STATE OF FLORIDA DIVISION OF ADMINISTRATIVE HEARINGS

GINNIE SPRINGS, INC.,)			
Petitioner,))			
vs.) Cas	se	No.	98-0945
CRAIG WATSON and DEPARTMENT OF ENVIRONMENTAL PROTECTION,)))			
Respondents.))			
PROFESSIONAL ASSOCIATION OF DIVING INSTRUCTORS, INC., and GEORGIA SHEMITZ,)))			
Petitioners,))			
vs.) Cas	se	No.	98-1070
CRAIG WATSON and DEPARTMENT OF ENVIRONMENTAL PROTECTION,)))			
Respondents.))			
ALACHUA COUNTY,) \			
Petitioner,) \			
vs.) Cas	se	No.	98-1071
CRAIG WATSON and DEPARTMENT OF ENVIRONMENTAL PROTECTION,)))			
Respondents,) \			
and	<i>)</i>)			
SAVE OUR SUWANNEE, INC., and GILCHRIST COUNTY,)))			
Intervenors.	<i>)</i>))			

RECOMMENDED ORDER

This matter came on for formal proceeding and hearing before P. Michael Ruff, duly designated Administrative Law Judge of the Division of Administrative Hearings. The hearing was conducted in Gainesville, Florida, on October 12-20, 1998.

APPEARANCES

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STATEMENT OF THE ISSUE

The issue to be resolved in this proceeding concerns whether the applicant, Craig Watson, has provided reasonable assurances in justification of the grant of an Industrial Waste Water Facility permit for a rotational grazing dairy to be located in Gilchrist County, Florida, in accordance with Section 403.087, Florida Statutes, and the applicable rules and policies of the Department of Environmental Protection. Specifically, it must be determined whether the applicant has provided reasonable assurances that the operation of the industrial waste water facility at issue will comply with the Department's ground water quality standards and minimum criteria embodied in its rules and relevant policy, including draft permit conditions governing the proposed zone of discharge for the project. It must be determined whether the ground water beyond the proposed zone of discharge will be contaminated in excess of relevant state standards and criteria and whether the water quality of the G-II aquifer beneath the site will be degraded. Concomitantly it must be decided whether the applicant has provided reasonable assurances that the proposed project will comply with the Department's effluent guidelines and policy for dairy operations as industrial waste water facilities, pursuant to the Department's policy enacted and implemented pursuant to its rules for granting and implementing industrial waste water facility permits, as they relate to dairy operations.

PRELIMINARY STATEMENT

This cause arose upon the submission by the applicant of a permit application and engineering report to the Respondent,

Department of Environmental Protection (DEP; Department), seeking authorization to construct and operate a "rotational grazing" dairy on 511 acres of land owned by the applicant in Gilchrist County, Florida. Upon review of the proposed project, the Department noticed the applicant and the public of its intent to issue an Industrial Waste Water Facility permit to the Respondent, Craig Watson. The above-named Petitioners filed Petitions for formal proceedings on February 12, 1998. On or about September 30, 1998, Gilchrist County filed a Motion to Intervene in the case and on October 5, 1998, Petitioner-Intervenor, Save Our Suwannee Inc., (SOS) filed a Motion to Intervene in the case.

The cause came on for hearing as noticed on the abovereferenced dates at which the Respondents jointly presented the
testimony of Dr. Dale Bottcher, Ph.D., P.E. He was accepted as
an expert in agricultural engineering and dairy waste management.
Dr. Thomas Kwader, Ph.D., P.G., was accepted as an expert in
geology and hydrogeology, in testifying for the Respondents.
Michael Holloway, P.E., testified for the Respondents as an
expert in agricultural engineering and dairy waste management;
John J. Davis, P.G., was accepted as an expert in geology and
hydrogeology, excluding photo linear trace analysis, soils
analysis, ground penetrating radar and geophysics.

Edward Dane Cordova, P.E., was accepted as an expert in environmental engineering as related to waste water system design and operation but excluding nutrient balance and management, uptake and volatilization rates, and ground penetrating radar. Additionally, the Respondents presented the testimony of fact witnesses, Vincent A. Seibold, P.E.; William R. Reck, P.E., environmental engineer with the Natural Resources Conservation Service and United State Department of Agriculture; Mark Bardolph; Craig Watson and Rich Watson.

The Petitioners presented the live testimony of four witnesses, Robert J. Windshauer, P.G., Curtis D. Pollman, Ph.D., Wes Skiles, and Sam B. Upchurch, Ph.D., P.G. Mr. Windshauer was accepted as an expert in geology, hydrogeology, geophysics and ground penetrating radar. Dr. Pollman was accepted as an expert in biogeochemistry, modeling of environmental and biogeochemical processes and the fate and transport of organic and inorganic contaminants. Dr. Sam Upchurch was accepted as an expert in hydrogeology, geophysics, statistics, geochemistry, geology, analytical modeling, hydrology and ground water monitoring design.

The Respondents presented a joint composite exhibit (Watson Joint Exhibit I), which was admitted into evidence. The Petitioners' exhibits 3, 6, 7, 8, 9, 10, 11, composite exhibit 12-13, composite exhibit 14, 15, 16, composite exhibit 17 and exhibits 18 through 32, were admitted into evidence. Petitioners

also proffered exhibits 4 and 5 which were excluded from evidence.

Upon conclusion of the proceeding the parties elected to obtain a transcript thereof and avail themselves of the right to submit proposed recommended orders, requesting an extended briefing schedule. The proposed recommended orders were timely submitted and have been considered and addressed in the rendition of this Recommended Order.

