STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

PALM BEACH COUNTY ENVIRONMENTAL COALITION, PETER TSOLKAS, ALEXANDRIA LARSON, and MICHAEL CHRISTENSEN,	)	
Petitioners,	)	
vs.	)	Case Nos. 07-5047 07-5062 07-5063
FLORIDA POWER AND LIGHT COMPANY and DEPARTMENT OF ENVIRONMENTAL PROTECTION,	)	
Respondents.	)	

RECOMMENDED ORDER

Robert E. Meale, Administrative Law Judge of the Division of Administrative Hearings, conducted the final hearing in West Palm Beach, Florida, on January 22-25, 2008.

APPEARANCES

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STATEMENT OF THE ISSUE

The issue is whether Respondent Florida Power & Light Company is entitled to Permit No. 247895-007-UC for the conversion of an exploratory well to an injection well, the construction of a second injection well, and the operational testing of both wells, which are intended to inject industrial wastewater from a power plant into the Boulder Zone of the Upper Floridan Aquifer.

PRELIMINARY STATEMENT

On April 25, 2007, Respondent Florida Power & Light Company (Applicant) filed an application with Respondent Department of Environmental Protection (DEP) for the conversion and

operational testing of Exploratory Well 2 (EW-2) into Injection Well 1 (IW-1), construction and operational testing of Injection Well 2 (IW-2), and incorporation of separately permitted Dual Zone Monitoring Well (DZMW-1) into an injection well system for the disposal of industrial wastewater at the West Coast Energy Center (WCEC) to be operated by Applicant (Application).

On September 13, 2007, DEP issued a Notice of Intent to Issue Permit, which is Permit No. 247895-007-UC (Permit).

On October 25, 2007, Petitioners Palm Beach County Environmental Coalition (Coalition) and Peter Tsolkas (Tsolkas) filed an Amended Petition to rescind the proposed issuance of "the permit" to construct and operationally test IW-1, IW-2, and DZMW-1, although the only relief that they sought was directed to the permit for IW-1 and IW-2. The Amended Petition states that Petitioners Coalition (and its members) and Tsolkas use the Loxahatchee National Wildlife Refuge for hiking, canoeing, and viewing wildlife and that the refuge is in the "zone of endangering influence." The Amended Petition raises a variety of issues, including that nearby blasting creates seismic disturbances that, inferentially, would adversely affect the wells; DEP has not analyzed the groundwater in the vicinity of the wells, the groundwater proposed to receive the injected fluids, the fluids proposed to be injected into the two injection wells, and the complex lithological formations; and

the proposed permit would fail to protect the aquifer into which the fluids would be injected. The Amended Petition requests that DEP deny the Permit application and require that Applicant demonstrate that any injection activity would contain the injected fluids in the receiving aquifer for 10,000 years. The Amended Petition was assigned DOAH Case No. 07-5047.

On October 29, 2007, Petitioner Alexandria Larson (Larson) filed an Amended Petition to rescind "the permit" for IW-1, IW-2, and DZMW-1. Petitioner Larson alleges that she lives within the "zone of endangering influence" and hikes and views wildlife in the Loxahatchee National Wildlife Refuge, which is also in the "zone of endangering influence." The Amended Petition was assigned DOAH Case No. 07-5062.

On October 16, 2007, Petitioner Michael Christensen (Christensen) filed an Amended Petition to rescind "the permit" for IW-1, IW-2, and DZMW-1. Petitioner Christensen alleges that he is a taxpaying resident of Palm Beach County; hikes, fishes, and watches birds in the Loxahatchee National Wildlife Refuge; and operates a fish farm in Palm Beach County. The Amended Petition was assigned DOAH Case No. 07-5063.

By Order Consolidating Cases entered November 7, 2007, these three cases were consolidated with DOAH Case Nos. 07-3881 and 07-4744, which had been commenced by Southern States Land and Timber, LLC. However, after a voluntary dismissal filed by

the petitioner in each of these cases, DOAH Case Nos. 07-3881 and 07-4744 were dismissed by Order Closing Files entered November 21, 2007. In this Order, the Administrative Law Judge relinquished jurisdiction over the proposed permit for the DZMW-1,[1] and DEP has since issued the permit for the construction and operational testing of DZMW-1. The above-styled cases therefore involve only the Permit, which pertains exclusively to the construction and operational testing of IW-1 and IW-2.

On December 21, 2007, Applicant filed a Motion to Strike and Motion in Limine directed to four allegations in the petitions: cumulative "affects," global warming, risk analysis, and air pollution. By Order entered January 15, 2008, the Administrative Law Judge granted the motion. The cases were transferred to the undersigned Administrative Law Judge on January 16, 2008. At the start of the hearing, petitioners orally requested a rehearing on the motion. Counsel for Petitioners Coalition and Tsolkas stated that he had not received notice of the motion. Allowing the parties a rehearing on the Motion to Strike and Motion in Limine, the Administrative Law Judge allowed extensive argument on all four issues and granted the Motion to Strike and Motion in Limine.

On January 15, 2008, the parties filed a Pre-Hearing Stipulation and, on January 18, 2008, they filed an Amended Pre-Hearing Stipulation (Stipulation). The Stipulation states that

these cases involve challenges to the proposed permit for IW-1 and IW-2. The Stipulation states that Applicant's position is that it has provided reasonable assurance that its injection of wastewater into the proposed wells meets all applicable regulatory criteria of DEP and that petitioners lack standing to bring this proceeding. As needed, facts from the Stipulation are incorporated into the findings of fact.

At the hearing, Petitioners collectively called five witnesses and offered into evidence 18 exhibits: Coalition Exhibit Nos. 1-3, Larson Exhibit Nos. 3, 6-11, and 13-15, and Christensen Exhibit Nos. 1-5. Respondent Applicant called four witnesses and offered into evidence 25 exhibits: FPL Exhibit Nos. 1-4, 7-9, 11, 13-14, 16-27, 29, and 31-32. Respondent DEP called one witness and offered into evidence two exhibits: DEP Exhibit Nos. 1 and 2. Four persons offered public comment, and one person offered Public Exhibit Nos. 1 and 2. All exhibits were admitted except Larson Exhibit Nos. 3, 10, and 13, Christensen Exhibit No. 4, Public Exhibit No. 2, and FPL Exhibit 32, which were proffered. FPL Exhibit No. 27 was admitted, but not for the truth of its contents.

