborough County called 14 witnesses and introduced 30 exhibits into evidence. Manasota-88 called 2 witnesses and introduced 4 exhibits. Progress Village Civic Council called 7 witnesses and introduced 2 exhibits.

The parties presented opening and closing arguments. Gardinier also was allowed to present rebuttal evidence. All of the parties were given an opportunity to submit proposed development orders.

After the parties presented their cases-in-chief, the Board held a hearing on April 4, 1984, at Curtis Hixon Auditorium to again receive public comments. Several hundred people attended this hearing. Approximately 40 witnesses testified. Their testimony was evenly divided -- half of the citizens favored the project, half of the citizens opposed it.

All of the witnesses were subject to cross-examination, except for the public witnesses who testified at the hearing on December 21, 1983. All of the exhibits, including those exhibits proffered by the public, were received in evidence. However, the parties were given the right, which they exercised, to state their objections to those exhibits at the time they were proffered.

All 5 of the Board members attended all of the hearings, with one exception. One of the Board members was unable to attend one hearing, but he reviewed the transcript of that hearing prior to the entry of this development order.

#### The Site

Gardinier has an existing phosphate fertilizer chemical plant and gypsum disposal field in Hillsborough County. Gardinier's facilities are bounded by the Alafia River, Highway 41, Hillsborough Bay, and Archie Creek. Gardinier purchased

these facilities in 1973, but its predecessors have operated this plant since 1924.

Gardinier's existing gypsum stack is nearing its maximum capacity. The 300 acre stack is already 165' tall. It will reach its maximum elevation of 200' in 1987.

Gardinier needs a new site to store gypsum. Gardinier produces gypsum, a by-product of the fertilizer manufacturing process, at the rate of 500 tons per hour, 12,000 tons per day, 3.65 million tons per year. (HC-2, TBRPC Report at 2, 10). Gardinier alleges that, unless it receives the Board's approval of a new gypsum storage area, it will have to close its East Tampa Chemical Plant. (HC-2, TBRPC Report at 10).

Gardinier's proposed gypsum storage area is located east of Highway 41, north of Archie Creek, south of Highway 676A (Madison Avenue) and west of 78th Street, in Hillsborough County, Florida. The location of the proposed site is shown in the maps attached hereto as Figures 1, 2 and 3. The legal description of the site is attached hereto as Exhibit "A." The proposed site is not located in an area of critical state concern.

The site covers approximately 600 acres, including 389 acres which Gardinier wants to use for gypsum disposal. (HC-1 at 216). As proposed by Gardinier, the gypsum stack will attain a maximum height of 200'. The proposed stack will be 40' tall in 10 years, 75' tall after 20 years, 140' tall after 30 years, and 200' tall after 40 years. (T-4 at 99).

The TBRPC report states that "[i]n the vicinity of the proposed stack, current land use patterns are mixed with only scattered residential areas except for Progress Village subdivision . . . . Existing land use within one mile of the site is predominantly agricultural or undeveloped open space . . . . Total residential use accounts for 8.9% of the area [within one mile] . . . . Zoning within one mile of the site classifies over 61 percent of the area as agricultural. Residential zoning is 16.8 percent and industrial zoning is 12.2 percent." (HC-2, TBRPC Report at 25, 26; HC-1 at 74, 75).



As proposed by Gardinier, the stack will have a minimum 500' buffer around it. It will be located approximately 600 feet from the nearest residence; 1,800 feet from the Progress Village Elementary School; 3,000 feet from Madison Avenue; and 4,000 feet from Riverview Drive. (HC-2, TBRPC Report at 5).

#### Agency Review of Environmental Issues

The environmental impacts of Gardinier's project have been reviewed by the Hillsborough County Environmental Protection Commission (HCEPC), the Florida Department of Environmental Regulation (DER), the United States Environmental Protection Agency (EPA), and the Tampa Bay Regional Planning Council (TBRPC). All of these agencies have concluded that the proposed project will satisfy the applicable local, state, and federal environmental regulations, if certain stringent conditions or limitations are imposed. (HC-1 at Appendix 2, EPA Finding of No Significant Impact; T-6 at 113; T-7 at 7, 11, 12). Those conditions or limitations are adopted herein by reference and are set forth in Section IV, Conditions for Development Approval, below.

#### Gardinier's Plans for Groundwater Protection

The design of the proposed gypsum storage area contains three major components which are designed to protect the groundwater:

- (1) a leachate collection system which will be built over a compacted clay liner;
- (2) a slurry wall which will completely encircle the gypsum disposal area; and
- (3) a covered drainage ditch which also encircles the gypsum stack.

These systems form a "bathtub" around and beneath the gypsum stack. They are designed to collect the leachate (i.e., the rainwater or process water which moves down through the gypsum stack) and prevent it from leaving the site. (T-2 at 37). These

components of the proposed gypsum stack are depicted in Figures 4, 5 and 6, which are attached hereto.

The leachate collection system consists primarily of perforated, flexible polyethylene pipe which will be placed on top of an 18-inch thick, compacted clay liner. (T-12 at 21). The clay liner will slope downward from the center of the gypsum disposal area toward a covered ditch on the outside edge of the disposal area. When leachate moves down through the gypsum stack, it will enter the pipes and then flow horizontally toward the covered ditch. (T-12 at 19). After the leachate enters the covered ditch, it will be pumped to Gardinier's East Tampa Chemical Plant and recycled. (T-12 at 18, 19).

The sides of the "bathtub" are formed by the slurry trench and slurry wall. The trench will go all the way around the gypsum stack. (T-2 at 116-118). It will extend from the surface of the ground down into the clay Hawthorn formation. The trench will be filled with a bentonite-soil mixture. The bentonite wall will create an impervious barrier which will prevent groundwater from flowing horizontally off of the site. (T-12 at 22, 23).

The bottom of the "bathtub" is the Hawthorn formation. (T-2 at 46). The Hawthorn formation on this site is a uniform, thick layer of relatively impermeable clay. (HC-1 at 105, 106; T-2 at 104, 105). The clays in the Hawthorn formation have an average thickness of 27 feet. Some of the clay will be excavated and used for the 18" clay liner, but Gardinier will ensure that the Hawthorn formation is maintained with a minimum thickness of 15' in all areas on the site. (T-2 at 102; T-12 at 36-39). The clay in the Hawthorn formation creates a natural barrier that will prevent leachate from moving down into the Tampa limestone. (T-12 at 18).

The third major component of Gardinier's design is the covered ditch which will completely encircle the gypsum field. (T-12 at 18). The bottom of the covered ditch will be set at an elevation below the regional groundwater level (i.e., the groundwater elevation outside the slurry wall). This design will create a constant flow toward the covered ditch, rather than away

from the site. (T-2 at 42). This will help ensure that the leachate flows into the collection system, and does not flow away from the site. (T-2 at 52).

Al Gipson, one of Gardinier's expert witnesses, testified that Gardinier's design is redundant. (T-2 at 47, 93, 94). Even if one component of the design failed, the other components of the system would protect the groundwater. For example, if the leachate collection system failed, the leachate would be retained on the site. (T-2 at 93). It would not be able to flow through the slurry wall which encircles the site. (T-12 at 22). It would not flow downward because of the Hawthorn formation. (T-12 at 18).

#### Mike Gurr's Analysis of Groundwater Impacts

Since nothing is completely impermeable, including 18" clay liners, Mike Gurr used various numerical and analytical models to evaluate the project's potential impacts on groundwater during the 40 year life of the project. (T-2 at 53; G-15). Gurr, one of Gardinier's witnesses, is an expert on hydrogeology. Gurr calculated that chloride, the most mobile contaminant, would only move 4 feet into the Hawthorn formation by the end of the 40 year life of the gypsum field. (T-2 at 53, 54). The chloride concentrations, however, would not exceed 250 milligrams per liter, the Florida drinking water standard. The other potential contaminants in the leachate would not move as far. (T-2 at 54). Thus, the leachate would not threaten groundwater supplies in the area or violate drinking water standards outside of the "bathtub."

Gurr also evaluated the potential impacts of the long-term migration of the leachate. (T-2 at 57). He found that the maximum chloride concentrations entering the Tampa Formation from the gypsum stack would be 165 milligrams per liter, which is less than the drinking water standard of 250 milligrams per liter. (G-15 at 15, 16). These concentrations would only occur after 250 years. (T-2 at 58). Similarly, fluorides would enter the Tampa formation at maximum concentrations of 42 milligrams per

liter, but these concentrations would not occur for 13,160 years. (T-2 at 59). The fluorides, however, would be quickly diluted as they moved into the Tampa formation. (T-2 at 59). Radium and pH would be attenuated in the upper 10 feet of the Hawthorn formation. (T-2 at 59). Chloride, radium, and pH would meet the applicable state water quality standards while in the Hawthorn formation. (G-15 at 18).

Gurr was asked to evaluate the potential impacts of a sinkhole; however, it is very unlikely that a sinkhole would ever occur on the proposed site. (G-15 at 3; HC-1 at 102-104). Approximately 106 test holes were drilled at the site to determine whether sinkholes currently exist or would occur in the future. (T-2 at 102). The drilling program showed that the uniform, thick clay Hawthorn formation at this site underlies and supports the surface. There is no evidence of any underground fractures or hydraulic connections through the Hawthorn formation.

Nonetheless, Gurr evaluated the groundwater impacts of hypothetical sinkholes. (G-15 at 3, 10-13). For purposes of his analysis, Gurr assumed that a massive sinkhole would develop and instantaneously drain all of the fluid out of the gypsum field. He then calculated the potential groundwater impact based on the existing subsurface conditions at the site. In addition, he calculated the impacts under an assumed set of conditions where the fluid in the gypsum pond would be rapidly transported through a cavernous limestone aquifer, one which might exist in an area where a sinkhole developed. (G-15 at 10).

According to Gurr, "[n]o appreciable impact on Hillsborough Bay is predicted under either case." (G-15 at 12). In the first hypothetical scenario, chloride concentrations would be elevated over natural background conditions near the gypsum field, but it would take thousands of years for the chloride concentrations to reach Hillsborough Bay. (P-15 at 12). Although maximum chloride concentrations of 240 milligrams per liter would reach the bay, these concentrations would be lower than the Florida drinking water standard of 250 milligrams per liter. Similarly, fluoride

concentrations of 42 milligrams per liter would reach the bay, but it would take tens of thousands of years for the fluorides to move that far. Radium and pH would be attenuated within the property boundaries.

If the fluid in the stack moved through a massive sinkhole and into a cavernous limestone aquifer, the fluid would move more rapidly, but it would have lower concentrations of contaminants. (G-15 at 10). It would be quickly diluted. In this hypothetical case, chloride concentrations would be below background levels within a short distance. Fluoride and radium would not reach Hillsborough Bay for tens of thousands of years.

Gurr's analysis shows that a sinkhole beneath the proposed gypsum stack would have no significant impact on Hillsborough Bay. (G-15 at 13). Although the concentrations of certain substances in the groundwater would be elevated, the groundwater would be flowing into a non-potable aquifer. There would be no impact on potable water supplies. Moreover, the rate of migration would be slow enough that remedial measures could be implemented. (G-15 at 10, 13).

#### Powell's Analysis of Groundwater Impacts

Dr. Robert Powell, a consultant to the TBRPC and Hillsborough County, is an expert on hydrogeology and groundwater. (T-7 at 31, 32). He carefully evaluated the design of the proposed project and its potential impacts on groundwater. (T-7 at 32-34). Powell concluded that Gurr's groundwater analyses were "satisfactory." Powell also concluded that Gurr appropriately evaluated the potential impacts of a sinkhole. (T-7 at 40, 41).

Powell agreed that even if a portion of the leachate collection system failed or collapsed, the leachate could be retained on site. If it escaped, it would be detected in the monitoring wells. Remedial or corrective measures could then be taken. (T-7 at 54, 55). Accordingly, Powell concluded that the

proposed design was acceptable, subject to certain additional conditions. Those conditions are included in Section IV., Conditions for Development Approval, below.

#### Groundwater Monitoring

Dr. Powell agreed with DER, TBRPC, and HCEPC that Gardinier should have a comprehensive groundwater monitoring program to ensure that the project operates as designed. Gardinier should collect background water quality samples from monitoring wells on-site and from the potable wells located west of the proposed stack. (HC-1 at 130, 131). Gardinier should monitor these wells during construction, throughout the active life of the gypsum stack, and for several years after the stack is closed. This monitoring program will give the County data to use when determining whether any groundwater contamination is occurring near the stack or in the potable wells that are located off-site. (HC-1 at 130).

#### Groundwater Gradient Reversal

The groundwater beneath the proposed stack flows to the west-southwest (i.e., toward Hillsborough Bay). (T-2 at 50; HC-1 at 105; G-15 at 20). As long as the groundwater flows to the west, there is no threat of groundwater contamination in Progress Village or along 78th Street. Nonetheless, there is always the potential for the groundwater flow to change in the future.

Gardinier's consultant, Mike Gurr, analyzed the potential for a "gradient reversal" in the groundwater. (G-15 at 20-23). He utilized data from the United States Geological Service, Southwest Florida Water Management District, and other appropriate agencies. His study showed that the groundwater flow beneath the site might move slightly toward the south by the year 2000. (G-15 at 22, 23). The groundwater flow would move toward

the Gardinier East Tampa Chemical plant, but it would not be reversed or moved toward the east. (T-2 at 63; G-15 at 22, 23).

Gardinier's project could affect future development in the area. (T-7 at 52). Although Gardinier contends that the project will not adversely affect development in the area, there is no way to predict what will occur in the future. There is currently no large-scale pumping in the area immediately north or east of the proposed gypsum stack, but there is no way to guarantee that such pumping will not occur in the future. (G-15 at 20-23).

Dr. Powell recommends that the Southwest Florida Water Management District be notified of the Board's concerns about gradient reversal near the proposed stack. When the SWFWMD reviews consumptive use permits in the future, it should evaluate their potential impacts on the groundwater flow near Gardinier's site. If future development would affect the groundwater flow, the SWFWMD should promptly notify the Board.

Gardinier's proposal in this case is significantly aided by two facts: (1) the proposed stack is located over slightly to very brackish (saline) water, not potable water; and (2) any leachate escaping from the proposed stack will flow toward the salt water in Hillsborough Bay, not toward potable water supplies. (G-15 at 9; HC-1 at 120). These are important factors which have materially affected the Board's evaluation of this project. If the facts were otherwise, the Board might require additional information concerning the project, or reach a different conclusion.

If the groundwater flows near the site are significantly altered in the future, Gardinier shall be required to promptly submit additional information to the Board concerning the significance of those changes. Such changes could constitute a substantial deviation from Gardinier's current proposal and must be reviewed pursuant to Chapter 380.06, Florida Statutes. Under such circumstances, Gardinier shall be required to take whatever steps the Board deems necessary to minimize or eliminate any threat to potable water supplies caused by its project. Such steps shall include the closure of the proposed gypsum stack.

### HCEPC Non-Degradation Rule

Rick Wilkins, the Deputy Director of the Hillsborough County Environmental Protection Commission (HCEPC), testified that the HCEPC reviewed the potential impacts of the project on air pollution, water pollution, wetlands, and other issues within HCEPC's jurisdiction. Based on its review, the HCEPC recommended approval of the project, subject to certain conditions. (T-6 at 113).

The HCEPC concluded that its "non-degradation rule," Rule 1-1.07, would not be violated because the project would not degrade the existing water quality to any reasonable extent. (T-6 at 118). Although the non-degradation rule could be literally interpreted to prohibit any project that has any impact on water quality, the HCEPC interprets its rule in a reasonable manner. (T-6 at 119). For example, HCEPC does not prohibit farmers from fertilizing their crops, even though the fertilizer will ultimately enter ground or surface waters, degrade water quality, and thus technically violate HCEPC's non-degradation rule. (T-6 at 119).

In this case, Gardinier's project is not expected to violate state water quality standards because it is designed to contain potential waterborne contaminants within the "bathtub" beneath the site. Since the project will not violate state water quality standards, HCEPC concluded that it will not "degrade" water quality or violate the HCEPC non-degradation rule.