FINDINGS OF FACT

1. The Respondent Craig Watson has applied for an Industrial Waste Water Facility permit to authorize the construction and operation of an 850-cow, rotational grazing dairy, with accompanying dairy waste management system, to be located in Gilchrist County, Florida. The system would be characterized by ultimate spray application of waste effluent to pastures or "paddocks" located on a portion of the 511-acre farm owned by Mr. Watson. The rotational grazing method of dairy operation is designed to prevent the ground water quality violations frequently associated with traditional dairy operations. Traditional dairy operations are often characterized by intensive livestock use areas, which result in denuding of vegetation and consequent compacting of the soil, which prevents the effective plant root zone uptake method of treating dairy waste and waste water for prevention of ground water quality violations. Such intensive use areas are typically areas around

central milking barns, central feeding and watering troughs, and other aspects of such operations which tend to concentrate cows in relatively small areas. The rotational grazing dairy attempts to avoid such problems by dividing a dairy farm's surface area into numerous pastures which cows can graze upon with constant and frequent rotation of cows between such pastures. This avoids overgrazing or denuding of the cover crop upon which cows graze, which is so necessary to proper treatment of wastes through root zone uptake.

- 2. A rotational grazing dairy is designed to re-cycle cow manure for use as fertilizer to grow and re-grow the forage established on the site in the paddocks or pastures. The rotational grazing method is based on the theory that nutrients from cow manure can be captured in the root zone and uptaken as fertilizer for the plant upon which the cattle graze. The waste from the barn area is collected in a waste storage pond or lagoon and sprayed as liquid effluent on the grassy cover crops established in the various pastures, as is the sludge or more solid waste removed periodically from the waste storage lagoon.
- 3. The applicant, the 511 acres and the project itself would use approximately 440 acres of that tract. The site is approximately 6 miles south of the Santa Fe River. The majority of the soil on the site consists of fine sand and clay-sand type soils.
 - 4. The dairy would contain approximately 850 cows. Lactating

cows (cows being milked) would be grazed in some 36 pastures divided by fencing. They would be grazed in the pastures approximately 85 percent of the time and lactating cows would be in the milk and feed barn located in the center of the lactating cow pastures approximately 15 percent of the time. The manure from the barn, approximately 15 percent of the total animal waste, would be collected and placed in the collection lagoon for spray irrigation on the forage crops grown in the pastures. The remaining 85 percent of the waste would result from direct deposition on the pastures by the cows. The rotational grazing dairy would contain permanent watering troughs in each of the 36 pastures. This creates the possibility of numerous "high intensity areas" or areas characterized by a high level of cattle traffic. This circumstance can result in denuding the cover crop or grasses around such water trough areas which would result in a failure, for that area, of the root-zone-uptake means of waste treatment of nitrates. minimize that eventuality, the cattle would be rotated on a frequent basis from paddock to paddock in an effort to maintain nitrate balance and maintain the sanctity of the cover crop, as would the option of employing movable watering troughs so that areas of denudment of the grass or forage cover can be avoided.

5. Manure would be flushed from the milking and feeding barn with approximately 2,000 to 5,000 gallons of water after each milking and at the end of each shift. Wastewater would then flow into a sand trap or filter and thence through an underground

pipeline into an 80 foot x 84 foot concrete-lined storage lagoon. The final site of the storage lagoon has not been firmly determined. The site proposed in the application is located in part over a depression which is a suspected karst feature or area that may be subject to sink hole formation. Therefore, consideration should be given locating the waste lagoon so as to avoid that depression and the permit should be conditioned on installation of the lagoon so as to avoid known karst features.

- 6. Effluent from the storage lagoon would be applied to 245 acres of pasture with a movable spray gun. The settled sludge from the lagoon would be spread on the same land periodically.
- 7. The primary grass crop on the site intended for cattle forage would be Coastal Bermuda grass. Coastal Bermuda grows through a large part of the year and is normally dormant, in the climate prevailing in the Gilchrist and Alachua County area, from mid-October until early March. There would thus be little nutrient uptake during that time but to off-set that dormant state rye, wheat, rye grass, sorghum and other small grains could be grown on the site during the winter months in order to continue the waste treatment function of the cover crops.

MANAGEMENT PLAN

8. The Department currently does not have in effect a specific rule requiring dairies in north Florida to obtain permits to construct and operate per se, although such a rule does prevail for dairies in the Okeechobee Basin in south Florida. Since 1990,

however, the Department has, by policy, required permits for new dairy facilities in the Suwannee River Water Management District as industrial waste water facilities. This policy is derived from the general regulatory authority contained in Section 403.087, Florida Statutes, and Chapter 62-670, Florida Administrative Code. The Department policy is described in a letter in evidence from the Department to applicant Watson containing the required conditions on any grant of the permit, to which the applicant has agreed. Those requirements are as follows:

A. Management Plan

A site-specific plan, with design calculations, providing for collection, storage and disposal of all wastewater from milking parlor and of runoff from the 25-year 24-hour storm event from all "high intensity" areas within the dairy farm. The calculations should include stormwater computer model SCS TR-55 or similar.

Supporting documentation for the plan shall include but not be limited to the following:

- 1. Water budget and balance, detailed and itemized.
- 2. Nutrient budget, including wastewater and solids management.
- 3. Crop management plan with projected crop nutrient uptake rates.
- 4. Herd management plan, including locations of barns, travel lanes, feed areas, pastures, and management of dry cows and heifers.
- 5. Treatment and disposal system details, construction details and methods, pumping systems and capacities, irrigation system

details, lagoon design and capacity, and site plans.

B. Ground Water Monitoring Plan

- Determination of ground water depth, variability and direction(s) of flow.
- 2. Topographic site plan which includes the location of facility property boundaries, sinkholes and cooling ponds.
- 3. Ground penetrating radar (GPR) if located within Suwannee River Water Management District.
- 4. Site borings for determination of soil properties, depth and extent of low permeability zones, and confirmation of GPR results.
- 5. Proposed locations, construction, and development criteria for monitor wells.
- 6. Inventory of potable wells within 1/2 mile of site.
- 7. Determination of current ground water quality and compliance.

Such plan shall be prepared in accordance with the standards of the USDA NRCS, at a minimum, and shall include detailed instructions for construction, operation, and maintenance of wastewater/runoff collection, storage and disposal systems. DEP Exhibit 1.

The various expert and fact witnesses for the Respondents described in their testimony the constituency of that Management Plan and the reasons, within their various scientific discipline areas and their personal factual knowledge concerning why it should be required for the site and project at issue.