Rosa Durando, one of the witnesses of Petitioner Alexandria Larsen, was unable to testify at the hearing due to a recent hospitalization. The Administrative Law Judge gave Petitioner Alexandria Larsen leave to take the testimony of Ms. Durando at

anytime on or before February 15, 2008. The Administrative Law Judge stated that this could be done by deposition or, if he were available, testimony with the witness, attorneys, and judge participating by telephone. The Administrative Law Judge also granted Petitioner Alexandria Larsen leave to use prepared direct testimony to spare Ms. Durando some of the stress of testifying. The Administrative Law Judge stated that he would allow the parties to file supplemental proposed recommended orders to address the evidence provided by Ms. Durando, if she testified. At the time of the final hearing, it was unclear whether Ms. Durando would be well enough to testify within the timeframe established by the Administrative Law Judge, but the Administrative Law Judge indicated that he would not be able to leave the record open beyond that time. After the conclusion of the hearing, Petitioner Alexandria Larsen did not file a request to take the testimony of Ms. Durando, so the record closed without her testimony.

The court reporter filed the transcript on January 30, 2008. The parties filed proposed recommended orders by February 12, 2008.

On February 25, 2008, the Administrative Law Judge wrote a letter to counsel for the Department of Environmental Protection, with a copy to all parties, asking for certain

omitted attachments to FPL Exhibit No. 13. Counsel filed the omitted exhibits on the same day.

FINDINGS OF FACT

1. Applicant is Florida's largest electric utility. It provides service to over 4.4 million customer accounts in 35 counties. Applicant operates 14 electric-generating sites in Florida to satisfy its statutory obligation to furnish each person applying for service reasonably sufficient, adequate, and efficient service upon the conditions set forth by the Public Service Commission.

2. By Final Order Approving Certification dated December 26, 2006, the Siting Board granted full and final certification to Applicant for the location, construction, and operation of the WCEC project, Units 1 and 2, to an immediate capacity of 2500 megawatts and to an ultimate capacity of 3300 megawatts (3800 megawatts, according to the Stipulation). Applicant anticipates obtaining permits for a third deep injection well and second dual zone monitoring well when the third generating unit is constructed.

3. Units 1 and 2 at the WCEC will be combined cycle power plants that produce power by the ignition of a combination of natural gas and compressed air that force expanding air through turbines that are connected by shafts to generators. The waste heat produced by this process is recovered by steam generators

that, using steam turbines, turn shafts connected to other generators, thus improving the efficiency of the power-production process. Applicant owns and operates 12 combined cycle power plants.

4. The certification issued by the Siting Board authorizes Applicant to power the plant by natural gas or ultra-low sulfur light fuel oil, which is diesel fuel. Diesel fuel is a backup source if natural gas is unavailable. The WCEC will store 12.6 million gallons of diesel in two onsite tanks, which are segregated from the rest of the site by secondary containment in the form of reinforced concrete that contains no drains.

5. The Final Order of the Siting Board describes, but does not itself permit, an onsite wastewater disposal process using a deep well injection system consisting of two 3200-foot deep injection wells and a dual zone monitoring well. WCEC Units 1 and 2 would be the first power units operated by Applicant to use deep well injection for the disposal of wastewater associated with the production of power. Other plants operated by Applicant use cooling ponds, such as a 6000-acre cooling pond at its power plant in Martin County. The WCEC sits on only 220 acres, so Applicant could not have constructed a sufficiently large onsite pond to accept the wastewater from the operation of Units 1 and 2. Although Applicant operates power plants on smaller sites, such as the 350-megawatt Cutler plant on 40

acres, the WCEC is a very small site given the power generating capacity of the facility.

6. The WCEC is in west Palm Beach County 20 miles due west from the Atlantic Ocean and 25 miles southeast of Lake Okeechobee. Draining Lake Okeechobee, the L-10/L-12 canal passes immediately adjacent to the WCEC site on the south side of State Road 80, which runs along the southern border of the WCEC site. Immediately across State Road 80 from the WCEC site, about 1000 feet to the south, is the Arthur R. Marshall Loxahatchee National Wildlife Refuge (National Wildlife Refuge). The WCEC abuts a quarry operated by Palm Beach Aggregates (PBA Quarry). Already located adjacent to the WCEC is Applicant's Corbett transmission substation and high-voltage transmission lines.

7. Petitioner Coalition is a member-based, unincorporated association that has been in existence for at least five years and serves, among other things, as an umbrella organization for other environmental organizations. As an umbrella organization, Petitioner Coalition facilitates the coordination, among these other organizations, of efforts to educate the public about the environment, assess threats to the environment, take action to protect the environment, and participate in recreational activities involving regional natural resources. Petitioner

Coalition directly performs these tasks and engages in these activities, as well.

8. Petitioner Coalition conducts monthly meetings that are attended by 15-25 persons, although it maintains a mailing list of about 400 persons, who constitute its membership. About 80-90 percent of the members of Petitioner Coalition reside in Palm Beach County; two members reside within 1.5 miles from the WCEC site. Many more members reside in the Loxahatchee and "Acreage" areas, which are not far from the National Wildlife Refuge and WCEC site. Petitioner Coalition does not charge dues, but collects donations from members and other persons. Each year, Petitioner Coalition conducts two larger conferences, which are open to the public.

9. Members of Petitioner Coalition regularly use the L-8 canal, which borders the east side of the WCEC site. The "20-mile bend" entrance to the National Wildlife Refuge is one-half mile west of the WCEC site, and many members of the Coalition use this entrance to enter the refuge for hiking, running, biking, bird-watching, canoeing, fishing, and other outdoor activities. The vast National Wildlife Refuge forms important headwaters for the Everglades.

10. Petitioner Tsolkas is the chairperson of Petitioner Coalition and engages in the member activities described above.

11. Petitioner Larson resides in Loxahatchee, about 2.5 miles east of the WCEC site. She resides on a 1.63-acre lot and relies for her potable water on a well drilled about 125 feet deep into the surficial aquifer.

12. Petitioner Christensen resides about 3 miles from the WCEC site. He has hiked and observed wildlife in the National Wildlife Refuge, as well as drawn spiritual comfort from this natural resource. As noted in the Preliminary Statement, the permitting of IW-1 and IW-2 is at issue in these cases. The proposed injection well system comprises these wells and DZMW-1, which has been permitted and is under construction. One other well is of interest in this case, Exploratory Well 1 (EW-1).