### Radioactivity in Groundwater

Dr. Jacqueline Michel was hired by Hillsborough County to determine whether Gardinier's project would affect the radioactivity in the groundwater near the site. Dr. Michel is an expert in hydrogeology and geochemistry. (T-9 at 8). She is a consultant to EPA and works throughout the nation as EPA's radium expert. (T-9 at 8).



Dr. Michel found that under normal operating conditions, radium in the leachate will be retained by the clay liner. (HC-18 at 10). It will stay within Gardinier's property boundaries. (T-9 at 12). Since radium is very insoluble, it quickly precipitates out of the groundwater. (T-9 at 12-13). Even if there were a major failure of the leachate collection system, radium would not cause significant groundwater contamination. (T-9 at 12; HC-18 at 11). Dr. Michel's conclusions agree with Gurr's analyses. (T-2 at 54, 59; G-15 at 10-13).

Dr. Michel's conclusions also are supported by Ron Miller's study for the United States Geological Service. (T-9 at 12, 13; HC-18 at 13). Miller studied gypsum stacks that had no liners or leachate collection systems. Miller found that the process water in the gypsum stacks contained high levels of radioactivity, but the radium did not migrate more than 100 feet, even when there was no liner or collection system. (T-9 at 12, 13, 42-44, 56, 60). Since Gardinier's stack will have a leachate collection system, Miller's study shows what would happen at Gardinier's site under the worst circumstances. (T-9 at 12, 13).

Although Dr. Michel believes the proposed project will not adversely affect groundwater supplies, Michel concurs with Powell's recommendation that the private wells located west of the gypsum stack be monitored. (T-9 at 13). Specifically, Michel recommends that the wells be monitored on a regular basis for gross alpha and radium 226. (T-9 at 13).

#### Airborne Radiation and Radiation Risk Assessments

The airborne radiation and radiation-related risks associated with the stack have been thoroughly reviewed. Gardinier hired Dr. Charles Roessler, Dr. Phillip Walsh and Dr. Phillip Cole to evaluate these issues. These radiological issues also were independently assessed by Wally Johnson, the state expert in the Department of Health and Rehabilitative Services,

and Mike Terpilak, a consultant to Hillsborough County. All of these experts agreed that the potential health risks caused by the gypsum stack would be very small.

7  
Dr. Charles Roessler, a certified health physicist and member of the Governor's Task Force on Phosphate-Related Radiation, studied the existing radiological data concerning gypsum piles. (T-3 at 19). Based on his research, he assumed that the radium content of Gardinier's gypsum would be 24 pCi/gram and the radon gas emissions from the proposed stack would be 26 pCi/m<sup>2</sup>/sec. (T-3 at 25, 26, 29, 118). Data collected from Gardinier's existing gypsum stack show that the radium content of the gypsum is 22.5 pCi/gram and the average radon emissions are approximately 23 pCi/m<sup>2</sup>/sec. (T-3 at 38-41). Thus, in both cases Roessler's estimates for the proposed stack were higher than the actual values at the existing stack. (T-3 at 38-41).

Using his estimated values, Roessler calculated the indoor concentrations of radon progeny which would be attributable to the proposed stack. The predicted concentrations of indoor radon progeny ranged from .0002 to .0008 pCi/liter. (T-3 at 31, 126). Roessler calculated that the proposed stack would cause maximum exposures of .0002 to .001 working levels (WL). (T-3 at 32). The existing stack contributes an additional exposure of .00001 to .00004 WL. (T-3 at 37).

The combined maximum exposure (.0002 to .001 WL) from the existing and proposed stacks is below the mean exposure in the United States (.002 to .02 WL). (G-24). It is far below the proposed standard for the State of Florida (.01 WL above background). (T-3 at 34). It also is far below the natural background average of .004 WL in normal Florida homes. (T-3 at 33, 126). In Dr. Roessler's opinion, the total combined exposure from the existing stack and the proposed stack will be "negligible." (T-3 at 37).

Dr. Phillip Walsh evaluated the potential risk associated with the anticipated levels of radon. Dr. Walsh worked for 8 years as a radiation physicist at the National Institute of

Health. (T-3 at 47). He currently works as the head of the Health Studies Section of the Health & Safety Research Division at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. (T-3 at 47). Walsh concluded that the risk from the proposed gypsum field would be insignificant. (T-3 at 53, 54, 57).

According to Walsh's calculations, there might be 1 lung cancer if 3,000 people stayed at the location with the maximum exposure (i.e., the northwest corner of the proposed gypsum stack) for 24 hours a day, for 70 years. (T-3 at 55, 56, 92, 93). Since less than 100 people live at the northwest corner of the proposed gypsum stack, this hypothetical situation would never occur. For this reason, Walsh concludes that there would be no lung cancer caused by the proposed stack. (G-23 at 25; T-3 at 130).

Walsh and Roessler agree that the exposure levels and the potential risk are approximately 10 times lower in Progress Village than at the northwest side of the stack. (T-3 at 92, 93, 101). Walsh found that the lifetime risk from the proposed stack is .02 cases of lung cancer in the total population of Progress Village. (T-101-102; G-23 at 25, 25). By comparison, other normal causes would result in 84 lung cancers in Progress Village over a lifetime. (T-3 at 102; G-23 at 3, 4).

To put this predicted risk in perspective, Walsh compared it to other risks that are routinely accepted in everyday life. Specifically, Walsh said the risk was similar to the risk incurred when a person: drank 1/2 liter of wine; smoked 1.4 cigarettes; travelled 6 minutes in a canoe; travelled 10 miles by bicycle; ate 40 tablespoons of peanut butter; drank 30 cans of diet soda; or ate 100 charcoal broiled steaks. (T-3 at 132, 133).

Dr. Phillip Cole also testified about these issues. Dr. Cole, a medical doctor, received his M.A. and Ph.D. degrees in public health at Harvard University. (T-4 at 15, 16). He taught at the Harvard School of Public Health for 10 years before becoming a Professor and the head of the Department of

Epidemiology of the School of Public Health at the University of Alabama in Birmingham. (T-4 at 15-16).

Dr. Cole reviewed the reports by Roessler and Walsh. He concluded that the reports were competent, thorough and very professional. (T-4 at 19). Cole believes that Walsh's risk estimate is too high by a factor of 10 and perhaps 100. (T-4 at 27, 50). The actual risk of lung cancer is probably much lower -- 1 in 30,000. (T-4 at 27, 50). Regardless of whether the risk is 1 in 3,500 or 1 in 30,000, Cole testified that such risks are so low that they are generally considered to be immeasurably small and, therefore, acceptable. (T-4 at 28). For all practical purposes, they are non-existent. (T-4 at 28).

Wally Johnson also prepared a risk estimate. (HC-4). Johnson is the radiation expert in the Florida Department of Health and Rehabilitative Services. Johnson is currently the Chairman of Governor Graham's Task Force on Phosphate-Related Radiation. (HC-16 at 7).

Since there are no standards or limits applicable to radon exposure in Florida, Johnson and the Task Force have proposed a state standard of .01 working levels. (T-7 at 65, 66; HC-4; HC-16 at 7-10). This standard is designed to protect public health. It is similar to the EPA and U.S. Surgeon General guidelines for remedial action where uranium mills cause increased levels of radon exposure. The EPA standard, like the Surgeon General's guideline, is .01 WL above background. (G-23 at 18, 19).

Johnson calculated that the radon concentrations caused by the proposed gypsum stack would be only 5% of the proposed Florida standard. (T-7 at 66, 88). The concentrations would be far below the guidelines of the EPA and Surgeon General.

Mike Terpilak assessed the radiological issues for Hillsborough County. Terpilak, an independent consultant, has performed radiation-related risk assessments for the United States Health Service and other federal agencies since the 1950's. (T-8 at 5-8). In this case, Terpilak reviewed the reports prepared by Walsh, Roessler, and Gary Lyman. Terpilak also reviewed the most

recent radiation reports by the Atomic Energy Board of Canada, EPA and other regulatory agencies. (T-8 at 8).

Terpilak concluded that the increased health risk from the proposed gypsum stack would not be significant. (HC-17 at 26, 17). The proposed gypsum stack would cause a very small increase in radon concentrations over normal background levels. (T-8 at 9). Terpilak found that the annual risk from the Gardinier project was 0.9 lung cancers per 100,000 population. (T-8 at 9). By comparison, existing background levels of radon create a risk of 6 lung cancers per 100,000 population; EPA's limit for radon in dwellings creates a risk of 30 lung cancers per 100,000; and the normal risk of lung cancer from other causes in Florida is 72.2 per 100,000 population. (T-8 at 9, 13). By comparison to the risk from normal background levels of radiation, and the risk from other causes, Terpilak found that the risk associated with the proposed gypsum stack is very small. It can be regarded as insignificant. (T-9 at 9, 28-30).

Terpilak concluded that the stack will not have a health impact on the children in the Progress Village Elementary School. (T-8 at 29-30). His calculations included an evaluation of the impact on children. Children are more sensitive to radiation than adults, but Terpilak's calculations show that the proposed stack will not affect their health. (T-8 at 29-30).

The conclusions of all of these radiation experts were disputed by Dr. Gary Lyman, a witness for Manasota-88. (T-9 at 142-145). He stressed that there is uncertainty in any risk assessment. (T-9 at 87, 88). Lyman claims that the risk estimates are too low. (T-9 at 106). Lyman, however, has had very little prior experience assessing radiation-related risks. (T-9 at 123-131).

All of the experts agreed that the Board must decide whether the increased exposure from the proposed gypsum stack would be acceptable. (T-3 at 62-64; T-9 at 75, 120, 121). All of the experts, except Lyman, agreed that the expected increase in radon concentrations would be very small. The increase would be much lower than the existing levels of natural background radiation.

The predicted radiation levels would be far below the proposed Florida standard and far below the guidelines established by EPA, the U.S. Surgeon General and others. Since those standards and guidelines were established by experts on radiation exposure, and since those standards were designed to protect the public health and safety, it appears that the radiation levels anticipated in this case are acceptable. (T-8 at 28-30).

Nonetheless, Gardinier should comply with any applicable standards adopted by HRS or EPA for radiation protection. Since HRS and EPA expect to promulgate rules concerning phosphate-related radiation in the near future, those rules should be applied here to protect public health.

Cole, Walsh, Roessler, and Lyman agreed that radon concentrations in Progress Village would be reduced even further if the buffer were increased between the proposed stack and Progress Village. (T-9 at 148, 149). Indeed, Dr. Roessler's data concerning radon concentrations near the existing stack show that radon concentrations are reduced to an immeasurably small level at a distance of 3,500 feet from the stack. (T-3 at 42-44). At that distance, it is impossible to distinguish the radon caused by the existing gypsum stack from normal background concentrations of radon. (T-3 at 43).

Dr. Cole testified that, as a general proposition, radon concentrations would be reduced by 75% if the buffer were doubled in size. If the buffer between Progress Village and the proposed stack were increased from 1800 feet to 3400 feet, the buffer would be nearly doubled. This would virtually eliminate the risk in Progress Village of radon from the stack.

#### Need For Additional Radiation Data

Dr. Kwalick, the Director of the Hillsborough County Health Department, and Wally Johnson recommended that Gardinier collect additional data concerning the long-term radon emissions from its existing stack. (T-7 at 57, 58, 61, 84, 85, 89). Accordingly,

Gardinier should collect radon data on a monthly basis until it has at least 18 months of data for its existing stack. Gardinier began collecting radon data for its existing gypsum stack in November 1983 and may use this radon data in part to satisfy this 18 month requirement, provided HRS' designated expert finds that the data was collected and reported using acceptable methods.

It will take Gardinier two years to build the proposed gypsum stack, so Gardinier will be collecting this radon data while construction is underway. However, no gypsum shall be deposited at the site until all of the data is collected and approved. If Gardinier chooses to start construction of the proposed stack before the data collection program is complete, it will do so at its own risk.

If the data confirms that the radon emissions from the stack are  $26 \text{ pCi/m}^2/\text{sec.}$ , or less, on an annual average basis, then Gardinier may proceed with its project. If the data shows that radon emissions from the stack are greater than  $26 \text{ pCi/m}^2/\text{sec.}$  on an annual average basis, Gardinier shall submit additional data to the TBRPC, HRS, and Hillsborough County to show whether there has been a substantial deviation from the representations made by Gardinier in this proceeding. Similarly, Gardinier shall submit additional data to the TBRPC, HRS and Hillsborough County if the radon emissions from the proposed stack ever exceed  $26 \text{ pCi/m}^2/\text{sec.}$ , on an annual average, at any time in the future.

#### Radiation in Dust

Dr. Roessler calculated that the radium in the windblown dust from the gypsum stack would be approximately 1/10 millionth of the recommended standard established by the National Council on Radiation Protection for radium in uncontrolled areas. (T-3 at 26, 27). Roessler considered this level of radiation to be totally insignificant. (T-3 at 26-27). EPA studied Roessler's report and noted that the dust emissions from the stack are a "minor" source of radioactivity. (G-22 at 1; T-7 at 80, 81).

The radium in the dust would be deposited at a rate of approximately .02 to .2 pCi/m<sup>2</sup>/year. (T-3 at 27). By comparison, typical soil normally contains about 7,500 pCi in an area of one square meter, 1 centimeter deep (approximately 1/2 inch deep). (T-3 at 27). If gypsum dust were deposited at this rate for 100 years, the radium content of the soil would only be increased 1/4 of 1% over the amount that is normally contained in the first 1/2 inch of the soil. (T-3 at 27). According to the Hillsborough County Health Department, the radium in the dust from the proposed gypsum stack "would be a negligible fraction of the amount contributed by fertilizing lawns in the area every two years." (HC-2, Health Department Report dated March 29, 1982, at 3).

The radium in the dust would not affect the radium in crops grown on nearby lands. Gypsum is currently used to neutralize alkaline soils in the southeastern United States where peanuts and other crops are grown. (T-4 at 135, 136). Studies in these areas have shown that the gypsum has negligible effects on the radiation in the crops. (T-3 at 110).

Mike Terpilak, the County's radiation expert, agrees with Roessler's general conclusions on these issues. Terpilak recommends, however, that Gardinier conduct a long-term monitoring program to ensure that the dust emissions from the stack are kept to a minimum. (T-8 at 9, 21, 22; HC-2, Terpilak letter dated December 20, 1983). The monitoring program will show whether Roessler's predictions are correct and whether Gardinier should submit to further review in a substantial deviation determination.

### Fluorides

The fluoride emissions from the proposed stack should have no impact on human health. (T-4 at 21, 61). The HCEPC has a fluoride monitoring station located across Highway 41 from the Gardinier East Tampa Chemical Plant. (T-4 at 9-10). The



fluoride concentrations at this monitoring station are approximately 3 to 4 parts per billion. (T-4 at 33, 34). Although there is no EPA standard for fluorides, the Occupational Safety and Health Administration (OSHA) has a standard of 3 parts per million. (T-4 at 12). If the OSHA occupational standard were converted to allow for continuous residential exposure, the standard would be approximately .6 parts per million. Since the HCEPC measurements show concentrations of only 3 parts per billion at its monitoring station, the concentrations near the chemical plant are approximately 200 times less than the OSHA standard. (T-4 at 12-13).

The HCEPC evaluated the potential effects of fluorides from the proposed gypsum stack. (T-6 at 114, 115). HCEPC found that people are encouraged to consume 3 milligrams of fluoride per day for good dental health. (T-4 at 20, 59, 61; T-6 at 115). To consume 3 milligrams of fluoride per day, however, a person would have to eat 520 milligrams of pure gypsum each day. (T-6 at 115). If a child were playing at the HCEPC monitoring station near the East Tampa Chemical Plant, the child would have to consume 2,100 milligrams of dirt to ingest 3 milligrams of fluoride. (T-6 at 116).

Dr. Cole testified that, at the extremely low levels recorded near the Gardinier plant, fluoride has no known affect on human health. (T-4 at 21, 61). Under experimental conditions, fluoride can cause minor irritation of the eyes, nose, and skin, but only when the fluoride concentrations are approximately 1,000 times greater than the concentrations measured near the Gardinier chemical plant. (T-4 at 13-14, 20). Cole's testimony is supported by an EPA study which reports that "fluoride emissions from phosphate fertilizer facilities do not contribute to the endangerment of public health." (T-4 at 14; G-4).