9. The 850-cow herd which would be contained on the proposed dairy consists of 550 lactating cows which are milked on a daily

basis but also contains 80 dry cows and 220 heifers. Thus some 300 cattle on the dairy will not be milked at any given time and consequently will not contribute to use of the high intensity barn area and the waste collected in the anaerobic lagoon to the extent that those non-milking cattle are not fed and watered in the central barn area. Their waste would more typically be deposited directly on the pastures by those cattle themselves.

- 10 The project is proposed to provide for on-site containment of all wastes generated by the dairy. There will be no discharge of effluent or other pollutants from the dairy to "waters of the state." The proposed permit requires that no surface water runoff be permitted from the dairy site.
- 11. The anaerobic or waste collection lagoon is designed to contain all effluent from the milking barn and other high intensity cattle areas in the event of a 25-year, 24-hour storm occurrence. Additionally, a safety factor of one-foot of "free-board" or additional wall height on the anaerobic lagoon is to be provided as an additional safety factor over and above the level expected to be achieved by the above-referenced storm event. The adequacy of the design capacity of the lagoon system is not in dispute.
- 12. The proposed project and design calls for four monitoring wells to be located along the northern boundary of the property, which is essentially co-extensive with the boundary of the discharge zone at issue. There would be three compliance wells and one background sampling well. The Department's expert geologist,

Mr. Davis, was of the belief that an intermediate monitoring well would not be necessary since the four wells would in his view be sufficient to enforce water quality standards. Those wells are located down-gradient according to the known direction of the ground water flow underneath the site, as required by Rule 62-522.600(6), Florida Administrative Code. Although no intermediate wells are provided for by the plan, they have been required at the other two rotational grazing dairies already permitted by the Department in the Suwannee River Water Management Region at least one of which was within a mile of the outstanding Florida water of the Suwannee Intermediate monitoring wells at other dairies have shown increased levels of nitrate, although there is no evidence to show that nitrate levels have exceeded state standards at the boundaries of those dairies or their discharge zones. In any event, however, the totality of the expert testimony demonstrates that intermediate wells would provide an efficacious early warning system to predict increases in nitrate contamination. Thus adjustments in the waste and commercial fertilizer nitrate application could be made so that prevention of violation of nitrate standards, by the time waste water migrated to compliance wells around the boundary of the site, could be effected. This would have a substantial predictive value to avoid future nitrate contaminant violations before they occur and they should be installed as a condition on permitting.

13. The proposed dairy design and operation involving rotational grazing is undisputed to be more beneficial to

environmental water quality considerations than a traditional cattle confinement type of dairy. The rotational grazing dairy is characterized by cattle spending minimal time in high intensity milking, feeding, and watering areas. Additionally, there will be a significantly lower level of nutrient loading on the pastures with little accumulation of effluent on the land surface. In fact, the deposition of waste through spray irrigation and through the urination and defecation of the cattle directly will still result in a deficit in nitrates needed for adequate plant growth of the grass, and other crop, ground cover necessary for feeding the cattle and making the operation succeed in a waste treatment sense as well. Consequently, it will have to be supplemented by the addition of some commercial fertilizer, the costs of which will result in a natural incentive for the farmer/applicant to ensure that the nutrient loading on the pastures is at a low, environmentally acceptable level in terms of potential contamination of ground The proposed dairy has been demonstrated to be consistent water. with the Natural Resources Conservation Services' requirements and policies concerning dairies and rotational grazing dairies. also undisputed that phosphorus is not of an environmental concern with this application and project. There is sufficient iron and aluminum coating on the soils involved so that excess phosphorus will be retained on the site and it is undisputed that nitrogen is the only limiting factor in the design of the dairy.

NITROGEN BALANCE

- The specific concern with regard to the application and 14. the dairy operation is nitrate leaching below the root zone of the crops grown on the surface of the dairy. The dairy is designed to use nitrogen and nitrates by growing crops in the pastures which will then be eaten by the dairy cows, so that the nitrogen is re-cycled with the resulting animal wastes being used as fertilizer for the same grass or crops which the cattle continuously graze. is anticipated that the amount of nitrogen produced by the dairy cows will be insufficient to optimize that plant growth. Therefore, additional fertilizer will be required to be applied to the land surface in the pastures at times. The additional nitrogen fertilizer will only be applied when testing of soil, and particularly plant tissue analysis, which will be done a regular basis, shows that application of commercial fertilizer is needed to supplement the natural cattle-waste nitrogen.
- 15. Nitrogen is a concern because if too much of it is applied to the land surface, it may leach below the plant root zone and eventually migrate to ground water. Nitrogen in high concentrations can be potentially harmful to human health, so state drinking water standards have been established for nitrogen with regard to the issuance of industrial waste water permits. The state drinking water standard for nitrate is ten parts per million at the zone of discharge, that is, the zone of discharge into the ground water aquifer.

- 16. The dairy is designed in such a way that nitrate levels will not exceed water quality standards. The design is determined by reviewing nitrogen balances and making sure that excess nitrogen will not leach past the root zone. The engineers evaluating and designing the project for the applicant, and testifying concerning it, arrived at a "mass balance" to estimate the nitrogen amounts on the site. This mass balancing is required by the Department in the required estimating of the pounds of nitrate leachate.
- 17. Nitrogen can be removed from the dairy operating system through atmospheric losses or "volatilization" particularly from the urine component of nitrogen application. It can be removed through milk losses, whereby nitrogen is removed from the digestive system of the cattle through its being bound up to some extent in the milk produced by the cattle and sold off the dairy site, as well as some minimal leaching of nitrate through the soil. The nitrogen that is not removed by volatilization to the atmosphere (excluding the small amount re-deposited by rainfall) will be cycled through the cows and the crops along with any supplemental nitrogen applied from time to time in order ensure optimal plant growth.
- 18. The mass balance, or amount of pounds of nitrate in the leachate, was determined by considering the amount of water flowing through the system. The re-charge rate was established by the applicant's engineer Mr. Holloway to be 17 inches. This means that there will be 17 inches of rainfall leaching below the root zone of the cover crops to reach ground water. The re-charge rate can be

determined by computing the average of the evapo-transpiration and average rainfall and subtracting the difference. It can also be calculated by employing computer models such as the "GLEAMS" model. Mr. Holloway, the applicants engineer, used both sources or methods and reached the figure 17 inches. The GLEAMS model is a computer model that uses local data to determine water budgeting and recharge rates.