13. On April 25, 2006, Applicant commenced the drilling of EW-1. The purpose of this project was to obtain data to determine the suitability of the WCEC for the onsite, deep well injection of non-hazardous industrial waste. For EW-1, Applicant obtained from DEP Permit No. 247895-001-UC, which was issued on January 11, 2006.

14. Applicant intended to drill EW-1 to a depth of 3400 feet, determine that the location was suitable for an injection well system, and convert EW-1 to a dual zone monitoring well, but EW-1 instead became what could be deemed a functional alternative injection lesson (FAIL) well. The most immediate information derived from this FAIL well was that, at 2230 feet

depth, a dredge zone existed at the location of EW-1. Although the bore hole initially reached 2510 feet, the well itself could not be extended deeper than 2220 feet.

15. A dredge zone is a fracture zone of uncertain thickness in a confining unit. At the site of EW-1, the dredge zone extends through at least much of the upper half of the confining unit directly above the proposed injection. Thus, Applicant did not obtain from EW-1 a complete picture of the critical confining zone. However, Applicant obtained information, from top to bottom, about the depths of the surficial aquifer, upper and lower limits of the Upper Confining Unit, upper and lower limits of the Upper Floridan Aquifer, and depth of the point at which, near the bottom of the Upper Floridan Aquifer, total dissolved solids (TDS) exceed 10,000 mg/L. As noted in the conclusions of law, the depth at which the water crosses this TDS threshold marks the deepest extent of an underground source of drinking water (USDW).

16. The data obtained from drilling EW-1, especially the geophysical logs, supported analysis that the top of the Upper Floridan Aquifer is 920 feet deep and the bottom is 1700 feet deep, the top of the Middle Floridan Confining Unit is 1700 feet deep and the bottom is 2005 feet deep, the base of the USDW is 1890 feet deep, and the top of a "fractured and transmissive" interval (i.e., the dredge zone) is 2005 feet and the bottom is

2240 feet deep. FPL Exhibit 13, Technical Memorandum from David McNabb, LBFH, Inc., to DEP and Applicant dated December 14, 2006, page 10. As noted below, the analysis of the data was incorrect as to the bottom of the Middle Floridan Confining Unit, probably because drilling of EW-1 did not extend past the dredge zone. Also, as noted below, later water quality testing established a slightly deeper USDW, between 1930-1941 feet deep.

17. The unconsolidated material in a dredge zone tends to fall into the drill hole after penetration by the drill bit. The inflow of material slows the drilling because it is necessary to grind up and remove the material that has fallen into the drill hole. The small drill bit used for EW-1 meant that the grinding and removal process was slow.

18. A dredge zone does is not necessarily indicative of vertically extensive fractures or fissures or poor confinement in the formation containing the dredge zone. Also, a dredge zone typically extends only a limited distance laterally. Thus, the significance of the dredge zone is largely restricted to the impediment that it presented to drilling.

19. FPL Exhibit No. 13 is the EW-1 Final Report. Attachment K sets forth the pilot hole water quality field data and laboratory analysis. The TDS values are all under 10,000 mg/L. The highest TDS value is 9234 mg/L, which is at 1930 feet

deep. This is the deepest point from which a pilot hole water sample was taken.

20. FPL Exhibit No. 13, Attachment L to sets forth the data and analysis from straddle-packer testing (packer testing) Packer testing is a more elaborate testing process that involves inserting two rubber stoppers, or packers, at intervals into the well and inflating them, so as to isolate the interval between them. Prior to testing, the water is allowed to settle from the disturbance of drilling. The rate at which the water level recovers in the interval is a measure of permeability and indicates whether the packers are in a confining unit or an aquifer. Packer testing examines only the native groundwater, not the drilling-bit coolant, so it produces more reliable water-quality data than testing of pilot hole water.

21. The deepest packer test is 1924-1941 feet, at which interval TDS are 18,696 mg/L. At 1848-1865 feet, TDS are 9664 mg/L. At 925-1055 feet, which is the only other interval tested, TDS are 4148 mg/L.

22. After several weeks of trying unsuccessfully to penetrate past the dredge zone and given the exigencies of time, Applicant abandoned the project to drill EW-1 to a sufficient depth that it could be incorporated into an injection well system. By "Minor Modification" to Permit No. 247895-001-UC, dated August 10, 2006, DEP permitted Applicant to convert EW-1

to a monitoring well in the Upper Floridan Aquifer, which Applicant anticipates may be tapped by water supply wells on the site sometime in the future. Applicant then backplugged the pilot hole to create a monitoring interval of 1015-1100 feet depth. After successfully pressure testing EW-1, Applicant filed a Well Completion Report showing a completion date of August 22, 2006.

23. On December 11, 2006, Applicant began drilling EW-2. Applicant chose a location 6000 feet south of EW-1 for the location of EW-2 to avoid the dredge zone that it had encountered when drilling EW-1. In an abundance of caution, though, Applicant used a larger-diameter drill bit, so that, if it encountered another dredge zone, it would be able to grind and remove the fallen materials more easily. The permit number for EW-2 is 247895-002-UC, which was issued on December 6, 2006.

24. FPL Exhibit No. 16 is the Final Report on EW-2. Applicant successfully drilled the pilot hole at EW-2 to a depth of 3411 feet and completed drilling on May 4, 2007. The data obtained from EW-2 established the bottom of the Upper Confining Unit at 975 feet deep, the top of the Upper Floridan Aquifer at 975 feet and the bottom at 1905 feet, the base of the USDW at 1932-1959 feet, the top of the Middle Floridan Confining Unit at 1905 feet and the bottom at 2665 feet, and the top of the Lower

Floridan Aquifer, which is known as the Boulder Zone in this region, at 2665 feet.

25. The drilling, which stopped at 3411 feet, did not establish the bottom of the Boulder Zone. Because EW-2 was not permitted, at that time, as an injection well, Applicant could not inject fluids into the well to learn more of the nature of the injection zone. However, it is clear that the Boulder Zone is a highly transmissive (due to its thickness), fractured, and cavernous interval within the Lower Floridan Aquifer. These factors militate against a build-up in pressure at an injection site in the Boulder Zone. It is also clear that the Boulder Zone presents low horizontal hydraulic conductivity, which suggests that injected fluid will travel only a few feet per year.