## Dust

The proposed stack should not significantly affect the concentrations of wind blown dust in the area. (T-6 at 67). James Little, an air quality analyst with the consulting firm of Dames & Moore, calculated that the highest concentrations of dust from the gypsum stack will not exceed .4 micrograms per cubic meter on an annual average. (G-46 at 3-1; T-6 at 55, 56, 66, 67).

The predicted dust concentrations are only a tiny fraction of the ambient air quality standard in Florida -- 60 micrograms per cubic meter. (T-6 at 65, 66; G-46 at 3-1). The Florida standard is designed to protect the public from adverse health and welfare effects, including damage to vegetation. (T-6 at 75-76). Indeed, the Florida standard is more stringent than the national standard. (T-6 at 65, 66).

The predicted dust concentrations of .4 micrograms per cubic meter also can be compared to the existing dust concentrations in the general Tampa area, including the area near the Gardinier plant, which are currently about 50 micrograms per cubic meter. (T-6 at 66). In Little's opinion, the increase in dust from the proposed stack will be negligible, insignificant, and immeasurable. It would not produce any adverse impacts. (T-6 at 67; G-46).

## Gypsum as "Hazardous Waste"

During this proceeding, a great deal of discussion focused on whether gypsum is "hazardous waste." Gypsum was identified at one time as a substance which might be subject to federal regulation as a "hazardous waste," as defined by EPA. At present, however, gypsum is not regulated by EPA or any other state or federal agency as a "hazardous waste." (T-7 at 25, 69; 40 U.S.C. §§261.3, 261.4(b)).

Regardless of how gypsum is legally categorized, there is a certain element of hazardousness associated with gypsum because of its slightly radioactive and acidic characteristics. In this case, it is largely irrelevant whether gypsum is classified as "hazardous waste." The important issue is whether gypsum can be stored at the proposed site in an environmentally acceptable manner.

#### Other Environmental Impacts

The proposed project includes the relocation of the North Canal and other activities which will have impacts on plants, animals, and the natural resources of the site. These aspects of the project were reviewed by the Hillsborough County Environmental Protection Commission, Florida Department of Environmental Regulation, United States Environmental Protection Agency, and the Tampa Bay Regional Planning Council. All of these agencies concluded that the proposed project could be built in accordance with applicable local, state, and federal environmental regulations.

Except for the issues discussed in this development order, no significant dispute was raised concerning the other potential environmental impacts of Gardinier's proposed project. No competent substantial evidence was introduced by any of the parties, or any of the regulatory agencies, to dispute Gardinier's claim that it could build the proposed facility in conformance with the applicable environmental regulations.

Nonetheless, Gardinier still must receive certain DER permits before it can build the proposed gypsum stack. Moreover, Manasota 88 has already requested an administrative hearing to challenge the issuance of those DER permits. DER's representative, Bill Hennessey, testified that the Department is satisfied with the proposed site and design, but Gardinier must prove its entitlement to the DER permits in a formal administrative hearing. Thus, the potential environmental

impacts of Gardinier's project will be subject to further review. (T-7 at 7, 11, 12).

### Economic Impacts

Gardinier significantly affects the local, regional and state economy. Gardinier paid \$1.2 million in taxes to Hillsborough County in 1982. (T-5 at 117; G-36 at 2). Gardinier pays \$4 million in state taxes every year.

Gardinier is the 7th largest employer in the private sector of Hillsborough County. (T-5 at 116; G-36 at 1). It is the 2nd largest private firm in the county insofar as sales are concerned. Gardinier's sales last year were \$253 million. (T-5 at 116-117).

Gardinier employs 929 people at its East Tampa plant. All of these employees are residents of Hillsborough County. (T-5 at 119-120). They earn an average annual salary of \$24,516. (T-5 at 120; G-36 at 2).

Gardinier's activities have indirect impacts on the economy. Gardinier creates a total of 3,776 jobs in Hillsborough County and a total income of \$70.3 million per year. (T-5 at 121-122; G-36 at 4, 5). In addition, Gardinier creates a total of 4,747 jobs in the region and a total regional income of \$87.4 million per year. (T-5 at 125; G-36 at 8).

The construction of the proposed gypsum stack would create 141 jobs in Hillsborough County. (T-5 at 122, 123). The total employment created by the construction project would be 531 jobs for a 2 year period. (T-5 at 122-123). The total income generated would be \$20.2 million. (T-5 at 124; G-36 at 6). The project will cost \$34.5 million, much of which will be spent in Hillsborough County. (T-5 at 122-123).

Hillsborough County would suffer economically if the East Tampa Chemical Plant were closed. Hillsborough County and the region would lose the direct and indirect economic benefits described in the preceding paragraphs. To replace Gardinier,

Hillsborough County would have to bring 25 or 26 new firms into the County. (T-5 at 129). Even if new firms enter the county, it will be difficult for Gardinier's employees to find new jobs. (T-5 at 126-128; G-36 at 11, 12). They are typically older employees whose training is limited to work in the phosphate industry. (T-5 at 126-128). Moreover, the average salary at Gardinier is substantially greater than the average salary in Hillsborough County.

Gardinier also would suffer. Gardinier would have to spend \$500 million to relocate its chemical plant. (T-4 at 158, 159). Gardinier would not enjoy the full benefit of its recently completed \$100 million modernization program at the East Tampa Chemical Plant and Fort Meade mine. (T-6 at 89).

#### Impacts on Property Values

There was conflicting testimony as to whether the proposed project would affect property values. Lance Trigg, an appraiser hired by Gardinier, claimed that the proposed gypsum stack would not have any measurable effect on the market value of property in the area. (T-5 at 100). Although Trigg did not fully evaluate the potential long-term impacts of the proposed project (T-5 at 101, 102, 105, 107-110), his opinion was bolstered by the testimony of Dan Blood, a Hillsborough County employee who works with the Community Development Block Grant Program. Blood testified that the proposed stack would not reduce the property values in Progress Village; however, Blood believes the project may have an impact on the marketability of the homes in Progress Village. (T-8 at 73, 75). Wallace Bowers and other residents of Progress Village unequivocally believe the proposed stack will have negative impacts on property values in Progress Village. (T-10 at 45, 47, 89, 90, 93, 95).

## Impacts on Community Development Block Grant Program

A related issue is whether the proposed project will adversely affect Hillsborough County's Community Development Block Grant (CDBG) Program. Between 1975 and 1983, \$3,252,000 in CDBG funds were spent in Progress Village. (T-8 at 65, 66; T-10 at 26-29). The CDBG funds were used to improve the infra-structure in Progress Village, including streets, drainage, and other public facilities. (T-8 at 65-66; T-10 at 28, 29). As a result, Progress Village is an established, stabilized community. (T-8 at 70). Home ownership in Progress Village is approximately 92 percent. (T-8 at 69). According to Dan Blood, Progress Village now has the same services and facilities as any other neighborhood in Hillsborough County. (T-8 at 80).

Blood reviewed Gardinier's 1980 application for development approval. (T-8 at 63-64). If the project were built as originally proposed, Blood thinks the project might affect Progress Village in several ways: the vacant parcels of land near the gypsum stack might develop with higher intensity uses; there could be an increase in absentee ownership in Progress Village; residential property values might decline; and CDBG funding might have to be increased. (T-8 at 61-62). Blood's analysis, however, was limited because he had not reviewed the most recent proposals made by Gardinier, including Gardinier's plans for visual buffering and landscaping. (T-8 at 63, 64, 89). He also failed to analyze the alternative proposal recommended by the staff of the Department of Development Coordination and the Hillsborough County City/County Planning Commission.

## Racial Impacts

Robert Saunders, the Civil Rights Officer for Hillsborough County, warned the Board that it must be concerned with the racial impacts of its decision in this case. Saunders noted that Title VI and Title VIII of the 1964 Civil Rights Act, and Section 109 of the Community Development Act, could be invoked by the

residents of Progress Village if there were race discrimination. (T-8 at 39, 51, 52). However, Saunders refused to express any opinion about whether discrimination had occurred or would occur if the Gardinier project were approved. (T-8 at 39, 46, 47; HC-20 at 13,14).

Saunders also refused to say that the selection of the proposed site was related to the fact that Progress Village is primarily black. (T-8 at 49). Although some of the residents of Progress Village made this allegation, there was no competent substantial evidence introduced by anyone in this proceeding to show that the selection of the proposed site was based on anything other than its geotechnical and environmental suitability for gypsum storage.

Several alternative sites were discussed during this hearing. The expert testimony, however, showed that the proposed site was the best area for gypsum storage because of its desirable geological and geotechnical characteristics.

It has been suggested that this project will have an impact on Progress Village. Any development on the proposed site could have an impact on Progress Village, simply because the proposed site is located near Progress Village.

The proposed site is zoned under the 1982 Amended Land Use Element for light industrial uses. It was undisputed that the proposed gypsum stack would have less effect on Progress Village than many of the light industrial uses that could be readily approved for this site. (T-5 at 85). Indeed, almost any other industrial use would have greater impacts on the traffic, noise, dust, lighting and public services in Progress Village.

If the proposed gypsum stack is properly designed and buffered in accordance with the terms and the conditions of this development order, it will have little or no impact on Progress Village and other nearby areas. There will be little or no noise, traffic, dust, lighting, odor, or other objectionable features associated with the project. For these reasons, the claims concerning race discrimination in this case appear to be unfounded. (T-8 at 132).

Land Use Issues Under Chapter 380

Section 380.06, Florida Statutes (1983), establishes a procedure for reviewing developments of regional impact. Under this statute, the local government must consider whether, and the extent to which:

- "(a) The development unreasonably interferes with the achievement of the objectives of an adopted state land development plan applicable to the area;
- (b) The development is consistent with the local land development regulations; and
- (c) The development is consistent with the report and recommendations of the regional planning agency. . . ."  
§380.06(13), Fla. Stat. (1983).

In this case, there is no state land development plan applicable to the area. Thus, the first criterion is irrelevant. (T-8 at 114-116).

The proposed development is consistent with the report and recommendations of the Tampa Bay Regional Planning Council. The TBRPC recommended approval of the project subject to certain conditions. Those conditions are reasonable and appropriate. (T-8 at 114-116). They are adopted by reference herein and explicitly set forth in Section IV, below.

As proposed, however, the project is not consistent with local land development regulations. Accordingly, the Hillsborough County Department of Development Coordination (DDC) and the Hillsborough County City/County Planning Commission (Planning Commission) have recommended denial of the project. (T-8 at 105, 106, 113-116). They concluded that the project is not consistent with the Hillsborough County comprehensive plan or zoning regulations. The grounds for their recommendations are discussed in more detail below.

Hillsborough County Horizon 2000 Comprehensive Plan

Gardinier's project is subject to review under the 1977 Hillsborough County Horizon 2000 Comprehensive Plan. Gardinier



filed its request for C-U rezoning on September 20, 1982, prior to the effective date of the 1982 Amended Land Use Element (ALUE). (T-8 at 102). Section 10 (the "grandfather" provision) of the ALUE provides that where, as here, an application is filed before the effective date of the ALUE, that application can be reviewed under the 1977 LUE.

The 1977 LUE authorizes industrial land uses in "urban transition" zones. Approval of such uses, however, is not automatically granted. Proposed industrial uses in urban transition zones are subject to review under the following criteria:

- (1) Location free of conflicts with other types of less intensive land uses;
- (2) Trend analysis;
- (3) Location analysis based upon accessibility, traffic count, and available municipal services;
- (4) Environmental impact analysis;
- (5) Design and aesthetic aspects;
- (6) Cost-benefit analysis.

Gardinier's proposed project is an industrial use located in an urban transition zone; however, the DDC and Planning Commission concluded that the project as proposed did not satisfy criteria 1, 2, and 5, above. (T-8 at 103, 105; HC-2, DDC Report dated February 16, 1984, at 2).

Under the 1977 LUE, it does not matter whether the proposed project is categorized as a heavy industrial or light industrial use. The issue is whether the project is compatible with less intensive land uses (e.g., residential developments). As proposed, the project is not compatible. (HC-22 at 50-53).

A 200' tall gypsum stack will tower over the tree tops. It will dwarf nearby single-story residences. (T-8 at 106). It will visually intrude into residential neighborhoods. (T-12 at 88; HC-22 at 51, 52).

Indeed, in its application for development approval, Gardinier concedes that:

"Under optimum visibility conditions of no visibility obstruction, the gypsum disposal field, at its maximum height, will be visible at 22 miles as a line on the horizon. At a distance of 15 miles, the top half of the 200-foot high gypsum

disposal field would be visible under ideal conditions." (Emphasis supplied.) (HC-1 at 57).

The application also notes that "[t]he existing stack can be seen across Hillsborough Bay." (HC-1 at 59).

A huge 389 acre, 200' gypsum stack is aesthetically unacceptable. (T-8 at 105, 106; HC-2, DDC Report dated February 16, 1984, at 3). It would constitute a permanent change in the landscape of Hillsborough County. (T-12 at 76). As Gardinier admits in its application,

"There is no doubt that this 400 acre gypsum disposal field will be an imposing structure when completed. Its composition and scale will be substantially different than most of the surrounding buildings or structures which rarely stand more than one story high." (Emphasis supplied.) (HC-1 at 59).

As proposed, the gypsum field is not compatible with less intensive land uses. The proposed 200' gypsum stack is not consistent with the policies of the Horizon 2000 Plan which require industrial developments to be aesthetically compatible with surrounding uses. See Horizon 2000 Plan, Policy Element, at Policy 7.05; Policy 7.05, guideline (b); Policy 103; Policy 103, guidelines (e), (f), (g). Thus, the proposed 200' gypsum stack cannot be approved under the 1977 LUE of the Horizon 2000 Plan.

#### Hillsborough County Zoning Regulations

As part of its DRI, Gardinier requested the Board to rezone the proposed site to "C-U" community unit zoning. Gardinier's proposed rezoning, however, violates the provisions of the Hillsborough County Zoning Regulations.

The zoning regulations provide that any project in a "C-U" zone is subject to "reasonable" height restrictions. In addition, the proposed "C-U" land use must be located and arranged so as to ensure "complete compatibility" with surrounding areas. (T-8 at 110; T-12 at 91, 92).

Since the proposed gypsum stack could be classified as either a heavy industrial or a light industrial land use, it is

appropriate to look at the height restrictions in heavy and light industrial zones when determining what height limitation would be "reasonable" for the proposed "C-U" use. (T-8 at 108, 109).

Under the county's zoning regulations, both heavy and light industrial zones are governed by the height limitation used in the "H-C" highway commercial zone, to-wit:

"No building or structure shall exceed thirty-five feet in height, provided that an additional height of one foot for each additional one foot of setback of a building or structure from any required setback line shall be permitted, up to a maximum total height of one hundred feet, . . . ."  
(Hillsborough County Zoning Regulations at page 26-2)

If the proposed gypsum stack were built in a heavy or light industrial zone, it would be subject to 100' height limitation. (T-8 at 109, 110). Although the "H-C" height limitation is not controlling in a "C-U" zone, it provides a guide as to what is a "reasonable" height in this case. (T-8 at 108, 109).

The 100' limitation is the maximum height allowed in any industrial zone in the county. There are taller structures in the county, but those structures are exempt from the 100' limitation.

Section 5 of the Hillsborough County Zoning Regulations authorizes exemptions from the height limitation for towers, water tanks, silos, and other similar structures. (T-7 at 118). These exempt structures are all relatively tall and thin. They do not constitute a huge mass or artificial landform on the horizon.

A massive 389 acre gypsum stack does not qualify for an exemption. It is not expressly identified in Section 5 of the zoning regulations as a structure that would qualify for an exemption. Moreover, it is not similar to the structures that do qualify for an exemption. It is not thin or spindly, like a silo or smoke stack. Thus, if the stack were more than 100 feet tall, it would be inconsistent with the County's zoning regulations. (T-7 at 102, 103).