- 19. Mr. Holloway also used a 50 percent volatilization rate for the nitrate losses when determining his mass balance. The applicant's experts also considered the plant uptake rates and concluded that the uptake rate would be between 500 and 700 pounds of nitrogen uptaken per year, per acre, by the plant cover. In order to be conservative and to install a sufficient safety factor in the system to avoid overloading it with nitrates and endangering ground water quality, they employed a lower uptake rate in their calculations and recommendations to the applicant, and thus to the Department, as to the amount of nitrogen applied per acre, per year, from all sources to only be 400 pounds.
- 20. The conditions imposed by the Department in the "free-form" consideration process and draft permit thus limits the total pounds of nitrogen permissibly applied to this site to 400 pounds per acre, per year. Those 400 pounds of nitrogen are represented by 260 pounds applied from manure from the livestock and no more than 140 pounds applied from commercial fertilizers purchased by the farmer, Mr. Watson. The 400 pounds of nitrogen per

acre, per year, as a condition on the permit is less than that allowed at the other rotational grazing dairies previously designed by Mr. Holloway and approved. Additionally, Mr. Cordova of the Department established that there are no rotational grazing dairies that have a higher nitrogen deficit than the Watson dairy. This further provides a significant safety factor not present in other approved dairies.

- 21. Atmospheric losses of nitrogen up to 80 percent have been documented with similar dairy operations. Atmospheric losses can occur through both volatilization and de-nitrification.

 Volatilization is the process where nitrogen is removed from the system by the ammonia in the waste products, changing into a gaseous state and migrating into the atmosphere as a volatile gas.

 De-nitrification is the process where microbes, principally in the absence of oxygen (anaerobic) reduce nitrates to nitrogen gas and to possibly N2O, which is a volatile, and then allow it to escape into the atmosphere.
- 22. The applicant has agreed, as a condition to the permit, to apply soil testing and crop tissue analysis as well as quarterly reviewing of the monitoring wells before he determines to supplement the natural fertilizer deposited from the animals with additional commercially purchased fertilizer. The commercially purchased fertilizer would represent a substantial investment in purchase costs and in labor costs for its application. This is an additional safety factor because the applicant clearly would not have an

interest in applying any more fertilizer than was absolutely needed to secure optimum plant growth for grazing purposes and nitrogen uptake or waste treatment purposes. This is a further method which will prevent excessive nitrate nutrients from being deposited on the site and possibly into the ground water.

- 23. Dr. Bottcher, an expert witness for the applicant, testified that he expected nitrate levels at the zone of discharge within the boundaries and beneath the surface of the dairy farm to be between 4 and 6 parts per million. Mr. Holloway expected within a reasonable degree of certainty that on a long term average, with about 4,000 pounds of nitrate leaching below the root zone system, that the concentration directly below the farm beneath the root zone would be between 2 and 3 parts per million.
- 24. Indeed, the proposed operation would be similar to the existing condition at the Watson farm involving grazing beef cattle on a system of pastures, with row crop operations. Row crops typically have a higher impact of nitrates than the proposed dairy operation would have and beef cow grazing would have a similar impact, although it would be slightly less. Thus the proposed operation is similar in its nitrate impact to the existing conditions at the site. Moreover, the applicant is limited by the permit conditions already agreed to, to spray manure on the spray field area at the rate of less than one half of an inch. The spraying to that limitation would probably take from two to five hours per week.
- 25. One of the important safety mechanisms in achieving a nutrient balance on the dairy site and in its operation, so as to ensure that ground water quality violations do not occur, is the application rate of nitrate to the land surface. As shown by Dr. Bottcher's testimony, the farmer may increase crop production by

applying more fertilizer during seasons of heavy growth of the plant cover. The application rate can then be decreased when there is less growth and, therefore, less need for nutrients to grow the cover crops. A smaller application rate will increase the volatilization rate by avoidance of the infiltration of the nitrate bearing effluent into the soil through hydraulic action and through the saturation mechanism, since a smaller amount of application would tend to leave more of the effluent within less than one inch of the land surface, or on the land surface, thereby allowing it to be volatilized more readily. This circumstance will decrease the amount of nutrient leaching below the root zone and thus prevent the nitrates from being transmitted to the ground water.

appropriately on the site in order to provide the grazing forage needed for the operation of the dairy. Examples, depending upon the season of the year, are rye, wheat, grain sorghum, and various grasses, including Coastal Bermuda grass. Coastal Bermuda is a perennial grass, high in protein available for livestock and is already established on the site. The various other crops can be grown as well and some that grow in the winter months, such as rye, will be grown by Mr. Watson. The growing of the various cover forage crops are limited by the limitation in the permit which is conditioned on maintaining a cover crop growth situation where the average annual uptake is at least 400 pounds per acre (the evidence reveals that in reality it would be more on the order of 500 to 700

pounds per acre, per year).

27. Dr. Pollman and Dr. Upchurch, expert witnesses for the Petitioners, question the nitrogen balancing and leachate predictions arrived at by the applicant's expert witnesses, as well as those of the Department. Neither Drs. Pollman nor Upchurch had any prior experience or expertise with testing for a nitrogen balancing on rotational grazing dairies. Instead they utilized various models to attempt to predict leachate amounts. Pollman's modeling utilized formulas prepared by the applicant's experts. His modeling showed a high percentage of the predicted outcomes to be actually within regulatory standards for nitrates, even though all of his estimates failed to take into account the variable inclusion or application rate for nitrogen through commercial fertilizer which will only be applied on an as needed basis after appropriate plant tissue and soil tests show that commercial fertilizer should be applied. Likewise, Dr. Upchurch's modeling results were also mostly within acceptable standards for nitrate concentrations unless one assumes that the nitrogen application rates exceed the amounts allowed under the permit, which will not be the case in reality because obviously the permit limits must be complied with. Dr. Upchurch also utilized a model, "NLEAP," which was neither designed nor calibrated to be used for predictive capabilities and is still considered experimental by the NRCS.