26. FPL Exhibit No. 16, Attachment N contains the pilot hole water quality data. The pilot hole water quality data reveals an abrupt increase in TDS from 4800 mg/L at 2030 feet to 13,000 mg/L at 2060 feet. After remaining at least 30,000 mg/L from 2100 feet to 2300 feet, TDS drops abruptly to 20,000 mg/L at 2330 feet and then drops steadily (with one minor increase) from 2330 feet to 2630 feet, where TDS falls to 9860 mg/L. TDS remains below 10,000 mg/L from 2630 feet to 2730 feet; at 2800 feet, TDS reaches 30,000 mg/L and remains at this level (with

two minor exceptions) to the deepest sampling depth of 3400 feet.

27. The pilot hole testing does not suggest that a deeper USDW occurs at 2330-2630 feet; rather, these data signal an extremely unproductive layer within the Middle Floridan Confining Unit. Applicant drilled these wells using a closed circulation system, which necessitates the introduction at specific intervals of external-source freshwater to cool the drilling bit. The rate of introduction may reach 50 gallons per minute. The EW-2 Final Report notes the "extremely unproductive nature of the test interval" sampled by the last packer test, which is noted below to be at 2624-2642 feet, where the sampled zone produced less than a quart of water per minute with 175 of water level drawdown. FPL Exhibit No. 16, page 18. If Applicant were introducing anything approaching 50 gallons per minute at this depth, the pilot hole water test was essentially of the introduced freshwater, not native groundwater.

28. FPL Exhibit No. 16, Attachment P contains the packer test data. Applicant packer tested five intervals: 1914-1932 feet, 1959-1987 feet, 2009-2027 feet, 2169-2187 feet, and 2624-2642 feet. TDS values for each of these intervals are 8060 mg/L, 21,400 mg/L, 24,100 mg/L, 37,300 mg/L, and 32,800 mg/L.[2] These results confirm the base of the USDW at around 1930 feet and confirm that no USDW exists at 2624-2642 feet.

29. FPL Exhibit No. 16, Attachment R reports the results from the sampling of the groundwater after the withdrawal of 130,000 gallons from the bottom of EW-2. TDS is 35,000 mg/L, which is the TDS of saltwater, and pH is 8.16, which is slightly base. The sampling revealed iron, sodium, zinc, arsenic, barium, chromium, manganese, chloride, fluoride, ortho-phosphate, sulfate, cyanide, two nitrogens, and phosphorus. The water sample also tested positive for radium-226 and radium-228.

30. FPL Exhibit No. 16, Attachment O is the Core Sample Laboratory Report. This covers multiple samples from four rock cores: one core within the Upper Floridan Aquifer, two cores within the Middle Floridan Confining Unit, and one core within the Boulder Zone. Analysis of these samples indicates the vertical hydraulic conductivity of the rock cores within each of these units.

31. The first rock core includes three samples from three depths: 1956 feet, 1960 feet, and 1962 feet. The tested vertical hydraulic conductivities are in the range of 10^{-6} to 10^{-7} cm/second.[3] According to the information obtained from drilling EW-2, these depths are the lower part of the Upper Floridan Aquifer. (According to the information obtained from drilling EW-1, which is 6000 feet to the north, these depths are in the Middle Floridan Confining Unit.)

32. The second rock core includes three samples from three depths: 2048 feet, 2062 feet, and 2065 feet. The tested vertical hydraulic conductivities are 10^{-3}, 10^{-9}, and 10^{-8} cm/second,[4] respectively, even though, according to the information obtained from drilling EW-2, these depths are all in the upper part of the Middle Floridan Confining Unit. The third rock core includes two samples at two depths: 2193 feet and 2200 feet. The tested vertical hydraulic conductivities are 10^{-6} and 10^{-4} cm/second,[5] respectively. The third rock core is also in the upper part of the Middle Floridan Confining Unit.

33. The fourth rock core includes one sample: at 2828 feet, which is 100 feet into the Boulder Zone. The tested vertical hydraulic conductivity is 10^{-8} cm/second.[6]

34. The rock core data evidently present an incomplete picture of the hydrogeology. For instance, although the third rock core is 200 feet down from the top of the Middle Floridan Confining Unit, it displays higher tested vertical hydraulic conductivities than those displayed by the rock core taken from the Upper Floridan Aquifer. The second lowest vertical hydraulic conductivity among rock cores is found, not in the Middle Floridan Confining Unit, but in the Boulder Zone (which militates further against upward migration of the injected fluid). However, the highest vertical conductivity among rock cores is found, not in an aquifer, but in the Middle Floridan

Confining Unit, although within 50 feet of the top of this unit (suggestive perhaps of some unevenness in the top of this confining unit). Two of the three values for vertical hydraulic conductivity in the rock core of the Upper Floridan Aquifer are one to three orders of magnitude lower than the values for vertical hydraulic conductivity in the rock core 200 feet below the top of the Middle Floridan Confining Unit. All of these results are assessments of only a few feet of rock within hundreds of feet of aquifer and confining unit and do not reflect other factors, such as porosity, which is a measure of how much rock is open space.

35. FPL Exhibit No. 16, Attachment I is the Lithologic Log for EW-2. This log reports the composition of formations, as well as porosity and permeability. For the most part, the materials above 2000 feet are limestone with moderate to high porosity that are poorly to moderately consolidated. A band of dolomite, mostly well consolidated, replaces limestone from 1670 feet to 1720 feet. After a couple of hundred feet of limestone, dolomite again predominates over limestone at about 1900 feet and extends down nearly 2200 feet, where a 70-foot band of dolomite occurs, followed by a band of predominantly limestone from 2620 feet to 2840 feet. From 2840 feet down, which is the Boulder Zone, dolomite predominates. From 2870 feet to 2910 feet, the unit is of low porosity and well consolidated. The

only reports of permeability at these depths indicate poor or fairly poor permeability from 2620 feet to 2700 feet, then predominantly poor permeability with some fair permeability from 2700 feet to 2760 feet, and then fair permeability from 2760 feet to 2790 feet, which is the lowest 30 feet of the Middle Floridan Confining Unit.