There are several other reasons why a 100' height limitation is "reasonable" and should be applied. Gardinier has agreed to

plant trees around the gypsum stack. (T-5 at 53-58; T-12 at 89). These trees will reach a maximum height of 90 to 100 feet. If the stack were limited to a height of 100 feet, it would be almost completely hidden behind the trees. (T-5 at 53-58). From most vantage points, people would only see trees, not a gypsum stack. (T-7 at 112). This would substantially eliminate the aesthetic impacts of the project.

A 100' limit on the stack would provide a better transition between the taller industrial structures at the East Tampa Chemical Plant and the low, single-story homes in Progress Village. A 100' limit on the stack would create a transitional height. It would help ensure the project's compatibility with the surrounding neighborhoods.

There is a third reason for limiting the gypsum stack to a height of 100 feet. Pearce Nelson and Rudy Cabina, Gardinier's president and vice-president, testified that Gardinier expects to find a use for gypsum within the next 10 to 15 years. (T-4 at 85). If so, Gardinier will not need the gypsum stack after that time. Since a 100' stack will provide approximately 20 years of gypsum storage, a 100' stack would satisfy Gardinier's current needs. (T-8 at 124). At this time, it is unnecessary to give Gardinier storage for more than 20 years because there is no proven need for that additional storage.

#### Staff's Alternative Proposal

Section 380.08(3), Florida Statutes (1983), requires local governments to "indicate any changes in the development proposal that would make it eligible to receive [approval] . . . ." Since the staff of the DDC and Planning Commission recommended denial of Gardinier's project, the staff considered various alternatives that might make the stack approvable. The staff concluded that the project could be approved, if certain modifications were made in Gardinier's proposal. (T-8 at 145, 146).

First, the DDC and Planning Commission decided that the Board should adopt all of the recommendations made by the TBRPC, HCEPC, HRS and Hillsborough County consultants. Those recommendations included many conditions for development approval which are set forth in Section IV, below.

Second, the DDC and Planning Commission concluded that the buffer should be increased between the stack and Progress Village. Increasing the buffer will further reduce the potential for problems with airborne radiation, fluorides, and dust. The buffer could be increased by eliminating the northeast corner of the stack and leaving the existing TECO transmission line in place. (T-8 at 122, 123). This would increase the buffer between the stack and the Progress Village Elementary School from 1,800 feet to 3,400 feet. (T-6 at 40; T-8 at 123, 124; T-12 at 134).

Third, the DDC and Planning Commission recommended that the stack be limited to a height of 100 feet. (T-8 at 123, 124). As previously noted, a 100' height limitation would be "reasonable." It would be consistent with the Hillsborough County zoning regulations. It also would be consistent with the policies in the Horizon 2000 Plan which encourage a harmonious transition from industrial to residential areas. See Horizon 2000 Plan, Policy Element, at Policies 1.03 and 7.05.

The alternative proposed by the DDC and Planning Commission also includes the extensive landscaping and buffering program that was proposed by Gardinier. Gardinier will build elevated berms and then plant a thick buffer of trees and shrubs around the proposed site. Trees and shrubs also will be planted along Madison Avenue, Progress Village Boulevard, and 78th Street. (G-50; T-5 at 54-58). The trees, shrubs and berms will hide the proposed gypsum stack from view at most locations in the area. (G-50; T-5 at 53-58).

If the proposed gypsum stack were modified in the manner recommended by staff, there would be little or no noise, dust, odor, traffic, radiation, fluorides, or other potential impacts from the stack. Under these circumstances, the stack would be

compatible with the residential development in Progress Village. (T-8 at 149). It would be consistent with local land development regulations. As modified, the gypsum stack could be approved pursuant to Section 380.06, Florida Statutes.

Staff's alternative proposal is economically viable. Gardinier's total annual cost for the proposed gypsum stack will be \$3 million. Staff's proposal will increase the total annual cost by \$1 million. (T-8 at 125, 126). This is not a very significant increase when compared to Gardinier's annual sales of \$253 million. (T-5 at 116-117). It is even less significant when compared to the cost of the other alternatives discussed below, or the cost of relocating the \$500 million East Tampa Chemical Plant. Indeed, Staff's alternative proposal will save \$600,000 for Gardinier because Gardinier will not have to relocate the existing TECO transmission lines that cross the northeast corner of the proposed site.

#### Alternative 1: Expand Existing Stack

Several alternative sites were evaluated. These sites, however, all have one or more fundamental flaws which make them environmentally less suitable for gypsum disposal than the proposed site. In contrast, DER and HCEPC have given their preliminary approval of the proposed location. (T-7 at 12). From an environmental perspective, the DER, EPA, and U.S. Army Corps of Engineers found the proposed site to be the most acceptable alternative. (T-4 at 70, 71, 105; T-7 at 12, 13).

The first alternative would be to expand Gardinier's existing stack. Unfortunately, this is not acceptable. The existing gypsum stack could be expanded, but this would be an expensive, short-term solution which would prolong and perhaps exacerbate the existing environmental problems at that site. (T-4 at 140, 141; T-6 at 80, 81; T-7 at 9, 10).

If Gardinier combined all of the available space near the existing stack, it would have approximately 65 acres of land

which could be used at a cost of \$19 million. (T-6 at 18, 23). This area would only provide 5 years of gypsum storage. After 5 years, Gardinier would have to find a new site.

DER does not recommend this alternative. (T-4 at 66, 140, 141). The existing stack is a source of long standing environmental concern. (T-7 at 9). Bill Hennessey, formerly the Manager of the DER District Office in Tampa, explained that the existing stack is a large pollution source in a very bad location. (T-7 at 9, 11). The expansion of the existing stack would simply continue and perhaps increase the pollution problems at the existing site. (T-7 at 9-11). DER would prefer to close the existing stack as soon as possible.

#### Alternative 2: North of Existing Stack

Gardinier sought DER approval of a 214 acre area which is located north of the existing gypsum stack, west of Highway 41, and north of Archie Creek. (G-30). This site is adjacent to Hillsborough Bay. (T-4 at 65). It consists primarily of tidal marshes and coastal wetlands. The DER, HCEPC, and EPA rejected this site because of the wetlands and the potential for pollution problems. (HC-1 at Appendix 2, p. 10; T-4 at 65; T-6 at 12, 13). This site, like Gardinier's existing site, poses an unacceptable threat to the Bay. (G-28; G-29).

#### Alternative 3: Cooling/Retention Ponds

Gardinier has two parcels of land located immediately east of Highway 41 and the East Tampa Chemical Plant. (T-4 at 67-69). Gardinier's existing cooling/retention ponds are located on one parcel containing 250 acres of land. Gardinier also owns 116 acres immediately south of the retention ponds. These two areas could be combined to create a total of 366 acres, but the usable storage space would only amount to approximately 170 to 200

acres. (T-4 at 68, 69; T-6 at 13). In addition, Gardinier would have to relocate the retention/cooling ponds. (T-4 at 68-69).

This area, however, has environmental limitations. The geotechnical data shows that, unlike the proposed site, the clay Hawthorn formation beneath this area is not uniform or continuous. There are hydraulic connections or conduits between the shallow aquifer and the deep Tampa aquifer. The geotechnical report prepared by Gardinier's consultants for the 238 acre site states that:

". . . local depressions in water levels in the upper aquifer, to below sea level, indicate the aquifers are probably hydraulically connected." (G-32 at 2).

\* \* \* \* \*

"We believe the unconfined [shallow] and confined [deep] aquifers are hydraulically connected in the northern third of the [cooling/retention] pond as evidenced by the depressions in the groundwater surface in the northern part of the site." (G-32 at 17, 18).

The geotechnical report for the 116 acre site states that the two aquifers "are hydraulically connected near the southwest corner of the site." (G-33 at 18, 19).

If Gardinier's process water escaped at this location, the process water could readily move into the Tampa formation. By comparison, the proposed 389 acre site has a uniform, thick layer of clay which separates the upper and lower aquifers.

Moreover, this area is only 500 feet from the homes along Riverview Drive. (T-6 at 38, 39; T-12 at 144, 145). It also is close to the Alafia River. (H-1 at Appendix 2, p. 10).

#### Alternative 4: The Goldstein Tract

Gardinier owns almost 1,000 acres of land known as the Goldstein Tract. This land is east of 78th Street and directly south of Progress Village. (T-4 at 69, 122). DER, EPA, and the U.S. Army Corps of Engineers have stated that this area is environmentally unacceptable for gypsum disposal. (T-6 at 13, 14).



The Goldstein Tract has wetlands, sinkholes, and a bald eagle nesting area. (HC-1 at Appendix 2, p. 10; T-4 at 69, 70). The sinkholes and fractures in the Hawthorn formation create conduits to the potable aquifer beneath the site. (T-4 at 69, 70, 89). Gardinier and the County could not be confident that new sinkholes would not develop. (G-34 at 11; T-4 at 89, 118-120). If gypsum were stored on this site, the potable groundwater in the area would be jeopardized.

#### Alternative 5: Pipeline or Railroad to Polk County

Gardinier considered the possibility of shipping gypsum by pipeline to the eastern portion of Hillsborough County or to Polk County. If gypsum were shipped by pipeline, Gardinier would have to install 4 pipes and a pumping system all the way across Hillsborough County. (T-4 at 75). In addition, a new gypsum field would have to be constructed at the end of the pipeline. (T-4 at 76, 77).

Gardinier was unable to find a suitable tract of land (i.e., 1000 acres or more) for gypsum disposal in eastern Hillsborough County. (T-4 at 82). If the pipeline went to Polk County, it would require a capital expenditure of \$128 million, plus \$35 million to build the gypsum field. (T-4 at 76, 77). These costs, combined with an annual operating cost of \$8 million, would result in an total cost of \$11 million per year. (T-4 at 75-77, 123, 124).

If gypsum were sent to Polk County by railroad car, the transportation system (loading and unloading facilities; rail cars; temporary storage facilities, etc.) would cost \$100 million. (T-4 at 79). The annual rail freight charge would be \$16 million and the annual operating cost would be \$6.5 million. (T-4 at 81). The total annual costs for a railroad shipping system to Polk County would be \$25 million. (T-4 at 81, 82, 125).

Gardinier claims that a railroad or pipeline system would be so expensive that it would not be economically feasible. These proposals are certainly much more expensive than the proposed 389 acre stack. The total annual cost of the proposed stack is \$3 million. (T-4 at 123, 124).

More importantly, these proposals are environmentally unacceptable. Under these proposals, gypsum would be stored over a potable aquifer in Hillsborough or Polk County. Bill Hennessey, Dr. Robert Powell, and Dr. Jacqueline Michel agreed that the proposed site, which is located over a brackish aquifer, is environmentally more desirable than a site located over a potable aquifer. (T-7 at 11-13, 41; T-9 at 14). In addition, gypsum would be continuously hauled or piped all the way across Hillsborough County. The risk of a spill, and the risk of contaminating a drinking water aquifer, would be much greater.

## II. CONCLUSIONS OF LAW

The Board, the governing body of Hillsborough County, has jurisdiction over this matter pursuant to Section 380.06, Florida Statutes. The public notice requirements of Section 380.06, Florida Statutes, and Section 125.66, Florida Statutes, have been satisfied.

The Board has reviewed and considered Gardinier's application for development approval, the report of the Tampa Bay Regional Planning Council, the reports of the other individuals and agencies that have been submitted into evidence, and the testimony of the expert and lay witnesses in this case. The Board evaluated the factors identified in Section 380.06(11), Florida Statutes, including the project's impact on the local and regional environment, economy, public facilities, public transportation facilities, housing, and other pertinent matters. Having considered all of the evidence presented in this case, and having balanced all of the criteria identified in Chapter 380.06, Florida Statutes, the Board concludes as a matter of law that:

1. The development will not unreasonably interfere with the achievement of the objectives of any adopted state land development plan applicable to this area;
2. The development proposed by Gardinier is not consistent with local land development regulations; and
3. The development is consistent with the report and recommendations of the Tampa Bay Regional Planning Council, subject to the conditions and limitations recommended by the TBRPC.

The proposed 200' tall, 389 acre gypsum stack is inconsistent with local land use regulations, including the Hillsborough County Zoning Regulations and Horizon 2000 Plan. Accordingly, Gardinier's application for development approval and request for rezoning are denied.

In accordance with the requirements of Section 380.08(3), Florida Statutes (1983), the Board has evaluated several alternatives to determine whether there are any changes in Gardinier's proposal that would make it acceptable. The Board concludes that the best alternative is to use the proposed site, subject to certain modifications and conditions. First, the Board adopts all of the recommendations made by the Tampa Bay Regional Planning Council, Hillsborough County Environmental Protection Commission, Department of Environmental Regulation, Department of Health and Rehabilitative Services, and consultants to Hillsborough County. Those recommendations are set forth as conditions for development approval in Section IV, below.

The Board also adopts the recommendations of the Department of Development Coordination and the Hillsborough County City/County Planning Commission. Specifically, the Board agrees that the buffer should be increased between Progress Village and the proposed stack. A minimum distance of 3,400 shall be maintained between the Progress Village Elementary School and the stack. This buffer shall be created by eliminating the northeast corner of the stack and by leaving the TECO transmission line in its current location. This will modify the shape of the stack to a "home plate" design. In addition, the proposed stack should be limited to a height of 100 feet.

If the stack is modified in this manner, it will be compatible with the surrounding areas. There will be a large buffer between the stack and any residential development. There will be trees planted around the perimeter of the stack. If the height of the stack is limited to 100', it will be virtually hidden from view behind the trees. There should be little or no noise, odor, dust, vibration, or other adverse impacts. Appropriate environmental safeguards, set forth as conditions to this development approval, should minimize or eliminate any potential environmental concerns.

As modified, the gypsum disposal area is compatible with adjacent developments, consistent with local land use regulations, and eligible for approval by this Board.

Accordingly, this alternative proposal is approved, subject to all of the terms and conditions contained in this development order, including those conditions set forth in Section IV, below. The approval of this alternative proposal constitutes approval of the development of regional impact under Chapter 380, Florida Statutes, and approval of the requested "C-U" rezoning under Section 22 of the Hillsborough County Zoning Regulations.

The Board will require Gardinier to strictly comply with the conditions contained in this development order. Among other things, the Board shall rigidly enforce its requirement that Gardinier keep a healthy cover of grass or other suitable vegetation on the slopes of the gypsum stack, and a thick buffer of trees and shrubs around the stack. Gardinier has represented that it will close the East Tampa plant if its vegetation programs are unsuccessful. The Board intends to hold Gardinier to its promise.

In addition, Gardinier shall be required to promptly establish a comprehensive monitoring program for fluorides, particulates (dust), radon, and surface and ground water quality. These programs shall be approved by the Hillsborough County Environmental Protection Commission and the Florida Department of Environmental Regulation. Gardinier shall provide copies of its monitoring data to the HCEPC, DER, Hillsborough County Health Department, HRS, and the United States Environmental Protection Agency. If the monitoring program reveals any violations of local, state, or federal standards, or if there are any significant fluctuations (as defined by HCEPC) in the monitoring data, Gardinier shall explicitly identify these matters to the regulatory bodies identified above within 14 days after discovering this information.

Many of the concerns raised by the residents of Progress Village are directly related to Gardinier's failure to develop a good public relations program with the community. Gardinier has done a poor job of communicating with the residents of Progress Village. If Gardinier had informed the residents of Progress

Village about its project from the outset, many of their concerns might have been addressed and resolved by now.

Gardinier claims it is a "good neighbor," but it has not done anything to improve the well-being of Progress Village. It has not offered to provide any assistance for community development or small businesses in Progress Village. It has not established a public relations committee with the members of the Progress Village Civic Council. It has not established an information hot-line or complaint center where the residents of Progress Village could express their concerns, if they believe the plant is not being operated properly. Gardinier has not tried to actively recruit the residents of Progress Village to work at the Gardinier plant. Although the Board cannot force Gardinier to adopt these recommendations, it strongly urges Gardinier to adopt these and other proposals that would assist Progress Village and the rest of Gardinier's neighbors.