WASTE LAGOON

28. The applicant proposes to construct a waste storage lagoon

designed to hold seven days' waste water generation capacity or 26,000 gallons per day. In addition to that required storage for a 25-year, 24-hour storm event, an additional safety factor of one foot of free board has been designed into the lagoon system. lagoon will be constructed with 6 inch thick, fiber-reinforced concrete. No evidence was offered by the Petitioners that the lagoon design itself was faulty or inappropriate, rather the Petitioners contend that there is a chance that a surface failure beneath the lagoon, by the result of a sink hole developing, particularly in the present preliminary location proposed for the lagoon, could cause the lagoon to crack. The applicant will, however, in order to ensure that the area is suitable for the lagoon have the appropriate engineer "over-excavate" the site in order to minimize the change of a sink hole developing. Additionally, soil borings will be done beneath the surface to provide additional assurance that the lagoon will not fail due to voids or sink holes being present beneath it. Because the lagoon is presently preliminarily located in an area that appears to embody an old, inactive karst depression, consideration should be given to altering the site of the lagoon slightly so as to avoid this area, after soil borings and other investigation is done to ascertain whether the area poses a risk of lagoon failure. Additionally it must be pointed out that because the applicant would need to expend a substantial investment to rebuild the lagoon in the event of such a failure, he has a strong incentive to locate the most suitable

geological placement for the lagoon in any event.

GEOLOGIC SITE CHARACTERISTICS

- 29. It is undisputed that the geology underlying the surface of the dairy site is karst in nature: that is, it is characterized by a sub-strate of limestone which can, through the dissolution process caused by percolating water, be susceptible to fissures, voids, underground conduits and sink holes. This, however, is true for essentially all areas used for agriculture in the Suwannee River Area Water Management District, the area to which the subject abovereferenced policy concerning installation and permitting of dairies applies. Because of the karst nature of the area, sink holes and other potential surface openings to the ground water could occur at the site. It is most significant, however, that both Mr. Holloway's and Dr. Kwader's testimony established that the soil layer at the site was more than sufficient to protect the ground water. the soil layer averages from 45 to 50-feet thick over the underlying limestone sub-strate of the Ocala Formation. Further, the proposed permit and its conditions would require a management plan which, with the conditions already placed on the permit and recommended herein, will adequately deal with the possibility of sink holes, "pipes" or "chimneys" developing on the site.
- 30. The dairy design success is derived essentially from the sufficient nutrient uptake in the root zone of the plant cover, balanced with careful control of the application rates of both the natural fertilizer from the cows and the commercial fertilizer which

will supplement it from time to time. Any possibility that the treatment zone for nitrates associated with the plant root zone would be by-passed by the effluent as a result of sink holes or other types of fissures developing can be resolved by proper management practices, which the conditions proposed for the permit and those recommended herein will insure are implemented. For instance, if sink holes, other depressions or holes develop in the site, they will be filled with soil to a depth of five feet, with an impervious clay cap on top of that and then a layer of top soil to allow for re-establishment of the root zone on the surface. permit should be so conditioned. Moreover, if sink holes or other voids develop that are too large to be so filled and pose a risk of migration of effluent below the root zone to rapidly to the ground water, they will be fenced off and cows will not be allowed in the The area will be removed from the irrigation application process until repairs are made, under the presently proposed conditions on the permit. An additional condition should be imposed whereby any sink holes or other voids or similar breaks in the ground surface which pose a risk of effluent rapidly migrating to ground water should be bermed around the circumference to prevent effluent or stormwater laden with nitrates from the land surface from entering the fault or cavity.

31. The applicant is required under the proposed conditions on the permit to report to DEP any sink holes which develop within a certain period of time in the barn area. Cows are not to be

permitted to enter into any of the sink hole areas by additional fencing, if necessary. If sink holes develop in the spray field there can be no discharges of fertilizer or irrigation on those areas until the sink holes have been repaired in the manner referenced above.

- The phosphate pits on the site will also be fenced to prevent discharges past the root zone potentially caused by cattle entering the pits. Additionally, berms are required to be constructed around the phosphate pits to prevent surface water from storm events or other means by which nitrates from the ground surface can be transported into the pits and then possibly to ground water. Any holes which may develop, also called "piping failures," around the periphery of the phosphate pits should be treated in a similar manner to prevent the migration of surface water into those holes whether or not they communicate with the phosphate pits themselves by fencing and berming. These arrangements coupled with the fact that the phosphate pits are characterized by a sufficient soil layer in the bottom of the pits between the bottom surface of the pits and the water table or aquifer will constitute reasonable assurance that the pits will not result in a conduit or path for nitrate-laden, surface water to migrate past the root zone directly into the ground water aquifer.
- 33. Mr. Holloway, an engineer, testifying for the applicant conducted soil borings on the site to verify the Natural Resources Conservation Service (NRCS) surveys as accurate and to ensure that

an adequate root zone for treatment purposes existed. Additionally, the NRCS did a ground penetrating radar survey or study on the property.

- The Petitioners also did a separate ground penetrating radar study performed by Mr. Windschauer. The Petitioners study identified a number of karst-type "anomalies" on the property. The number of anomalies located by Windschauer was not unusual for a such a karst geologic area, but, in any event, all of them had adequate soil depth to support the crops necessary to establish the root zone and maintain the nitrogen balancing. Soil borings were conducted, as well on four of the anomalies, under Dr. Upchurch's supervision. They confirmed that there was adequate soil depth to support crops and protect groundwater. The conditions already imposed on the permit to which the applicant has agreed, require a minimum of five feet of soil depth to ensure adequate treatment including the soil below the root zone and that soil depth and plant cover will have to be maintained even if repairs are necessary to karst anomalies or "sink holes," or the dairy will have to cease operation.
- 35. The soil depth on the dairy is approximately 45-50 feet and the water table is approximately 55 feet below the ground surface. While the Department's expert, Mr. Davis, is satisfied that the location of the monitoring wells and the number of wells are adequate to monitor compliance with water quality standards for groundwater at the site, the draft permit conditions allow for a

change in the number and the location of the monitoring wells. The evidence in the case, including that which shows that an intermediate well at another similar dairy site has shown elevated nitrate levels (although it has not been shown that other conditions are similar to those proposed in this permit application and in the evidence) would indicate that it would be prudent to install intermediate monitoring wells, upgradient, within the dairy site to serve as an early warning, predictive mechanism to avoid water quality violations at the boundary of the zone of discharge. This will allow time for steps to be taken, through various adjustments in the operation, to prevent any violations of the ten parts per million nitrate groundwater standard. The permit is recommended to be so conditioned.