36. FPL Exhibit No. 16, Attachment D states that the pilot and reamed holes deviates only 1/4 of a degree through 3400 feet. This is important because, if the reaming for the well casing does not follow the pilot hole, the uncased pilot hole may be left as a vertical passage for water to penetrate through confining units.

37. The construction of EW-2 includes the installation through the duration of the well of progressively smaller steel casings with the following diameters, from top to bottom: 72 inches, 60 inches, 48 inches, 36 inches, and 20 inches (which runs nearly the entire length of the well). The thickness of the casing wall is 3/8 inch, except for the final segment which is 1/2-inch thick and seamless.

38. The inside and back of all casings, except the final casing, are encased in American Society of Testing and Material (ASTM) C150 Type 2 cement, which is suitable for use in saline water. The final casing (the 20-inch diameter) is encased only on the back. The cement on the outside of the exterior casing

is added in such quantities to ensure that it forms a tight bond between the casing and the confining formation wall. To ensure the efficacy of the bonds formed by the cement, Applicant conducts temperature tests, a video survey, and radio tracer surveys.

39. On the inside wall of the 20-inch casing, upon conversion of EW-2 to IW-1, will run a reinforced fiberglass pipe or tube. At the base, a packer isolates the fluid-filled annulus, or space, between the injection tubing and the final casing, and a corrosion inhibitor is injected into that space. No injection well using this form of tubing and packer construction has ever provided a vertical channel for water from the injecting zone (or above) to pass up through a confining bed and into an USDW.

40. After final analysis of all of the available data, the Final Report for EW-2 concludes that the top of the Boulder Zone is at 2790 feet, the top of the Middle Floridan Confining Unit is at 2000 feet and the bottom is at 2790 feet, and the base of the USDW is 1932-1959 feet. These depths are all credited, although the top of the Middle Floridan Confining Unit is probably 100 feet deeper, so that the thickness of this unit is around 700 feet, not 800 feet. The Final Report recommends that EW-2 be converted to a Class I deep injection well, with an

injection zone from 2778 feet to 3411 feet, for the disposal of non-hazardous waste from the WCEC.

41. On March 2, 2007, Applicant submitted an application for the construction and operational testing of DZMW-1 at the site of EW-1. This application resulted in the issuance of proposed Permit No. 247895-006-UC, which, as noted above, became final when another petitioner in two other cases withdrew its challenge to the proposed permits for DZMW-1 and IW-1 and IW-2. Pending completion of the analysis of the data from EW-2, the proposed permit for DZMW-1, which is dated June 5, 2007, states that the upper monitoring zone is anticipated to be 1955-1975 feet deep, and the lower monitoring zone is anticipated to be 2160-2180 feet deep. These depths represent, respectively, conservatively deep values for the base of the USDW and the top of the Middle Floridan Confining Unit (even if it is 100 feet deeper than reported). The record contains no reports from the construction of DZMW-1, perhaps because work had not progressed very far at the time of the final hearing.

42. On April 25, 2007, Applicant submitted the Application, which is FPL Exhibit No. 19. The Application is for approval to convert EW-2 to IW-1, construct IW-2, and operationally test both wells. Besides completed forms, the Application comprises the Supporting Information for Construction Permit Applications for a Class I Deep Injection

Well System at the Florida Power & Light Company West County Energy Center (Supporting Information), one table, 11 figures, and ten attachments.

43. As stated in the Stipulation, the Application was signed by a responsible corporate officer of Applicant, and Applicant has also satisfied all financial-responsibility requirements. As stated in the Stipulation, a public meeting on the Application took place on September 10, 2007. DEP received public comments on the Permit and submitted a written response to these comments. On September 13, 2007, DEP issued the Notice of Intent for Permit. DEP also prepared a fact sheet for the proposed Permit.

44. Attachment F describes the construction specifications for IW-1, which, as EW-2, was largely finished at the time of the Application, and IW-2. For the conversion of EW-2 to IW-1, Applicant proposed to install 2770 feet of 16-inch diameter fiberglass reinforced pipe and fill the annular space between this tubing and the 20-inch casing with a specified solution, as well as conduct various tests of annular pressure and the injection well. For the construction of IW-2, Applicant proposed almost the same technique already described as to IW-1, although the casings were smaller in diameter, probably due to the elimination of concerns about encountering a dredge zone.

45. The Supporting Information discusses the overall injection well system. The DZMW-1 is to monitor intervals above and below the base of the lowermost USDW at the site. DZMW-1 will be 145 feet west of EW-2 and will provide monitoring for IW-2, which, according to Figure 2, will be within 150 feet west of DZMW-1. The injection capacity of each injection well is 7.29 million gallons per day (mgd) at an injection velocity of 10 feet per second. Supporting Information, page 2. Based on projected power demands, Applicant anticipates that each operating injection well will operate at an average rate of 5 mgd. Average and maximum injection pressures will probably be 40 pounds per square inch (psi) and 50 psi.

46. The purpose of IW-2 is to serve as a "back-up" to IW-1. Supporting Information, pages 2 and 5. Applicant is constructing two injection wells so that "when one well is out of service, flows will be diverted to the operating well." Supporting Information, page 5.

47. As authorized by the certification issued by the Siting Board, the principal water sources for WCEC Units 1 and 2 are the Upper Floridan Aquifer and the L-10/L-12 canal, as the South Florida Water Management District determines that this surface water is available for withdrawal. Applicant will also obtain potable water from Palm Beach County.

48. WCEC Units 1 and 2 require 14.5 mgd of water. The principal water uses of the WCEC Units 1 and 2 are cooling tower water and process water, as well as potable water for use in the administration building. The cooling tower wastewater (also known as "blowdown") is the water that has cooled the power generating equipment and itself been cooled in the cooling towers. Cooling tower blowdown makes up 88 percent of the wastewater generated by the WCEC Units 1 and 2. The process water is water that has been demineralized by reverse osmosis and makes up for the water lost in the steam-generating process. The resulting wastewater is the heat recovery steam generator (HRSG) blowdown, which makes up 6.5 percent of the wastewater generated by WCEC Units 1 and 2. The power generating process recycles its cooling and process waters, but constantly removes slipstream to maintain balanced chemistry and avoid scaling from excessively base water that will damage the equipment.