### III. GENERAL PROVISIONS

1. The legal description set forth in Exhibit "A" is hereby incorporated into and by reference made a part of this development order.

2. All provisions contained within the application for development approval marked "Exhibit B" shall be considered conditions of this development order unless inconsistent with the terms and conditions of this development order, in which case the terms and conditions of this development order shall control.

3. This resolution shall constitute the development order of Hillsborough County in response to the application for development approval for the Gardinier, Inc., Phase II Development of Regional Impact. This resolution also constitutes the Board's response to Gardinier's request for a "C-U" rezoning.

4. The definitions contained in Chapter 380, Florida Statutes (1983), shall govern and apply to this development order.

5. This development order shall be binding upon Gardinier and its heirs, assignees or successors in interest including any entity which may assume any of the responsibilities imposed on Gardinier by this development order. It is understood that any reference herein to any governmental agency shall be construed to mean any future instrumentality which may be created or designated as successors in interest to, or which otherwise possesses any of the powers and duties of, any branch of government or governmental agency.

6. In the event that any portion or section of this development order is determined to be invalid, illegal or unconstitutional by a court of competent jurisdiction, such decision shall in no manner affect the remaining portions or sections of this development order which shall remain in full force and effect.

7. Whenever this development order provides for or otherwise necessitates reviews or determinations of any kind subsequent to its issuance, the right to review shall include all

directly affected government agencies and departments as are or may be designated by the Board of County Commissioners of Hillsborough County to review development of regional impact applications as well as all governmental agencies and departments set forth under applicable laws and rules governing developments of regional impact.

8. In each instance in this development order where Gardinier is responsible for ongoing maintenance of facilities at its proposed gypsum disposal area, Gardinier may transfer any or all of its responsibilities to improve and maintain those facilities to an appropriate private body created to perform such responsibilities. Provided, however, that before such transfer may be effective, the body to which responsibility has been or will be transferred must be approved by the County, upon determination that the entity in question can and will be responsible to provide maintenance as required in this development order, which approval shall not be unreasonably withheld.

9. Development activity constituting a substantial deviation from the terms or conditions of this development order or other changes to the approved development plans which create a reasonable likelihood of additional adverse regional impact, or any other regional impact not previously reviewed by the Regional Planning Council shall result in further development of regional impact review pursuant to law and may result in Hillsborough County ordering a termination of development activity pending such review.

10. Any development activity constituting a change from the approved development plan shall also be reviewed, where appropriate, pursuant to the provisions of the Hillsborough County Zoning Regulations, including the provisions for "C-U" community unit developments.

11. The County Administrator of Hillsborough County shall be responsible for monitoring all terms and conditions of this development order. For purposes of this condition, the County Administrator may rely upon or utilize information supplied by



any Hillsborough County department or agency having particular responsibility over the area or subject involved. The County Administrator shall report to the Board of County Commissioners any findings of deviation from the terms and conditions of this development order. The County Administrator shall issue a notice of such non-compliance to Gardinier and, if the deviation is not corrected within a reasonable amount of time, shall recommend that the Board of County Commissioners establish a hearing to consider such deviation.

12. Gardinier shall file an annual report in accordance with Section 380.06(16), Florida Statutes (1983), and appropriate rules and regulations. Such report shall be due on the anniversary of the effective date of this development order for each following year until and including such time as all terms and conditions of this development order are satisfied. Such report shall be submitted to the County Administrator who shall, after appropriate review, submit it for receipt by the Board of County Commissioners. The Board of County Commissioners shall review the report for compliance with the terms and conditions of this development order and may issue further orders and conditions to ensure compliance with the terms and conditions of this development order. Gardinier shall be notified of any Board of County Commissioners' hearing wherein such report is to be reviewed. Provided, however, that the receipt and review by the Board of County Commissioners shall not be considered a substitute or a waiver of any terms or conditions of this development order. The report shall contain:

- a. The information required by the State Land Planning Agency to be included in the Annual Report, which information is described in the Rules and Regulations promulgated by the State Land Planning Agency pursuant to Section 380.06, Florida Statutes;
- b. A description of all development activities proposed to be conducted under the terms of this development order for the year immediately following submittal of the annual report;

- c. A statement listing all applications for incremental review required pursuant to this development order or other applicable local regulations which Gardinier proposes to submit during the year immediately following submittal of the annual report;
- d. A statement setting forth the name(s) and address(es) of any heir, assignee or successor in interest to this development order.

13. Gardinier's annual report also shall be submitted to the Zoning Administrator for review pursuant to Section 22(J) of the Hillsborough County Zoning Regulations, and other applicable rules and regulations.

14. The provisions of this development order shall not be construed as a waiver of or exception to any rule, regulation, or ordinance of Hillsborough County, its agencies or commissions; and to the extent that further review is provided for in this development order or required by Hillsborough County, said review shall be subject to all applicable rules, regulations, and ordinances in effect at the time of the review.

15. This development order shall become effective upon adoption by the Board of County Commissioners of Hillsborough County in accordance with Section 380.06, Florida Statutes (1983).

16. Upon adoption, this development order shall be transmitted by the Ex Officio Clerk to the Board of County Commissioners, and by certified mail, to the State Land Planning Agency, the Tampa Bay Regional Planning Council, and Gardinier.

17. Unless expressly provided otherwise, terms and conditions one (1) through and including sixty-one (61) of Section IV shall be satisfied prior to the commencement of construction of the new gypsum storage area.

#### IV. CONDITIONS AND LIMITATIONS

The following conditions and limitations on development approval are based on the recommendations of the Tampa Bay Regional Planning Council, the Hillsborough County Environmental Protection Commission, the Florida Department of Health and Rehabilitative Services, and Hillsborough County's consultants. The recommendations from each of these entities are discussed separately below. This document also explains the reasons for any deviations from those recommendations.

##### TBRPC Recommendations

The TBRPC's recommendations are contained in the TBRPC report to the Board (dated October 14, 1983). The TBRPC report is part of Hillsborough County Exhibit No. 2, the blue notebook compiled by the county staff.

##### No. 1 - TBRPC

"Prior to final approval of construction plans, Gardinier shall provide data to address and assure that the design reflects the variance of potentiometric head present on the project site rather than a design based on the average potentiometric head along the cross-section." (TBRPC Recommended Order, ¶ 1)

This requirement was recommended by Dr. Robert Powell. During the Board's public hearings in this case, Dr. Powell testified that this requirement had been satisfied by Mike Gurr's groundwater analyses for Gardinier. (T-7 at 48, 49).

##### No. 2 - TBRPC

"To provide the best possible protection to surrounding air quality, any approval of this proposal shall require that Gardinier provide to Hillsborough County and TBRPC, a clear and convincing verification from a professionally qualified or licensed individual representing a responsible entity that

airborne fluorides do not pose a significant public health hazard to humans to preclude approval of this proposed project." (TBRPC Recommended Order, ¶ 2)

This requirement also has been satisfied. Dr. Phillip Cole, a professor and the head of the Department of Epidemiology of the School of Public Health at the University of Alabama in Birmingham, testified that the extremely low levels of fluoride recorded near the Gardinier plant will have no effect on human beings. (T-4 at 21). Cole's conclusion was supported by the testimony of Dr. Lewis Rogers, a former professor at the University of Florida, who has 50 years of experience in air pollution control, and Rick Wilkins, the Deputy Director of the Hillsborough County Environmental Protection Commission. (T-4 at 5, 6, 12, 13, 14; T-6 at 114-116). Their testimony was bolstered by an EPA study which stated that "fluoride emissions from phosphate fertilizer facilities do not contribute to the endangerment of public health." (T-4 at 14; G-4).

### No. 3 - TBRPC

"To assure that the existing stack is properly and adequately decommissioned and closed, Gardinier shall prepare and present for review and approval to Hillsborough County and TBRPC a plan prepared pursuant to the U. S. Environmental Protection Agency regulations. This plan shall identify the manner proposed to close the top of the stack and the existing collection system for leachate and shall address Gardinier's commitment to maintain and/or improve this system over future years. This plan shall also require a commitment to maintain vegetation on the existing stack over future years." (TBRPC Recommended Order, ¶ 3)

The plan to close the stack also shall comply with any applicable requirements adopted by the Florida Department of Environmental Regulation for the closure of gypsum stacks. If the Department has no such regulations at the time of closure, the HCEPC shall adopt appropriate requirements for the closure of the proposed stack. Additional requirements were recommended by

Dr. Powell. Those requirements are discussed in paragraphs 44-46, below.

No. 4 - TBRPC

"Any approval of this development shall require that in the event gypsum is declared to be a hazardous waste, Gardinier shall be required to come into immediate compliance with applicable law and regulations. Gardinier shall acknowledge its legal responsibility for dealing with the waste in an acceptable manner as referenced in the ADA." (TBRPC Recommended Order, ¶ 4)

No. 5 - TBRPC

"Any approval of this proposed development shall require implementation of the design and construction standards proposed in the ADA or as they may be amended pursuant to condition number one above including but not limited to the following:

- a. Extend the clay liner to the slurry trench wall.  
Gardinier shall have the opportunity to confirm the adequacy of the existing design proposal relating to the horizontal extent of the clay liner. Confirmation of the adequacy of the existing design shall be made by a qualified Professional Engineer, under seal.
- b. Monitoring wells shall be installed as indicated by the selection of the final construction design criteria pursuant to condition number one.
- c. Verification, by a qualified Professional Engineer, under seal, during final design of the facilities that the permeability of the clay liner under vertical load of 1,000 psf is at least  $1 \times 10^{-7}$  cm/sec.
- d. Design the components of the leachate collection system to reduce the piezometric head of the contained water in the center of the gypsum stack and to maintain a gradient between the groundwater inside and outside of the area contained by the slurry trench wall as proposed in the ADA or as amended pursuant to condition number one.

- e. Design the leachate collection system to allow for settlement of the bottom of the stack.
- f. Maintain strict quality control during construction such that the liner system maintains minimum thickness throughout. This procedure shall include adequate testing of compaction, percent clay, etc. A qualified Professional Engineer shall be on site to certify construction in accordance with design/permitting criteria.
- g. Verification, by a qualified Professional Engineer, under seal, that the nature of the Hawthorn formation is such that adequate slurry wall depth can be constructed.
- h. Verification, by a qualified Professional Engineer, under seal, that the amount, variability, spatial limits, and material properties of the clay deposit at the site is adequate for use as proposed in the ADA.
- i. Design of the recirculation system to the most critical case, i.e., the short duration high intensity storm event, if it is greater than the proposed 24-hour duration storm.
- j. Design of the underdrain system for leachate collection for continuous operation during the active life of the disposal field. Adequate maintenance of the drain system shall be provided to ensure its continued effectiveness for reducing the build-up of groundwater within the gypsum stack. Following closure, this leachate shall be contained and treated as appropriate before final disposal.
- k. Construction of all leachate collection systems including: slurry walls, underdrains, and clay liners shall be completed before the beginning of any disposal operations on the site." (TBRPC Recommended Order, ¶ 5)

Dr. Robert Powell testified that it will be unnecessary to extend the clay liner to the slurry trench wall, as suggested in

subsection 5(a), above. He confirmed that the proposed design is adequate, if modified in the manner he recommended. (See paragraphs 44-48 below). Accordingly, the requirement in subsection 5(a) has been satisfied.

Requirement No. 5(d) has been satisfied. The leachate collection system is designed to reduce the piezometric head of the water in the center of the gypsum stack. The covered ditch is designed to maintain a proper gradient between the groundwater inside and outside of the slurry trench wall. This will ensure that the groundwater inside the slurry trench wall does not flow off site.

Requirement No. 5(e) has been satisfied. The leachate collection system is designed to allow for settlement of the bottom of the stack. (T-2 at 98, 99; T-12 at 41).

#### No. 6 - TBRPC

"Any approval of this development shall require that a program of air quality monitoring be implemented by Gardinier with parameters to be acceptable to Hillsborough County, the Environmental Protection Agency, Department of Environmental Regulation, and TBRPC to specifically include fluoride monitoring. If future ambient air quality monitoring demonstrates that emissions from the proposed gypsum storage area cause a violation of applicable standards adopted by the United States Environmental Protection Agency, the Department of Environmental Regulation, or other authorized agency, Gardinier, Inc., shall take immediate action to mitigate the situation including, if necessary, discontinuing operation, as referenced in the ADA. Any proposed design alternatives shall be reviewed pursuant to Chapter 380, Florida Statutes." (TBRPC Recommended Order, ¶ 6)

Air quality monitoring also was recommended by the HCEPC and Michael Terpilak. See paragraph Nos. 20 and 49, below.

#### No. 7 - TBRPC

"Any approval of this development shall require that Gardinier implement a program of groundwater monitoring with

parameters to be acceptable to Hillsborough County, Department of Environmental Regulation and TBRPC. If future groundwater monitoring demonstrates that the gypsum disposal area causes or contributes to a violation of applicable groundwater quality standards, or of conditions duly imposed in permits issued by appropriate state agencies, Gardinier, Inc., will take immediate action to mitigate these circumstances including, if necessary, discontinuing construction or use of the gypsum disposal area, as referenced in the ADA. Any design changes proposed to mitigate adverse impacts shall be reviewed pursuant to Chapter 380, Florida Statutes." (TBRPC Recommended Order, ¶ 7)

Groundwater monitoring also was recommended by the HCEPC, Dr. Robert Powell, Dr. Jacqueline Michel, and Michael Terpilak. See paragraph Nos. 29, 33, 34, 47 and 49 below.

No. 8 - TBRPC

"Any approval of this development shall require a yearly site visit to monitor Development Order implementation and verify Gardinier has successfully provided an adequate program for surficial erosion and runoff from the gypsum stack to adjoining properties or areas outside the slurry walls and that an adequate vegetative cover on the sides of the stack, has been maintained as committed in the ADA. In the event that a healthy vegetative cover is not evident, Gardinier shall immediately take whatever mitigative measures are necessary to meet this commitment, including, if necessary ceasing production until improvement is evident." (TBRPC Recommended Order, ¶ 8)

The yearly site inspection shall be conducted by representatives of the HCEPC, DER, and Board. Additional requirements for the vegetation program are contained in paragraph No. 57, below.



No. 9 - TBRPC

"Any approval of this development shall require a favorable opinion from a qualified Professional Engineer, under seal, that the integrity of the starter dam can withstand a hurricane velocity storm surge." (TBRPC Recommended Order, ¶ 9)

No. 10 - TBRPC

"Any approval of this development shall require that the re-creation of North Canal incorporate meanders, sloping banks, and other environmentally advantageous features to prevent the degradation of downstream communities as set forth on pages 56 and 70 of the Response to Comments." (TBRPC Recommended Order, ¶ 10) If the HCEPC and DER find that it is infeasible to meander the North Canal, meandering will not be required.

No. 11 - TBRPC

"Any approval of this development shall require that the erosion control measures described on page 131, Response to Comments, be implemented and that the measures, as well as in-stream measures (such as securing hay bales), shall be used during final construction of the new canal and just downstream of the areas to be filled (old North Canal and the two small sub-drainages)." (TBRPC Recommended Order, ¶ 11)

No. 12 - TBRPC

"Any approval of this development shall require institution of a program of capture-release of gopher tortoises and indigo snakes found on-site as discussed on page 133, Response to Comments." (TBRPC Recommended Order, ¶ 12)

No. 13 - TBRPC

"Any approval of this development shall require that the 23.54 acres of mesic hammock shall be left in their natural state, including understory vegetation, as committed in the ADA." (TBRPC Recommended Order, ¶ 13)

No. 14 - TBRPC

"Any approval of this development shall require that the 70.5 acre buffer area set forth on Figure 7 of the ADA shall be left in its natural state and, if necessary, revegetated with appropriate native vegetation according to a plan approved by Hillsborough County." (TBRPC Recommended Order, ¶ 14)

No. 15 - TBRPC

"Any approval of this development shall stipulate that should any significant historical or archaeological sites or artifacts be discovered during construction, the Florida Bureau of Historic Sites and Properties will be notified and the disposition of such resources be determined with the approval of the Bureau and Hillsborough County." (TBRPC Recommended Order, ¶ 15)

No. 16 - TBRPC

"Any approval of this development shall require that the project site shall be totally secured prior to construction to prohibit entry to unauthorized persons." (TBRPC Recommended Order, ¶ 16)

No. 17 - TBRPC

"Any approval of this development shall require that Hillsborough County coordinate with Southwest Florida Water Management District to assure that no wells will be approved in the area which could significantly affect the direction of groundwater flow or potentiometric head beneath the project site." (TBRPC Recommended Order, ¶ 17)

No. 18 - TBRPC

"Any approval of this development shall require that Gardinier be required to actively participate in research efforts to identify alternative uses for gypsum by-products." (TBRPC Recommended Order, ¶ 18)

No. 19 - TBRPC

"Any approval of this proposed development which requires substantive additional review by TBRPC shall be subject to the incremental review fee adopted October 14, 1982." (TBRPC Recommended Order, ¶ 19)

HCEPC Recommendations

The recommendations of the HCEPC are contained in a memorandum dated December 1, 1983, from Rick Wilkins to Jeff Miller. This memorandum is cited below as the HCEPC Report. It is part of Hillsborough County Exhibit No. 2, the blue notebook compiled by the Hillsborough County staff.