36. Dr. Kwader performed a photolinear trace analysis. He indicated that he did not find any particular linear features such as fractures. A fracture in the limestone stratum is significant in that it can provide a conduit or preferential pathway through the sub-surface rock and thus transfer contaminants from one point to another at a more rapid rate than simple percolation through soil and pores in the rocks. This could result in excessive nitrates being deposited in the groundwater aquifer before an adequate treatment time and mechanism has had its effect on the nitrates. A fracture or conduit flow will, however, cause dilution and Mr. Davis, for the Department, testified that he did not expect a higher concentration of nutrients in a fracture than in the surrounding

- rock. Additionally, there will be substantial dilution once the nutrients reach the aquifer and begin moving laterally. The dilution will be proportional to the water moving through the conduit, meaning that if the fracture is relatively large, then the concentration of nutrients will be proportionately smaller because of the higher volume of water.
- Such linear features or fractures are difficult to observe through 50 or more feet of soil existing at the site above the rock stratum and the top surface of the aquifer. Dr. Upchurch, for the Petitioners, also performed a photolinear trace analysis and identified two areas as being highly probable, in his belief, for linear fracture features beneath the farm and surrounding area. believes there is a possibility of a number of other fractures beneath the Watson property, although the evidence does not definitely identify such nor the measures or precise locations of any such postulated fractures. The Watson property, however, is not unlike any of the surrounding karst terrain with respect to such potential linear fracture features and, in fact, much of north Florida can be so characterized. Moreover, Dr. Upchurch himself agreed that only a limited area of the Watson farm would be impacted by such features, and further, if they are present, they will not impact the nutrient balance aspect of the dairy design because it will perform above many feet of soils separating it from the fractures, if they exist.
 - 38. Limestone pinnacles protruding to the land surface can

provide preferential pathways for water to migrate downward to the groundwater aquifer in a manner similar to that posed by a sink They can also function as a break in the soil and plant root hole. zone covering the spray effluent treatment area if allowed to remain exposed. Limestone was observed within one of the mine pits and in a sink hole. It is not clear whether it is a pinnacle which leads down to the sub-strate containing the aquifer or is merely a remnant In any event, these pinnacles or limestone outcroppings or boulders, whatever they prove to be, will not result in a preferential pathway for water to migrate to the aquifer because the management plan conditioning the permit requires that any limestone protruding to the surface be sheared off and replaced with top soil and vegetation. The permit conditions require that at least five feet of soil overlaid by vegetation must be present for all areas in the spray field.

- 39. No exposed groundwater was observed in any of the sink holes. In fact the aquifer water level would be at least ten to twenty feet below the bottom of any pit or sink hole observed on the property. An additional 50-foot buffer from the property boundary surrounds all of the paddocks, providing an additional safety factor before the outside boundary of the zone of discharge is reached.
- 40. The proposed dairy is located approximately six miles south of the Sante Fe River at its nearest point. The Sante Fe River is an outstanding Florida waterway in accordance with Rule 62-302.700(9)(i)27, Florida Administrative Code. The dairy site is

not within the flood plain of the river and there will be no surface water discharged from the dairy, including none to the Sante Fe River. Any impact the dairy might have on a water quality in the Sante Fe River would come from groundwater flowing from the site to river. Groundwater beneath the dairy site flows first in a northeasterly direction thence apparently swinging more northerly in the direction of the river, more or less in a "banana shape" flow pattern and direction.

- 41. Current permitting requirements for such a dairy require that the groundwater leaving or flowing from the zone of discharge must meet "drinking water standards." Those standards are codified in Rules 62-520.400 and 62-522.400, Florida Administrative Code. Those standards require that nitrates not exceed the standard or level of ten parts per million. Dr. Bottcher's expert opinion, which is accepted, is that the dairy design and operation will provide adequate protection to the Sante Fe River with that perameter in mind. He also established that reasonable assurances exist that the river will be adequately protected and not significantly be degraded alone or in combination with other stationary installations in addition to the dairy in question.
- 42. The dairy waste management system has been established by preponderant evidence to abate and prevent pollution of the groundwater to the extent required by the applicable statutes, rules and policies, in that water or pollution will not be discharged from the dairy in violation of the above-referenced standard. Especially

because of the great thickness of soil cover and because of the conditions and protective measures designed into the draft permit, and the project and recommended as conditions herein, in order to prevent effluent from bypassing the root zone treatment area due to karst features the preponderant, credible geological and hydrogeological evidence, including that of Mr. Davis, shows, within a reasonable degree of professional certainty, that there are not conditions concerning the hydro-geology or geology in the area of the site as to make it unsuitable for the proposed dairy operation in the manner conditioned and recommended herein.

SECTION 120.57(1)(E) - FINDINGS

43. The specific permitting requirements for the rotational grazing dairy at issue are embodied in a policy followed by the Department as far back as 1990. Those requirements are not contained in a Department rule. Rather, the policy is presumably enacted pursuant to the statute referenced by the parties, including the Department, in this case as the general pollution abatement statute, Section 403.087, Florida Statutes. The action of the Department in announcing its intent to grant the permit may be deemed an agency action "that determines the substantial interest of a party and that it is based on an un-adopted rule . . . " to the extent that one might deem this policy, consistently followed in a substantial area of the state since 1990, an un-adopted rule for purposes of Section 120.57(e)(1), Florida Statutes. context, the agency must demonstrate that the un-adopted rule

comports with the statutory definitional of characteristics of a valid rule. Thus the agency must present proof that its un-adopted rule or "policy" would be valid as a rule. In that context the evidence adduced by the Department and indeed by both Respondents, since they presented a joint case, shows that the policy at issue is within the powers, functions and duties delegated by the legislature in Section 403.087, Florida Statutes, which is a generalized grant of authority designed to give the Department the power to regulate in a way to abate the pollution of waters of the state, including groundwater.