49. Another 5 percent of the wastewater generated by WCEC Units 1 and 2 will be derived from the reverse osmosis process, which generates water for the HRSG. The remaining 0.5 percent of wastewater is derived from miscellaneous wastewater streams.

50. The Supporting Information states that an analysis of the injection fluid is not available and is not anticipated to be available prior to plant start-up. However, the Supporting Information states: "A sample of the injection fluid will be

collected within the first 30 days of commercial operation of the power generating facility." FPL Exhibit No. 19, Supporting Information, page 5.

51. FPL Exhibit No. 19, Attachment G identifies anticipated wastestreams. Based on "analytical characterization" of "historical data," Applicant will determine that the cooling tower blowdown, HRSG blowdown, demineralizer and reverse osmosis water, pretreatment wastewater, steam cycle water treatment, and miscellaneous wastewater streams are not hazardous and dispose of them into IW-1 or IW-2. Based on its vendors' "analytical characterization" of the chemicals that they supply, Applicant will determine that the cooling system water ("biocide additional chlorine, scale inhibitor, pretreatment chemicals") and leak-tracing dyes are not hazardous and dispose of them into IW-1 or IW-2. Based on "process knowledge," Applicant will determine that its treated sanitary wastewater is not hazardous and dispose of it into IW-1 or IW-2. This is the only non-industrial wastewater that Applicant proposes to inject into the injection well system, and the only wastewater whose hazardous/non-hazardous determination will be based explicitly on "process knowledge." Lastly, based on "analytical characterization" of the "wastestream," Applicant will determine whether the wastewater from the chemical cleaning of the HRSG and pre-boiler piping is hazardous. If so,

Applicant will dispose of this wastewater by a licensed approved vendor. If not, Applicant will dispose of this wastewater into IW-1 or IW-2. Although an industrial wastewater, this chemical-cleaning wastewater is the only wastewater that Applicant or its agent will test and the only wastewater that Applicant anticipates may be hazardous.

52. Attachment G adds that intermittent shock chlorine or other biocides will be used to prevent biofouling of the cooling system, and a chlorine solution will be fed into the cooling tower. A scale inhibitor, including sulfuric acid, will be added to the circulating water system to control the formation of calcium carbonate scales that can adhere to heat-transfer surfaces and impede cooling. Treated sanitary wastewater from an onsite package plant will be recycled to the cooling tower or disposed of directly through the injection well system. The chemical cleaning of the HRSG and pre-boiler piping is done during commissioning and periodically during the life of the plant. According to testimony, such cleaning, which may release chromium from the boiler tubes, is performed once every ten years.

53. FPL Exhibit No. 19, Attachment H is the Proposed Monitor Program. For IW-1 and IW-2, at start-up, Applicant will test for primary and secondary drinking water parameters and standards. Continuously, Applicant will test these wells for

flowrate and wellhead pressure. For the wastestream entering IW-1 and IW-2, Applicant will test weekly for TDS, chloride, specific conductivity, pH, and temperature. For DZMW-1, Applicant will test for primary and secondary drinking water parameters and standards prior to start-up. Continuously, Applicant will test this well for water level. Weekly, Applicant will test DZMW-1 for the five items for which it tests the wastestream plus total phosphorous, sulfate, sodium, calcium, magnesium, potassium, carbonate, and bicarbonate. After operational testing and DEP approval, Applicant will decrease the frequency of testing from weekly to monthly.

54. The Supporting Information calculates the Area of Review by determining the "zone of endangering influence," which is the lateral area in which the buoyant forces or increased pressure in the injection zone may cause migration of the injected or formation fluid into a USDW. The Area of Review is the land overlying the zone of endangering influence.

55. The calculations are conservative because they assume that IW-1 and IW-2 are operated at each well's maximum permitted injection rate (7.29 mgd each) for ten years. Using a 200-foot high injection zone and 20 percent porosity for the injection zone, Applicant calculated that the radius of the bubble of injected fluid, from the point of injection, would extend 7526 feet. Applicant rounded this result off to two miles.

56. No well, besides EW-2/IW-1, penetrates to the Middle Floridan Confining Unit within two miles of the proposed injection well system. Thus, Applicant was not required to undertake any Corrective Action to preclude the possibility that such wells could allow fluid to enter the USDW.

57. The Permit is for the conversion and operational testing of EW-2 into IW-1, construction and operational testing of IW-2, and eventual incorporation of DZMW-1 into the subject injection well system. The Permit notes that the anticipated depth of IW-2 is 3250 feet, although field data will determine the final depth required for this injection well. The Permit notes that IW-1 is 3400 feet. The Permit states that the injection level for each well will be in the Boulder Zone from about 2775 feet to the total depth of each well, which is a vertical range of around 600 feet, at last as to IW-1. The Permit states that the Class I injection well system is designed for use at the WCEC for non-hazardous wastewater, primarily cooling tower blowdown.

58. Permit Specific Condition 1.a requires proper operation and maintenance, including adequate staffing and training and adequate laboratory and process controls. Specific Condition 1.d prohibits any injection that causes or allows movement of fluid into a USDW, except as authorized by 40 C.F.R. §§ 146.15 and 146.16.[7]

59. Permit Specific Condition 2.h specifies the requirements to convert EW-2 to IW-1. These include taking a video survey of the length of the 20-inch diameter casing, installing 2770 feet of 16-inch diameter fiberglass reinforced pipe tubing, filling the entire annulus between the fiberglass reinforced pipe tubing and the final casing with a specified solution, conducting a pressure test of the fluid-filled annulus, performing a radioactive tracer survey, and conducting a preliminary capacity injection test.

60. Permit Specific Condition 2.i specifies the requirements to construct IW-2. These are similar to those described above in the construction of EW-2/IW-1 except that the initial casings are somewhat smaller.

61. Permit Specific Condition 2.j requires Applicant to add DZMW-1 to this Permit, either separately under its permit number or under the Permit number. This condition requires Applicant to take samples and determine the ambient groundwater quality in both zones of the DZMW-1 prior to the injection of any fluids into IW-1 or IW-2. Four weeks prior to use of IW-1 or IW-2, Applicant must start weekly sampling of the monitoring zones.

62. Permit Specific Condition 2.l requires packer tests in the anticipated confining zone. Permit Specific Condition 2.m provides that Applicant shall use the DZMW-1 to monitor the

confinement of the injection zone from overlying aquifers. The upper zone is the compliance point as to the USDW, and the lower zone is the compliance point as to vertical movement out of the injection zone.