No. 20 - HCEPC

The EPC recommends that Gardinier "implement a fluoride monitoring program to be reviewed and approved by the EPC to include at least two years of background data before the new gypsum stack is put into operation and at least five years of data after the stack is in full operation. The monitoring would include the following:

- a. One continuous ambient fluoride monitoring station including daily 24-hour particulate fluoride monitoring and continuous wind speed and wind direction at 10 meters.
- b. Pasture grass sampling network.
- c. Passive fluoride monitoring (fluoride plates).

Monitoring network design, operating procedures and quality assurance program must be approved by the EPC and the network will be reviewed by Gardinier and the EPC on an annual basis." (HCEPC Report, p. 2) The HCEPC may modify the fluoride monitoring program if it concludes that such modifications are appropriate.

Fluoride monitoring also is recommended in paragraphs Nos. 6 and 49 herein.

No. 21 - HCEPC

"Final design and construction of this project shall be as described in the permit application and supporting documents."

(HCEPC Report, p. 3)

No. 22 - HCEPC

"Any change in the final design shall be reviewed and approved by Hillsborough County Environmental Protection Commission and Department of Environmental Regulation prior to implementation." (HCEPC Report, p. 3)

No. 23 - HCEPC

"A surface ditch shall be designed and constructed completely surrounding the slurry wall to capture any surface runoff from the outer slopes of the dike. Any discharge from this ditch to surface water must meet the Class III water quality standards set forth in Chapter 17-3, F.A.C." (HCEPC Report, p. 3)

Gardinier may use a swale, instead of a ditch, if the swale is approved by HCEPC and DER.

No. 24 - HCEPC

"The clay liner shall, after compaction, yield a permeability of  $1.0 \times 10^{-8}$  cm/sec or less and a density of 98% or greater." (HCEPC Report, p. 3)

No. 25 - HCEPC

"After formation and compaction of the liner, the following tests shall be made and the results submitted to DER's southwest district office and Hillsborough County Environmental Protection Commission for review:

- a. Modified hammer compaction test be used to determine the compaction once for every 5 acres.
- b. One moisture content test for every 5 acres.

c. One permeability test using acid leachate for every 5 acres." (HCEPC Report, p. 3)

During his deposition, Rick Wilkins explained that the reference in subsection (a), above, to "modified" hammer compaction tests was inadvertent. HCEPC wants Gardinier to perform "standard" proctor compaction tests. (HC-13).

Dr. Powell testified that the tests described in this section should be performed at least once each acre over the entire site, for each 6" lift or layer of the clay liner; except the leachate permeability tests which should be performed once each 5 acres. Since Powell's recommendation is more stringent than the HCEPC's recommendation, his shall be applied. His recommendations are set forth in paragraphs 44-48, below.

No. 26 - HCEPC

"DER's southwest district office and Hillsborough County Environmental Protection Commission shall be advised of the dates on which construction of the liner will begin so site inspection can be performed." (HCEPC Report, p. 3)

No. 27 - HCEPC

"During construction phase of the proposed project, any stormwater runoff from the site shall not cause the turbidity of the receiving body of water to increase by more by 29 NTU's." (HCEPC Report, p. 3-4)

No.28 - HCEPC

Fourteen days prior to the initial excavation of the slurry wall trench, Hillsborough County Environmental Protection Commission and DER's district office shall be notified so that a site inspection can be performed during the filling of the trench with impermeable material. (HCEPC Report, p. 4)

This requirement has been modified slightly to ensure that HCEPC and DER receive adequate prior notice of the trench excavation and construction.

No. 29 - HCEPC

"Two surface water monitoring stations shall be installed in North Canal and in Archie Creek, during and following construction of the proposed project. Each stream will have a monitoring station located upstream and one located downstream from the proposed project site." (HCEPC Report, p. 4)

The monitoring program for these stations shall be subject to approval by the HCEPC, DER AND TBRPC. The monitoring program shall include tests for all appropriate water quality parameters, including radium and gross alpha. The data collected in the monitoring program shall be submitted to HCEPC, DER, HRS and EPA.

No. 30 - HCEPC

The Hawthorn Clay formation overlying the Tampa formation shall not be unduly disturbed during construction. The Hawthorn formation shall be maintained at a minimum thickness of 15' at all locations beneath the site. (HCEPC Report, p. 4)

This requirement has been modified slightly to be consistent with the representations made by Gardinier at the public hearing.

No. 31 - HCEPC

"There shall be no surface discharge of any process water (acidic waste) from the proposed project." (HCEPC Report, p. 4)

No. 32 - HCEPC

"All the acidic water collected by the underdrain system (Toe drain) shall be transferred to the company's cooling ponds for recirculation." (HCEPC Report, p. 4)

No. 33 - HCEPC

"Gardinier shall modify the proposed groundwater monitoring program to include at least four sets of monitoring wells with one set in each corner of the proposed gypsum stack. Each set shall include a surficial (shallow) aquifer well and a Floridian aquifer well." (HCEPC Report, p. 4)

Dr. Robert Powell recommended that at least 6 sets of monitoring wells be installed down-gradient of the proposed stack. See Paragraph No. 47 below.

No. 34 - HCEPC

"Should any contamination be detected in the groundwater, permittee [Gardinier] will take immediate action to modify the problem." (HCEPC Report, p. 4)

For purposes of this paragraph, "contamination" shall mean any substance which causes or contributes to a violation of any applicable local, state or federal water quality standard.

No. 35 - HCEPC

Gardinier, Inc., shall "provide meanders in the alignment of the North Canal, if feasible, so that the length of the canal includes the 1000' of the hydric hammock system." (HCEPC Report, p. 5)

No. 36 - HCEPC

"Additional wetland and transitional species shall be planted along the slopes of the [North] canal to enhance the quality of the system. It is suggested that the vegetation be indigenous to central Florida and be those species listed in the Department of Environmental Regulations 17-4 Dredge and Fill Rule." (HCEPC Report, p. 5)

No. 37 - HCEPC

"Slopes of the North Canal shall be made less steep (no greater than 6 horizontal to 1 vertical)." (HCEPC Report, p. 6)

No. 38 - HCEPC

"Gardinier shall submit to the EPC a close-out plan for the existing gypsum stack at least six months before decommissioning begins." (HCEPC Report, p. 6)

Gardinier shall submit a detailed plan for the closure of its existing gypsum stack. The plan shall be subject to approval by the HCEPC, DER and Board.

No. 39 - HCEPC

"Decommissioning of the existing gypsum stack shall begin within six months of switch-over and de-bugging of the new gypsum stack." (HCEPC Report, p. 6)

No. 40 - HCEPC

"Decommissioning of the existing gypsum stack shall include sealing the top of the stack with an impermeable material to prevent continued leaching of contaminated water." (HCEPC Report, p. 6)

No. 41 - HCEPC

"Decommissioning of the existing gypsum stack shall include vegetation of the side slopes to reduce fugitive particulate emissions." (HCEPC Report, p. 6)

No. 42 - HCEPC

"Decommissioning of the existing gypsum stack shall include restoration and revegetation of the shoreline of the bay." (HCEPC Report, p. 7)

NO. 43 - HRS and Health Department Recommendations

Dr. Kwalick of the Hillsborough County Health Department and Wally Johnson of the Florida Department of Health and Rehabilitative Services testified that Gardinier should conduct an 18 month to 2 year study of the radon emissions from its existing gypsum stack. (T-7 at 57, 58, 89, 91). This study should be approved by Johnson, or another appropriate radiation expert at HRS, and DER, HCEPC, and the U.S. EPA, before it is conducted.



The data collected during this study shall be submitted to these agencies for review.

Dr. Robert Powell's Recommendations

Dr. Powell made his recommendations to the Board during the public hearing on March 14, 1984. His recommendations are also contained in a report from CDM to Jeff Miller, dated December 8, 1983, which is included in Hillsborough County Exhibit No. 2, the blue notebook compiled by the Hillsborough County staff.

No. 44 - Powell

The leachate collection system shall be maintained as a permanent part of the facility throughout the life of the proposed gypsum stack. Following the closure of the stack, the leachate collection system shall be monitored quarterly to ensure that the leachate is not building up within the stack. The monitoring program shall continue until the HCEPC determines that leachate is no longer being generated and all of the leachate has been removed from the stack. (T-7 at 35).

No. 45 - Powell

The 18-inch clay liner beneath the proposed gypsum stack shall be installed in three separate lifts or layers. Each lift or layer shall be tested at least once each acre for moisture, compaction, clay content, and other appropriate parameters; however, permeability shall be tested at least once every 5 acres. (T-7 at 38; T-12 at 44, 45).

No. 46 - Powell

When the proposed gypsum stack is closed, a clay seal and soil cover shall be placed over the stack. The seal shall have an in-place permeability no greater than  $10^{-8}$  cm/sec. (T-7 at 35, 36). The clay seal shall extend at least to the slurry wall. The clay seal shall be tested at least once per acre, in the same

manner as the clay liner, over the entire site. (T-7 at 35, 36; HC-2, CDM Report dated December 8, 1983, at Section 4). See No. 45, above.

No. 47 - Powell

At least six sets of monitoring wells shall be installed down-gradient of the proposed gypsum stack. (T-2 at 39, 74, 75; T-7 at 37). These monitoring wells, and all of the domestic wells located to the west of the proposed gypsum stack that are designated by HCEPC, shall be monitored on a quarterly basis. (T-7 at 37). The number and location of the monitoring wells, and the scope of the monitoring program shall be subject to approval by the HCEPC and DER. At a minimum, the monitoring program shall satisfy the DER requirements in Section 17-4.245(6), F.A.C. The monitoring program shall continue until the HCEPC and DER agree that the proposed gypsum stack no longer poses a threat to the groundwater.

No. 48 - Powell

The groundwater systems at the site should not be significantly altered by additional pumping in the area. Whenever the Southwest Florida Water Management District considers a new permit application for a consumptive use permit, it should evaluate the potential impacts on the Tampa formation and the potential impacts on groundwater contamination in the area near the proposed gypsum stack. (T-7 at 37).

Mike Terpilak's Recommendations

Mike Terpilak's recommendations were presented to the Board during the public hearing on March 27, 1984. His testimony supplemented the recommendations contained in his letter reports (dated December 12 and December 20, 1983) to Dr. Robert Powell.

Those letters are contained in Hillsborough County Exhibit No. 2, the blue notebook compiled by the Hillsborough County staff.

No. 49 - Terpilak

Gardinier shall conduct a comprehensive environmental monitoring program for radioactive materials entering the environment from the proposed gypsum stack. The monitoring program shall be approved by the HCEPC, DER, and HRS. At a minimum, the monitoring program shall test for radon gas emissions, fugitive dust particles, and radioactive substances in the groundwater. The data collected in this monitoring program shall be provided to DER, HCEPC, HRS, and EPA. (T-7 at 91; T-8 at 9).

No. 50 - Terpilak

Gardinier shall take all necessary and appropriate measures to protect against the misuse or dispersal of the proposed gypsum stack, including the improper use of gypsum in housing materials. Any proposed use of the gypsum shall be reported to the Board, HCEPC, DER, and HRS, at least 14 days before the gypsum is removed from the proposed site. (HC-1 at 46; G-22 at 2; T-8 at 10).

No. 51 - Terpilak

Gardinier shall comply with any applicable EPA standards that are adopted in the future for radioactivity associated with gypsum piles, including EPA standards for radon emissions. (T-8 at 10, 14, 15).

Other Requirements

No. 52

Gardinier shall provide long-term maintenance for the site until the proposed gypsum stack is removed. Among other things,

Gardinier shall: maintain a fence around the perimeter of the entire site; provide adequate security guards to prevent trespassing; maintain grass or other vegetation on the stack; and maintain trees, shrubs, or other plants around the site in accordance with its buffering and visual management programs. (HC-1 at 68).

No. 53

Gardinier shall establish proof of its financial responsibility for the long-term monitoring, security, and closure of the proposed gypsum stack, by providing a bond, trust fund, escrow account, or other appropriate proof of financial responsibility. The type and amount of proof shall be recommended by the HCEPC, DER, TBRPC, and county staff, but it shall be subject to approval by the Board. (T-6 at 83).

No. 54

Gardinier's annual report shall specifically describe Gardinier's attempts to develop alternative uses for gypsum. It shall describe the status of gypsum research performed by Gardinier and other research groups.

No. 55

The other conditions described in the preceding portions of this Development Order are hereby adopted by reference and incorporated herein. Where more than 1 condition refers to a single subject matter, the more (most) stringent condition shall control.

No. 56

There shall be at least 3400' of buffer between the proposed gypsum stack and the Progress Village Elementary School. This buffer shall be established by modifying the shape of the proposed stack so that the stack resembles a "home plate" configuration. In addition, the existing TECO transmission line shall be left in place along the northeast side of the site. The

proposed gypsum stack shall not exceed 100' in height above the surface of the surrounding areas.

No. 57

Gardinier shall submit a detailed written plan for its proposed visual management program. At a minimum, this plan shall include: (a) the specific details concerning the location, types and numbers of trees and shrubs which will be planted around the site, including the areas along Highway 41, Madison Avenue, and 78th Street; (b) the specific details concerning the plan to plant grass and other vegetation on the proposed gypsum stack; (c) the time frames in which these programs will be started and completed; and (d) the criteria that will be utilized when determining whether the programs have been successful. This plan shall be subject to approval by the Hillsborough County Department of Development Coordination ("DDC"), the Hillsborough County City/County Planning Commission, and the Board. The tree and shrub planting programs shall be started, and whenever reasonably possible, fully completed before any gypsum is stored on the proposed site. If at any time the trees and other vegetation fail to provide an adequate visual buffer between the proposed gypsum stack and off-site areas, as determined by the DDC, Planning Commission, and Board, Gardinier shall submit supplemental plans for approval by the DDC, Planning Commission and Board.

No. 58

In addition to the conditions contained herein, Gardinier shall comply with all applicable local, state, and federal rules, standards, and regulations, including, but not limited to, the requirements of the HCEPC, DER, HRS and U.S. EPA.

No. 59

Gardinier shall conduct environmental studies and monitoring programs for radon, particulates (dust), fluorides, leachate, air quality, surface water quality, ground water quality, and

stormwater quality in accordance with the conditions contained in paragraphs nos. 6, 7, 20, 23, 27, 29, 33, 34, 43, 44, 47, and 49, above. These programs shall be subject to approval by the Hillsborough County Environmental Protection Commission and the Florida Department of Environmental Regulation. Gardinier shall provide copies of its monitoring data to the HCEPC, DER, Hillsborough County Health Department, Florida Department of Health and Rehabilitative Services, and United States Environmental Protection Agency.

If these studies show that Gardinier's activities: (a) violate any applicable local, state, or federal standard for the protection of human health or the environment; or (b) constitute a hazard to the public health, safety, or welfare; or (c) significantly differ from the representations made by Gardinier during the public hearings previously held in this case, then the Board may hold a public hearing to evaluate these matters. At least 14 days prior to such hearing, the Board shall give written notice to Gardinier, the Progress Village Civic Council, and Manasota-88. These three parties and any person may present testimony or evidence to the Board.