- 44. It has also been adequately shown that the policy or unadopted rule does not enlarge, modify or contravene the specific provisions of that law being implemented but rather provides sufficient regulatory details so that the general principals, stated in that statute, can be carried out in terms of the installation, regulation and operation of the subject dairy project. It has been adequately proven that the rule is not vague and that it establishes adequate standards for agency decisions on whether or not to permit such a rotational grazing dairy.
- 45. It does not vest unbridled discretion in the agency nor constitute an arbitrary or capricious act or policy imposition, because the standards and requirements advanced by the Department as being necessary under this policy or un-adopted rule, for a permit to be granted, must, of legal and factual necessity, be predicated on competent, scientific expert and factual evidence. That has been

shown, which likewise meets the requirement that the un-adopted rule be supported by competent and substantial evidence.

46. Likewise, the evidence shows that under the circumstances, given the great public necessity in protection of the groundwater and the Floridian aquifer, that the requirements placed upon a grant of a permit for this project and the conditions placed upon its construction and operation do not impose, under the circumstances, excessive regulatory costs on the regulated person, Mr. Watson, or the governmental entity where the project is located, in other words, Gilchrist County.

CONCLUSIONS OF LAW

The Division of Administrative Hearings has jurisdiction of the subject matter of and the parties to this proceeding pursuant to Section 120.57(1), Florida Statutes.

- 47. The Department has met its burden to demonstrate the validity of its policy to the extent it may be deemed an "un-adopted rule" in accordance with Section 120.57(1)(e), Florida Statutes.
- 48. The Petitioner-in-Intervention, Gilchrist County, was dismissed from the proceeding because it did not plead nor prove any injury-in-fact and because the interest it sought to protect is that general interest in clean water which is no more than that all members of the public have and which is within the police power of the DEP, under the mandate of Chapter 403, Florida Statutes.

- 49. The applicant has the ultimate burden of proof in demonstrating entitlement to the permit sought. Department of Transportation v. J.W.C., Company, Inc., 396 So. 2d 778 (Fla. 1st DCA 1981). The applicant has the burden of providing reasonable assurance that the proposed project will not violate Department standards, that the proposed dairy will abate and prevent water pollution to the extent required by Department rules and policies and that the project will not discharge or cause pollution in violation of relevant statutes, rules and policies. Rule 62-4.070, Florida Administrative Code, and Rule 62-4.030, Florida Administrative Code.
- 50. The applicants burden is one of "reasonable assurances, not absolute guarantees." See Manasota-88, Inc., v. Agrico

 Chemical, 12 F.A.L.R. 1319, 1325 (DER 1990). Reasonable assurance must deal with reasonably foreseeable contingencies.

 The necessary reasonable assurance in a particular case that a proposed project will comply with relevant air and water quality standards is a mixed question of law and fact. See Sierra Club, et al. v. Department of Environmental Protection, et al.,

 18 F.A.L.R. 2257, 2260 (Fla. DEP 1996); Save Our Suwannee, Inc., v. Pechocki and Department of Environmental Protection,

 18 F.A.L.R. 1467, 1471 (Fla. DEP 1996).
- 51. Once an applicant has presented evidence and made a preliminary showing of reasonable assurance, a challenger must present "contrary evidence of equivalent quality" to that

presented by the permit applicant. J.W.C., 396 So. 2d at 789. Simply raising "concerns" or even informed speculation about what "might occur" with regard to the water in the aquifer and in the Sante Fe River and its attendant springs is not enough to carry the Petitioners' burden. See Chipola Basin Protective Group, Inc., vs Florida Department of Environmental Protection, 11 F.A.L.R. 467, 480-81 (DER 1988). In other words, for instance, even though the scientific evidence adduced by the Petitioners shows that there is a possibility of fissures, fractures and sand pipes and other sub-strate anomalies, which might serve as conduits for percolating water to reach the aquifer before it has had a chance to have the nitrates removed or treated adequately, does not overcome the applicant's showing of reasonable assurances. Some of that evidence may be deemed to be of "equivalent quality" in terms of the scientific investigation and study involved, in terms of the way the investigation by the Petitioners' experts were performed (aside from the criticisms embodied in the above Findings of Fact). Even so, the result they produced still lies, in large part, in the area of informed speculation or conjecture as to the pathways any fractures other anomalies in the might represent for the water traveling through the aquifer in the direction of the Sante Fe River, if indeed it does so. If, in fact, the water would migrate from the dairy farm in question ultimately to the Sante Fe River, it was not shown, as to any future sampling or

projection of nitrate content in the river how, in this body of evidence, it could be determined that the feared nitrate levels in the river in the future would come from the farm or would be attributable to the subject dairy farm operation, as opposed to some other source.

It is difficult to see how such theories and postulations about the fractures and other suspected, although not definitively proven, pathways for the groundwater from the farm in a northerly and then a northeasterly flow direction toward the river might constitute structures which would prevent adequate dilution of the effluent water and would also transport it to the aquifer and to the waters of the river before adequate treatment and abatement of the nitrate pollution potential had occurred. There is great difficulty in establishing such facts about suspected, but not proven, structures beneath 50 feet of soil with the only tools being theoretical models and the ground penetrating radar, with all its frailties. Other potential methods of ascertaining the flow rate and pathway the water takes through the aguifer, such as "dye tracing" studies, were not suggested in the evidence. Thus, while the evidence in terms of scientific evidence of "equivalent quality" might have been adduced, it was not shown in a preponderant way to be "contrary evidence" in terms of being preponderant over that adduced by the applicant's and the Department's witnesses and documentary evidence.