63. Permit Specific Condition 2.n requires Applicant to demonstrate confinement for IW-2 by using lithologic properties, geophysical evidence, and tests performed while pumping the formation. These requirements require proof of confinement during the drilling of IW-2.

64. Permit Specific Condition 4.g requires DEP approval, pursuant to Florida Administrative Code Rules 62-528.401(4)(c), 62-528.420(4)(c), and 62-528.605(2), of the final selection of specific injection intervals.

65. Permit Specific Condition 4.i requires that Applicant provide certain justifications for each request of a short-term injection test for IW-1 and IW-2. Generally, justification consists of the documentation to assure that confinement above the injection zone is intact.

66. Permit Specific Condition 5.b imposes requirements on Applicant to obtain DEP approval for operational testing. Specific Condition 5.b.1-4 requires Applicant to provide DEP with certain materials prior to the approval of DEP for the commencement of operational testing. These are generally the documentation to assure that confinement above the injection

zone is intact and the results of the short-term injection test. This condition notes that, under normal operating conditions, the velocity of each injection well may not exceed ten feet per second, although, in a multiple well system, each may run at 12 feet per second when the other well is inoperative due to testing or maintenance. During the injection test, Specific Condition 5.b.1-4 requires Applicant to collect injection flow rate, injection wellhead pressure, and monitoring well pressures in both zones.

67. Also prior to obtaining DEP approval for operational testing, Specific Condition 5.b.6 requires Applicant to submit to DEP "[i]nformation concerning the compatibility of the injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone." Specific Condition 5.b.9 requires Applicant to provide DEP with a copy of a draft operation and maintenance manual. Specific Condition 5.b.13 requires Applicant to submit to DEP background water quality data from the monitoring and injection zones and analysis of these data for primary and secondary drinking water standards and minimum criteria parameters.

68. Specific Condition 5.c imposes requirements on Applicant prior to starting operational testing. Specific Condition 5.c requires compliance with Florida Administrative

Code Rule 62-528.450(3)(a), (b), and (c), which requires, among other things, "wastestream analysis."

69. Specific Condition 5.d imposes requirements on Applicant within 90 days of starting plant operations. This condition refers to Florida Administrative Code Rules 62-528.425(1)(a) and 62-528.450(2)(f)3 and requires a wastewater stream analysis for primary and secondary drinking water standards.

70. Specific Condition 6 imposes requirements on Applicant during operational testing. Specific Condition 6.a.4 requires Applicant to monitor the flow to the injection well at the wellhead and to control the flow to ensure that it does not exceed the rate at which the well was tested. Pursuant to Florida Administrative Code Rule 62-528.425(1)(b), Specific Condition 6.a.5 requires Applicant to continuously monitor the injection well system by recording and totalizing devices for effluent flow rate and volume and recording devices for injection and monitoring zone pressures. Specific Condition 6.a.9 provides: "The injectate shall be non-hazardous in nature at all times, as defined in 40 CFR, Part 261 and as adopted in Chapter 26-730, F.A.C."

71. Specific Condition 6.a.10 requires mechanical integrity prior to injection. Specific Condition 6.a.11 requires Applicant to monitor and control the pressure at the

wellheads to ensure that it does not exceed 66 percent of the tested pressure on the final casing.

72. Specific Condition 6.a.13 requires Applicant to monitor the injection system and submit monthly operating reports to DEP concerning the flow, volume, and wellhead pressure of the injection well; chemical characteristics of the wastewater stream in terms of TDS, chloride, specific conductance, three types of nitrogen, phosphorous, pH, and sulfate; physical characteristics of the monitoring well, including daily and monthly maximum, minimum, and average pressures; and chemical characteristics of the upper and lower monitoring zones in terms of, weekly, the items listed above plus total coliform and field temperature and, monthly, sodium, calcium, potassium, magnesium, iron and bicarbonate. Specific Condition 6.a.13.c provides that, after at least six months of weekly monitoring of the monitoring zones, Applicant may, based on a showing of groundwater stability, request that DEP reduce the monitoring frequency to monthly.

73. Specific Condition 6.a.19 requires Applicant to submit annually to DEP a wastewater stream analysis for primary and secondary drinking water standards and minimum criteria, as identified on a list attached to the permit. The list identifies 95 primary drinking water items, including chromium, and 17 secondary drinking water items, including pH. The list

also identifies 24 municipal wastewater items, such as ammonia, several volatile organics, two pesticides, biological oxygen demand, and temperature, which presumably are added because the wastewater will include effluent from Applicant's onsite package plant.

74. Petitioners have identified two relevant issues. The first issue concerns the integrity of the Middle Floridan Confining Unit in its present state and after construction of the wells (i.e., well integrity), so as to prevent the injected fluids from migrating upward into the USDW. The second issue concerns the composition and volume/pressure of the wastewater stream (i.e., whether it will meet the Permit criterion prohibiting hazardous wastes and, even if the injected fluids meet this criterion, whether the fluids, in terms of their composition and volume/pressure, will adversely affect the Boulder Zone and the bottom of the Middle Floridan Confining Unit).

75. Applicant has provided reasonable assurance that the bottom of the Upper Floridan Aquifer is about 2000-2100 feet deep, and the USDW is in the lower reaches of the Upper Floridan Aquifer at around 1950 feet deep. The water samples from the packer test preclude the existence of a deeper USDW. Applicant has provided reasonable assurance that the Middle Floridan Confining Unit extends from no deeper than 2100 feet to about

2800 feet deep, for a minimum thickness of 700 feet. Applicant has also provided reasonable assurance that the injecting zone will be in the Boulder Zone of the Lower Floridan Aquifer, and the confining unit of the Middle Floridan Confining Unit will prevent the upward migration of the injected fluids into the Upper Floridan Aquifer and, thus, the USDW.

76. The Middle Floridan Confining Unit is not homogenous. At places, it is fractured. At other places, it exhibits greater permeability and porosity than it does elsewhere. But, at the location of the proposed injection well system, the 700-foot thick Middle Floridan Confining Unit is ample insurance against upward migration of the injected fluids.