After conducting the public hearing, the Board may require Gardinier to immediately take all necessary and appropriate steps to comply with applicable standards, or eliminate the hazard, or comply with this development order. Among other things, the Board may require the closure of the proposed gypsum stack and the East Tampa Chemical Plant.

No. 60

Gardinier shall file an annual report in accordance with Section 380.06(16), Florida Statutes (1983). In addition to the requirements contained in Section III, paragraph 12, above, the annual report shall: (a) identify each of the environmental studies and monitoring programs which were conducted during the preceding year; (b) state the results of those studies; (c) state whether the studies show a violation of any applicable local, state or federal standard for the protection of the public

health, safety, welfare, or environment; (d) identify any significant fluctuations (as defined by HCEPC) in the monitoring data; (e) state whether any notices of violations or enforcement proceedings have been brought against Gardinier by any local, state, or federal agency during the preceding year; and (f) state whether the studies or monitoring programs show the existence of a health or environmental hazard. The annual report shall be submitted to the Board, TBRPC, the Department of Community Affairs, Progress Village Civic Council, and Manasota-88.

The County Administrator shall report to the Board about any findings of noncompliance or deviation from the terms and conditions of this development order. The County Administrator shall also incorporate into his report any comments, letters or complaints he has received from the Progress Village Civic Council or Manasota-88 concerning Gardinier's compliance with the terms and conditions of this development order. The Board may conduct a public hearing to consider Gardinier's annual report and the County Administrator's report. The Board shall give written notice of such hearing at least 14 days in advance to Gardinier, the Progress Village Civic Council, and Manasota-88. These parties and any person may present testimony and evidence. The Board may then enter any order necessary and appropriate to ensure Gardinier's compliance with the terms of this development order.

No. 61

Gardinier shall immediately embark upon an improved community relations program with those living in the vicinity of the proposed gypsum field, which shall specifically include working with the Progress Village Civic Council, Inc., its officers and members, and the citizens of Progress Village to improve communications and relationships among the various parties. Gardinier and Progress Village Civic Council, Inc., have agreed upon actions to be taken by each, including Gardinier's commitment to continue the restabilization of the

Progress Village neighborhood through making certain public improvements in the area and taking other actions as is more specifically agreed to and provided for in a Stipulation and Agreement between Progress Village Civic Council, Inc., and Gardinier, Inc., and dated August 15, 1984.



EXHIBIT A

LEGAL DESCRIPTION

The parcel of land described as follows:

Beginning at a Point of Beginning on the southern boundary of Section 10, T 30 S, R 19 E 1324.03 feet west of the southeast corner of said Section 10: thence run N 00°29'25" E 660.83 feet, N 00°31'27" E 660.41 feet, N 00°33'28" E 663.03 feet, S 89°44'37" E 175.63 feet, S 00°43'11" W 663.44 feet, S 89°36'51" E 641.79 feet, thence along East of Tracts 8 & 1 in the SE 1/4 and 16 & 9 in the NE 1/4 of Section 10, N 00°26'06" E 664.87 feet and N 00°27'06" E 1963.84 feet, thence S 89°33'56" E 198.00 feet, S 00°27'06" W 330.00 feet, S 89°33'56" E 198.00 feet, N 00°27'06" E 330.00 feet, and S 89°33'56" E 270.05 feet into Section 11, T 30 S, R 19 E to the center of the road intersection at the NE corner of Tract 9 in the NE 1/4 of Section 10 which point is also the center of the road intersection at the SW corner of Tract 5 in the NW 1/4 of Section 11, T 30 S, R 19 E, thence N 00°16'25" E 676.01 feet, S 89°28'57" E 659.89 feet, N 00°16'08" E 663.45 feet to the N boundary of said Section 11 at a point 660.24 feet E of NW corner of said Section 11, thence along N boundary S 89°43'00" E 1855.45 feet, S 89°10'17" E 2662.64 feet to the NE corner of said Section 11 which is the NW corner of Section 12, T 30 S, R 19 E thence along N boundary of said Section 12 N 89°28'25" E 100.28 feet thence along W R/W line of 78th Street S 00°01'17" W 661.62 feet and S 06°11'50" W 1333.85 feet into said Section 11 thence S 00°06'43" W 664.31 feet to a point on the 1/4 section line 40 feet W of E boundary of said Section 11, thence along 1/4 section line N 89°21'32" W 1292.01 feet, thence S 00°10'49" W 662.64 feet, S 89°18'01" E 665.93 feet, S 00°11'43" W 663.45 feet, N 89°16'51" W 665.75 feet, S 00°10'49" W 1326.69 feet to the S boundary of said Section 11, thence along S boundary N 89°15'00" W 4028.67 feet to the SW corner of said Section 11, thence along S boundary of said Section 10 N 89°30'44" W 1324.03 feet to the Point of Beginning

Less the following Tampa Electric Company R/W:

Beginning at a Point of Beginning on the N boundary of said Section 11 349.30 feet W of NE corner of said Section 11, thence S 00°26'03" W 1310.48 feet, N 89°14'30" W 200.00 feet, N 00°26'03" E 1310.73 feet, S 89°10'17" E 200.00 feet to the Point of Beginning, and from the NE corner of said Section 11 run N 89°10'17" W 349.30 feet and S 00°26'03" W 1340.48 feet to the Point of Beginning, thence S 00°24'07" W 115.00 feet, S 52°07'51" E 437.63 feet, S 06°11'50" W 217.12 feet, N 52°00'54" W 663.08 feet N 00°26'03" E 194.05 feet and S 89°14'30" E 200.00 feet to the Point of Beginning.

All tracts are in accord with plat of South Tampa in Plat Book 6, page 3, Hillsborough County.

All above contains 629.85 acres and is in Sections 10, 11 and 12, Township 30 South, Range 19 East, Hillsborough County, Florida.

EXHIBIT B

Gardinier's Application for Development Approval is on file with the Board of County Commissioners and is incorporated herein by reference.

EXHIBIT C

Gardinier's Request for Rezoning is on file with the Board of County Commissioners and is incorporated herein by reference.

DRI #76 GARDINIER PHOSPHATE  
GYPSUM DISPOSAL FIELD  
General Location Map

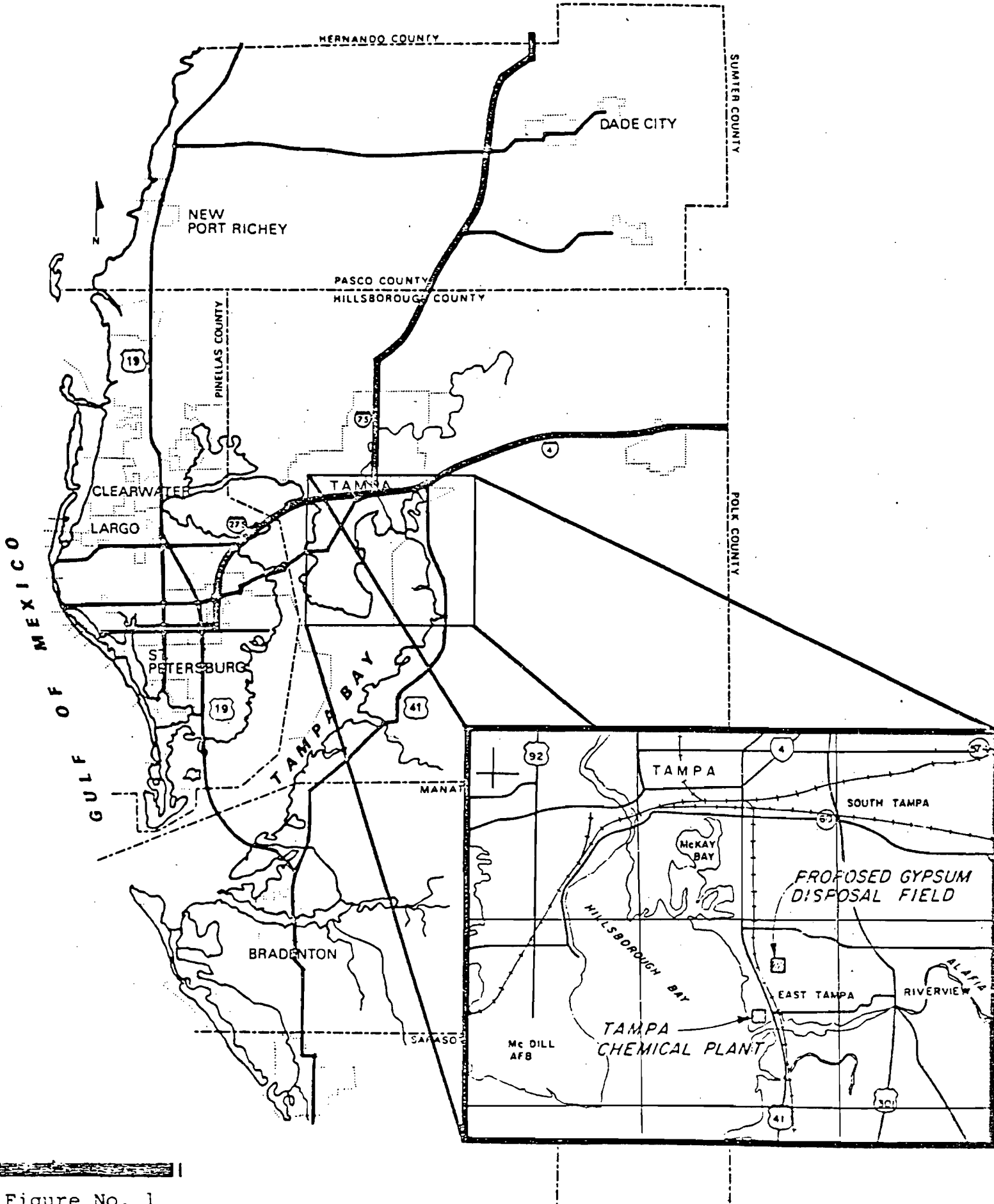


Figure No. 1

DRI #76 GARDINIER PHOSPHATE  
 GYPSUM DISPOSAL FIELD  
 Master Development Plan

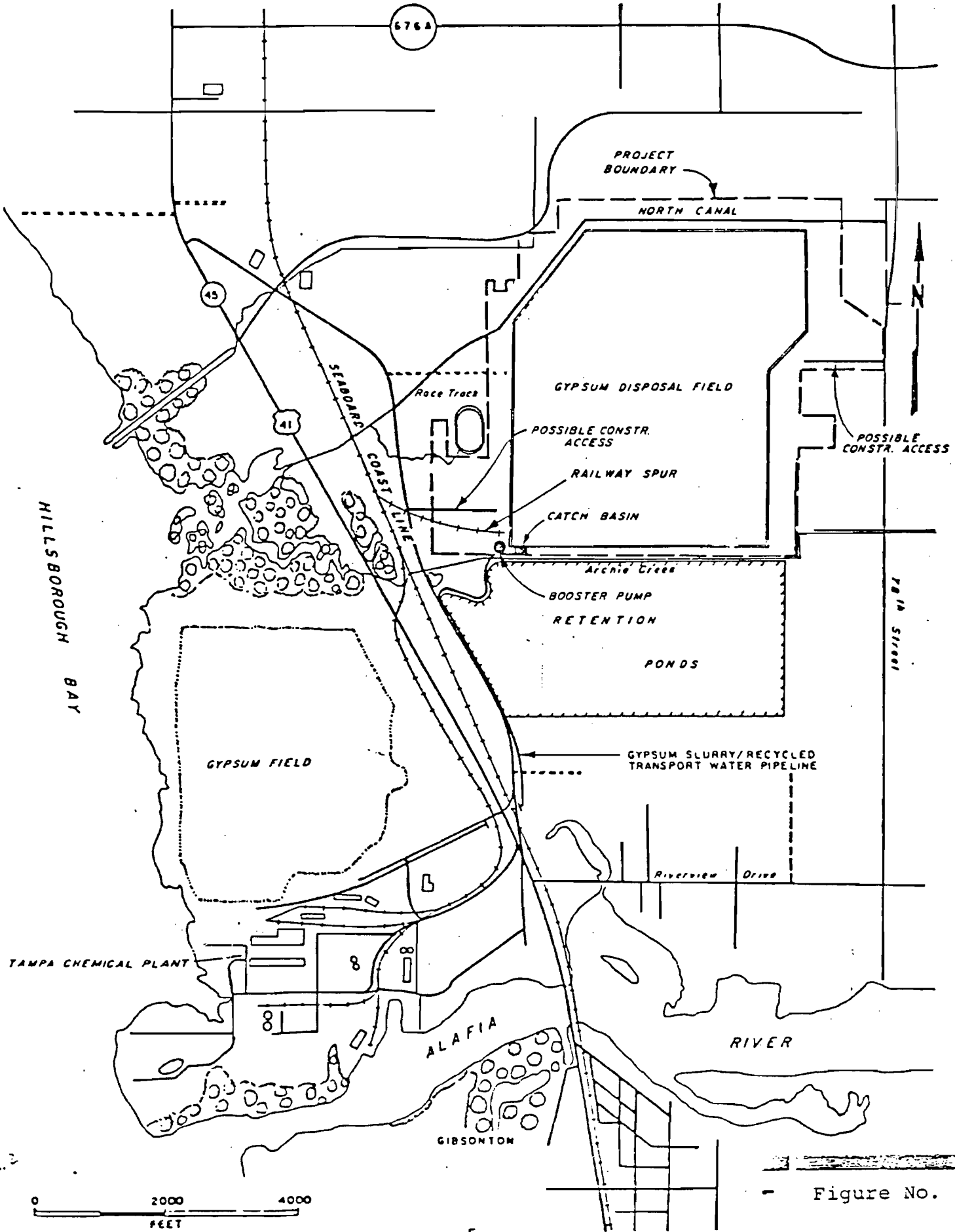


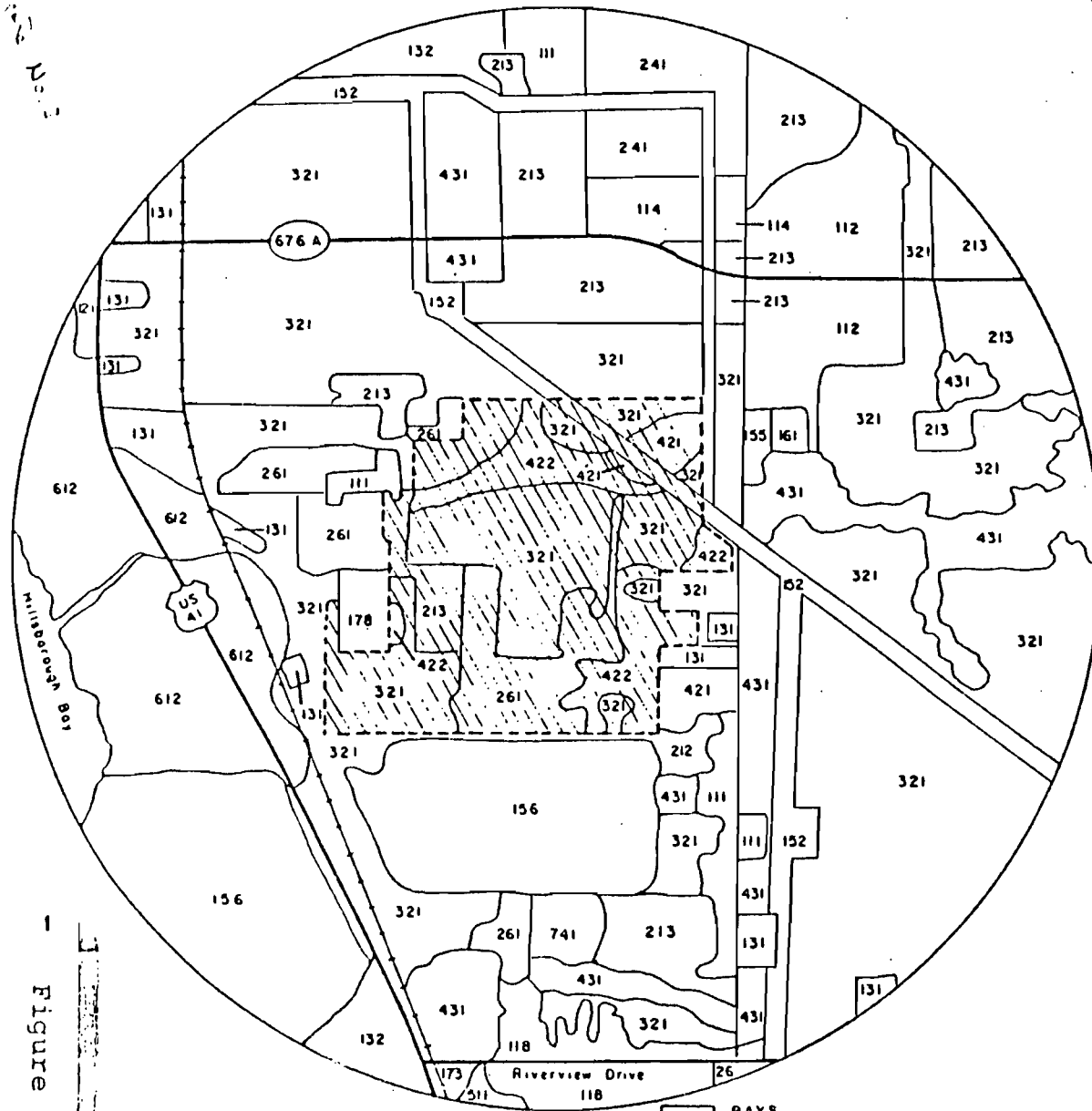
Figure No. 2

REFERENCE:  
 MAP BASED ON U.S. GEOLOGICAL SURVEY LAND USE  
 AND LAND COVER MAP, DATED 1972 (TAMPA, FLA.)  
 BY CARL S. WOOD, 1981