- 53. Although, by policy, Chapter 403.087, Florida Statutes, provides authority for the permitting process, there is no specific rule that requires a dairy in north Florida to obtain a permit to construct and operate that dairy (contrary to the rule prevailing in a similar context for the Okeechobee Basin in south Florida). Since 1990, however, the Department has, by policy, adopted pursuant to Section 403.087, Florida Statutes, required a permit for new dairy facilities in the Suwannee River Water Management District. See Desmond v. Pioneer Farms (E.T. Usher) and Department of Environmental Protection, 17 F.A.L.R. 2903 (Fla. DEP 1995); Save Our Suwannee Inc., supra.
- 54. Moreover, in terms of waste water discharge regulation, Chapter 403.087, Florida Statutes, is also implemented by Rule Chapters 62-4, 62-302, 62-520, 62-522, and 62-660, Florida Administrative Code. In terms of proof with competent, substantial evidence of the appropriateness and factual and legal effiacy of this policy and in terms of proof of its compliance with the provisions of Section 120.57(1)(e), Florida Statutes, as delineated in the above Findings of Fact, if the policy is deemed an "un-adopted rule", the Department has met its burden of proof alluded to in Section 120.57(1)(e), Florida Statutes.
- 55. Rule 62-522.410, Florida Administrative Code, allows the establishment of a zone of discharge around a groundwater discharge site. The "zone of discharge" is the area underlying a site wherein there is opportunity for treatment, mixture or

dispersion of waste into the aquifer. <u>See also</u>
Rule 62-520.200(23), Florida Administrative Code.

- 56. Rule 62-522.300(5), Florida Administrative Code, establishes that the number of groundwater monitoring wells on a proposed dairy site shall be minimized, consistent with the ability to obtain useful and reliable information. The above conditions, however, given the nature of the site and the subterranean geology at the site, dictates that intermediate monitoring wells be installed as an additional safety feature and early warning system for potential groundwater pollution violations.
- 57. Rule 62-4.242, Florida Administrative Code, relates to permits where proposed activity or discharge is within an outstanding Florida water or might significantly degrade an outstanding Florida water. It is inapplicable to this proceeding because the proposed dairy is not within an outstanding Florida water and does not significantly degrade either by itself, or in combination with other activities, any outstanding Florida water. Moreover, the Petitioners did not raise this issue in their pleadings and it was not shown as an issue in the pretrial statement. The Petitioners introduced no preponderant persuasive evidence of potential degradation of the outstanding Florida water, the Sante Fe River, by the proposed dairy. It has not been demonstrated by preponderant, persuasive evidence that even if the groundwater flowing from the site beneath the dairy is

ultimately deposited in the Sante Fe River that that event given the conditions on the permit and the manner and method of treatment of nitrates at the dairy, will cause any degradation of the outstanding Florida water, the Sante Fe River. Even if the scientific evidence adduced by the Petitioners concerning flow of water and potential fractures in the stratum beneath the dairy established that the water percolating through the soil beneath, the dairy to the aguifer would ultimately flow into the river, the Petitioners' evidence really does not rise beyond the level of concern or informed speculation concerning potential degradation of that outstanding Florida water and does not overcome the counter-countervailing evidence adduced by the applicant that the permitting conditions and the physical circumstances of the dairy site, including the substantial overlying soil layer, which demonstrates that the dairy operation will not cause degradation of receiving state waters in violation of the relevant perameters referenced herein.

58. The applicant has provided reasonable assurances of compliance with the Department rules, regulations and policies governing performance and operation of the proposed dairy and that the proposed dairy will comply with the Department's groundwater quality standards and minimum criteria. Reasonable assurances have been provided that the dairy operation will not violate DEP rules nor the draft permit conditions governing the proposed zone of discharge for the dairy. It has also been

demonstrated that the Department has complied with the relevant rules, statutes and its own policy regarding issuance of the proposed permit in terms of the conditions it has sought to impose on issuance of that permit. The applicant has provided reasonable assurance that the project will comply with effluent guidelines of the Department for such dairy operations pursuant to the Department's rules and policy governing such industrial waste water facilities. The applicant has provided sufficient, persuasive, preponderant evidence concerning specific site conditions so as to show reasonable assurance that the groundwater beyond the proposed zone of discharge will not be contaminated in excess of relevant standards and criteria and that the water quality of the G2 Aquifer beneath the site will not be reduced.

59. In summary the applicant has provided "reasonable assurances" that the project as proposed to be constructed and operated will not violate the relevant statutes, rules and policies of the Department germane to such an industrial waste water facility if the conditions imposed by the Department's position on the grant of the permit and those conditions recommended to be adopted and followed in this Recommended Order are adopted, adhered to and complied with. This applicant's reasonable assurances showing has not been overcome by countervailing evidence of equivalent quality adduced by the Petitioners. Accordingly, under these circumstances and with the

imposition of the conditions imposed in the Department's draft permit and agreed to by the applicant and also including the additional conditions recommended to be adopted in this Recommended Order, the permit should be granted.

RECOMMENDATION

Having considered the foregoing Findings of Fact,

Conclusions of Law, the evidence of record, the candor and

demeanor of the witnesses and the pleadings and arguments of the

parties, it is

RECOMMENDED:

That a Final Order be entered granting the permit requested by Craig Watson to construct and operate the proposed dairy waste management system in accordance with the draft permit proposed by the Department, including the general and specific conditions attached and incorporated therein and also including the general and specific conditions recommended to be adopted and implemented for the proposed system in this Recommended Order, based upon the preponderant, persuasive, credible evidence.

DONE AND ENTERED this 23rd day of February, 1999, in Tallahassee, Leon County, Florida.

P. MICHAEL RUFF
Administrative Law Judge
Division of Administrative Hearings
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Filed with the Clerk of the Division of Administrative Hearings this 23rd day of February, 1999.

ENDNOTE

1/ See Desmond v Pioneer Farms (E.T. Usher) and Department of Environmental Protection, 17 FALR 2903 (DEP); Save our Suwannee, Inc., v Robert Piechoki and Department of Environmental Protection, 18 FALR 1467 (DEP).

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NOTICE OF RIGHT TO SUBMIT EXCEPTIONS

All parties have the right to submit written exceptions within 15 days from the date of this recommended order. Any exceptions to this recommended order should be filed with the agency that will issue the final order in this case.