9

LAND USE WITHIN ONE MILE OF THE SITE

Figure No. 3



KEY:

- 111 SINGLE UNIT LOW DENSITY (2 du)
- 112 SINGLE UNIT MEDIUM DENSITY (2-6 du)
- 114 MOBILE HOMES MEDIUM DENSITY (6 du)
- 115 MIXED RESIDENTIAL
- 121 RETAIL SALES AND SERVICES
- 131 LIGHT INDUSTRIAL
- 132 HEAVY INDUSTRIAL
- 142 RAILROADS
- 152 MAJOR LONG DISTANCE TRANSMISSION LINES
- 155 SEWAGE TREATMENT FACILITIES
- 156 SOLID WASTE DISPOSAL SITES
- 161 ELEMENTARY SCHOOL
- 173 PARK
- 178 RACE TRACKS
- 212 ROW CROPS
- 213 IMPROVED PASTURE
- 241 DAIRY OPERATIONS
- 261 INACTIVE AGRICULTURAL LAND
- 321 PALMETTO PRAIRIES
- 421 XERIC OAK HARDWOODS
- 422 MESIC HARDWOODS
- 431 MIXED FOREST
- 511 STREAMS
- 541 BAYS
- 612 WETLAND - POND PINE
- 741 ALTERED LANDS (SCRAPED)

DRI #76 GARDINIER PHOSPHATE  
 GYPSUM DISPOSAL FIELD  
 Master Development Plan

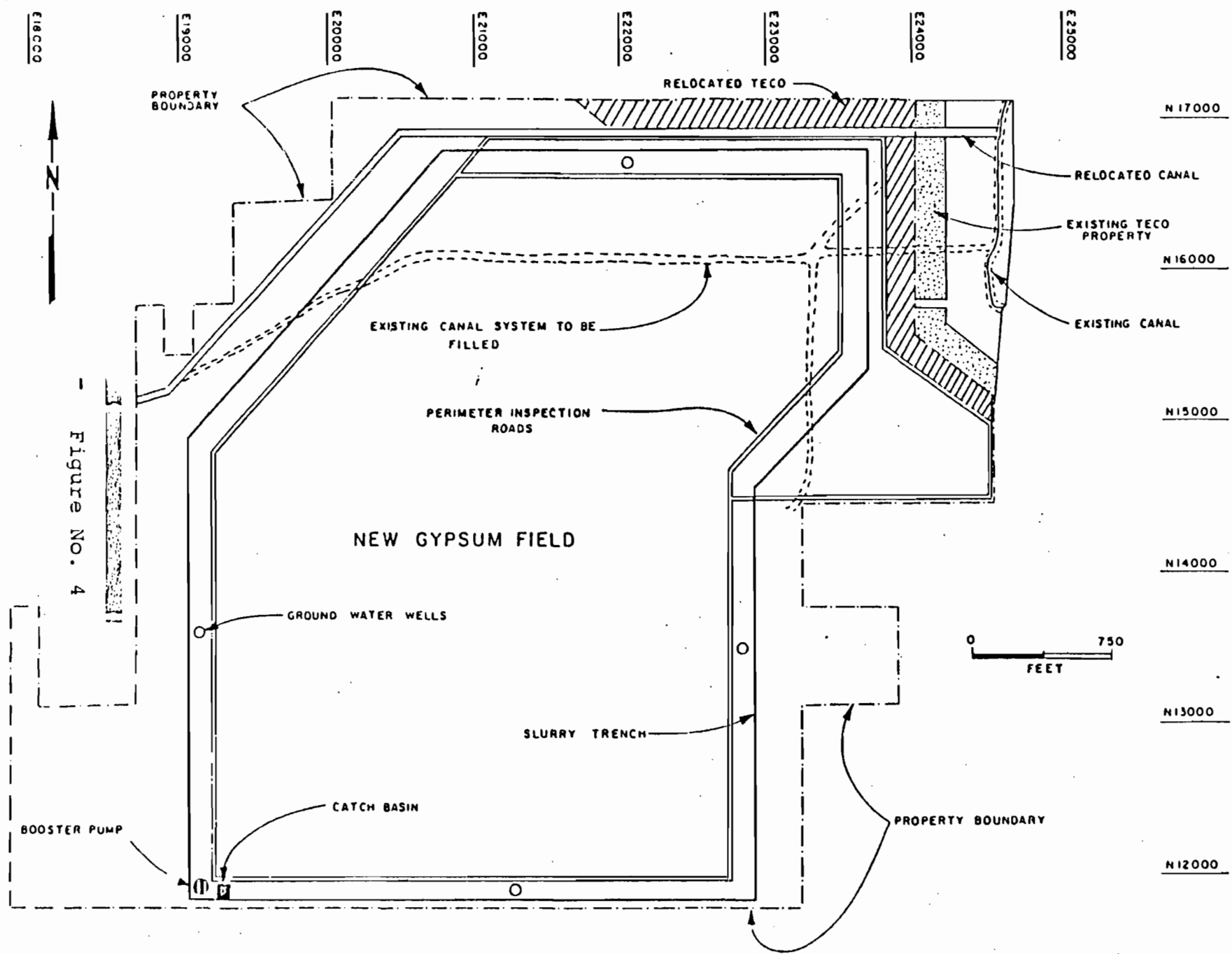
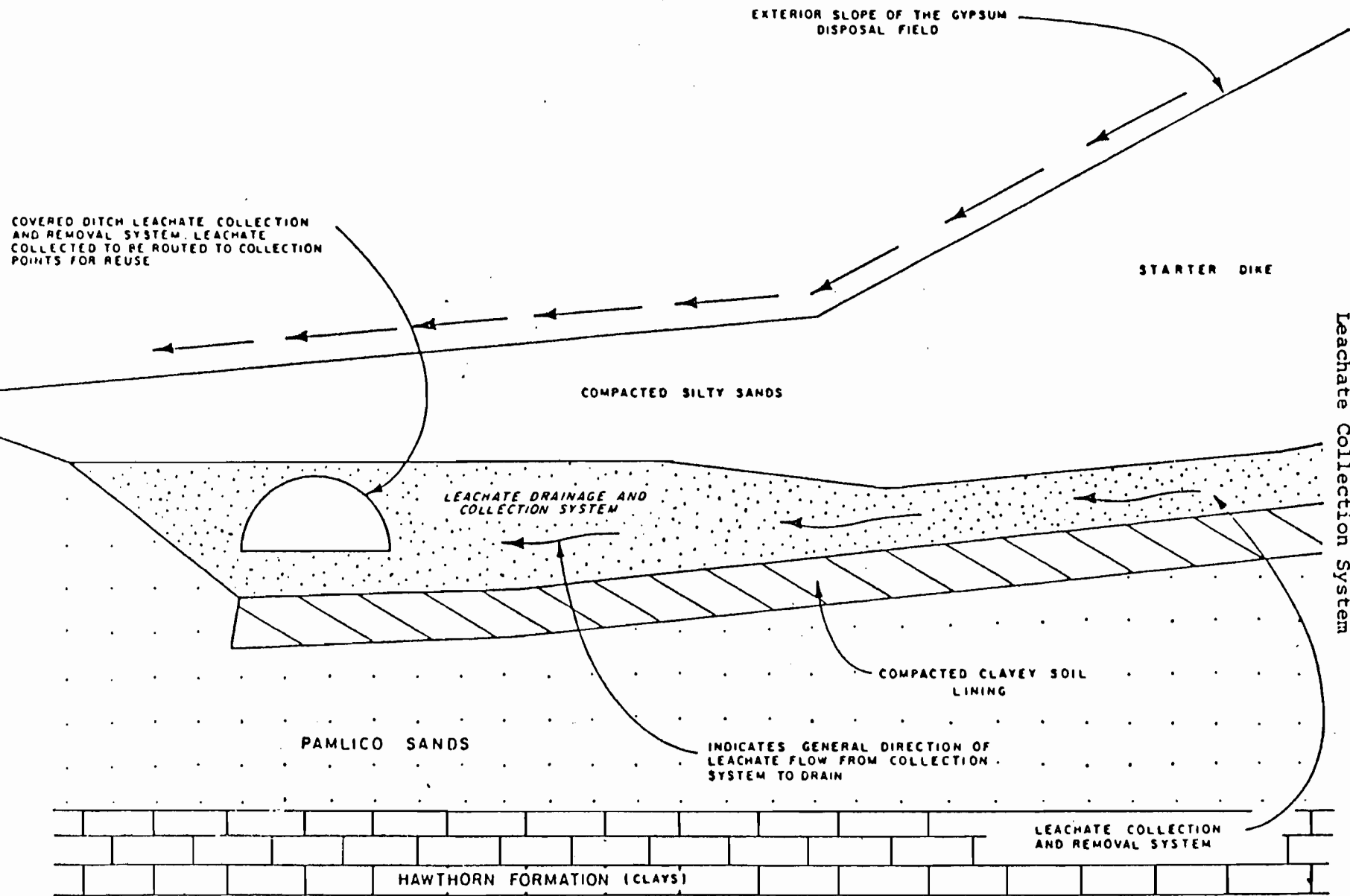


Figure No. 4

7-11-68  
DRI #76

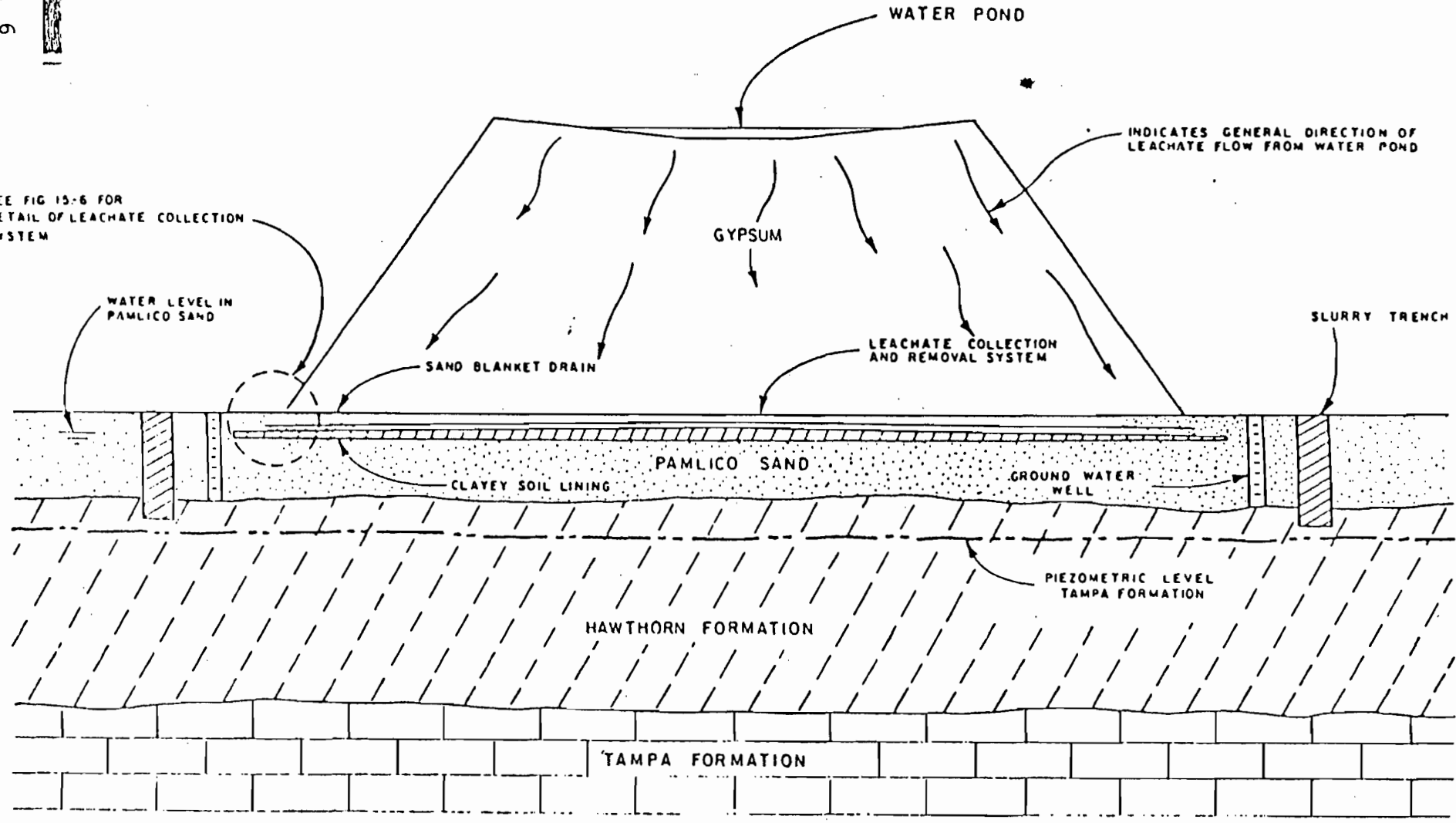


DRI #76 GARDINIER PHOSPHATE  
GYPSUM DISPOSAL FIELD  
Leachate Collection System

NOT TO SCALE

Figure No. 5





SEE FIG 15-6 FOR  
DETAIL OF LEACHATE COLLECTION  
SYSTEM

DRI #76 GARDINIER PHOSPHATE  
GYPSUM DISPOSAL FIELD  
Proposed Gypsum Field Section

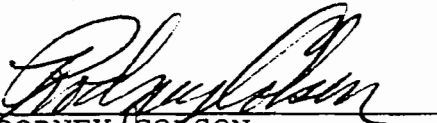
NOT TO SCALE

A F F I D A V I T

STATE OF FLORIDA            )  
                                  )  
COUNTY OF HILLSBOROUGH    )

By the power vested in me by the Board of County Commissioners ("Board") of Hillsborough County, Florida, I, RODNEY COLSON, Chairman of the Board, do hereby certify that the above and foregoing is a true and correct copy of the development order approved and adopted by the Board at its duly noticed hearing on August 20, 1984, and do hereby execute the development order on behalf of the Board.

WITNESS my hand this 30th day of August, 1984.

  
\_\_\_\_\_  
RODNEY COLSON  
Chairman  
Board of County Commissioners  
Hillsborough County, Florida