77. DEP Program Manager for Underground Injection Control for the relevant district is Joseph May. Mr. May testified that he gets "nervous" when confining zones are only 300 feet thick, "antsy" when they are only 200 feet thick, and skeptical of the eligibility for a deep well injection permit when the confining zones are less than 200 feet thick. These are not rule criteria, nor did Mr. May intend them to be, but these values are useful in these cases, if only to suggest the suitability of this relatively thick confining unit to prevent the upward migration of injected fluids.

78. Other factors, of course, contribute to the efficacy of the confining unit. First, the Boulder Zone is highly

transmissive, a function of the vast thickness of this zone. The characteristic tends to reduce the effect of pressure at the point of injection, relieving the force of pressure that might otherwise drive the injected fluid up through hundreds of feet of confining unit. On the other hand, the thickness of the Boulder Zone and low horizontal hydraulic conductivities suggest that the injected fluids will not travel far within the Boulder Zone, so the likelihood of the injected fluid's encountering a chimney is diminished over time. And, as time passes, the fluids will take on the characteristics of the native fluids in the Boulder Zone to the point that they are indistinguishable from these native fluids. This is particularly important as to TDS; as the differential in TDS between the injected and native fluids decreases, so will the buoyancy of the injected fluids.

79. Nor will the injected fluid be especially buoyant. After five cycles, according to FPL Exhibit No. 25, the water drawn from the Upper Floridan Aquifer will have 24,505 mg/L of TDS, which is close to the TDS level of the native groundwater in the Boulder Zone. After five cycles, according to FPL Exhibit No. 24, the water drawn from the L-10/L-12 canal will have 4605 mg/L of TDS, so it will be buoyant, but many times less buoyant than if not recycled at the power plant.

80. Petitioners rely on the failures of other deep injection wells as a basis for contending that Applicant has

failed to provide reasonable assurance in this case as to the integrity of the confining unit. In an interesting turn, they rely on a recent work by one of Applicant's expert witnesses, Dr. Thomas Missimer.

81. Dr. Missimer is a prominent licensed geologist with many years' field experience in Florida's geology and hydrogeology. Dr. Missimer recently co-authored (with Robert G. Malivea and Weixing Guo) an article, "Vertical Migration of Municipal Wastewater in Deep Injection Well Systems, South Florida, USA," published in Hydrogeology Journal (2007) 15: 1387-96. The focus of this article is on the vertical migration of municipal wastewater injectate. This low salinity, high density injection fluid is buoyant relative to the high salinity, low density water of the Boulder Zone of the Lower Floridan Aquifer, where the fluid is injected.

82. In the article, Dr. Missimer states that southeastern Florida hosts 32 active Class I injection wells. Based on his review of the data, he finds that injected wastewater has migrated upward into the USDW at three sites: one in Palm Beach County and two in Dade County. Dr. Missimer finds that injected wastewater has migrated upward into the monitor zone below the USDW at another seven sites, all in Broward and Palm Beach counties. Dr. Missimer emphasizes that municipal wastewater is

susceptible to upward migration due to its greater buoyancy than the saline water native to the Boulder Zone.

83. Dr. Missimer characterizes the Boulder Zone as an area of high transmissivity that has received injected fluid wastes since 1943. A consequence of this high transmissivity is that the Boulder Zone "allows for minimal increases in pressure during injection." Coalition Exhibit No. 2, page 1391.

84. Dr. Missimer notes that vertical hydraulic conductivities in the Middle Floridan Confining Unit vary by eight orders of magnitude with the dolostones having lower vertical hydraulic conductivities than the limestones. However, the main point of the article is to account for the fact that predicted vertical hydraulic conductivities in some failed injection wells, based on analyzed rates from core plug data, understated the actual migration rate of injected fluids by four orders of magnitude. Coalition Exhibit No. 2, page 1393.[8]

85. Dr. Missimer finds that enhanced vertical hydraulic conductivity in the Middle Floridan Confining Unit is likely due to fracturing in zones that may have a limited horizontal extent, creating a chimney through which buoyant injected fluid can migrate up relatively quickly. Suggesting that well-construction problems and possibly regional tectonic effects may have contributed to this fracturing, Dr. Missimer concludes: "The focus of confinement analysis should, therefore, be on the

extent and distribution of fracturing rather than analyses of the properties of the rock matrix." Coalition Exhibit No. 2, page 1395.

86. Most difficult for Petitioners' contentions is the testimony of Dr. Missimer concerning the thickness of the Middle Floridan Confining Unit at the subject site and the absence of fracturing in this unit, based on the sonic logs from EW-2/IW-1. Dr. Missimer testified that, based on the sonic logs in particular, there is over 700 feet of unfractured confining unit over the injection zone, and he has a "high level of confidence" that no material fracturing exists to undermine the integrity of this confining unit. Logically, the possibility of a relevant fracture decreases with the thickness of the confining unit.

87. Nor does the construction of IW-1 and IW-2 provide a chimney through which the injected fluids can escape the Boulder Zone and migrate into the USDW. In no respect do the construction plans for IW-2 or construction or conversion plans for IW-1 depart from the requirements of DEP's rules or sound engineering and construction practices. These matters have been adequately addressed above. In particular, the DEP-imposed requirement to monitor and document the absence of any deviation in the orientation of well from the bore hole promises to eliminate a likely cause of past problems in the construction of deep wells.

88. Finally, as to the integrity of the Middle Floridan Confining Unit, Petitioners contend that tectonic forces from blasting at the PBA Quarry threaten the integrity of the wells.[9] Applicant purchased the WCEC site from the owner-operator of the PBA Quarry, which is an active limestone-mining operation on land adjacent to the WCEC site. In connection with the purchase, Applicant entered into a blasting agreement with the owner-operator of the PBA Quarry. This agreement imposes certain requirements on the owner-operator concerning the maximum size of blasts, minimum separation distances from the power plant (5000 feet starting June 1, 2006, and 7500 feet starting June 1, 2007), and coordination and notification provisions.

89. Although Applicant has no experience with power plants located in close proximity to blasting operations, for two reasons, Applicant has provided reasonable assurance that the nearby blasting will not damage the injection wells (or either confining unit). First, as noted by the Black & Veatch geotechnical engineer retained by Applicant to examine the effects of blasting on the WCEC, excessive vibration, from any source, trips relays that protect equipment from damage due to excessive vibration. The most sensitive equipment at the plant will be the large rotating steam turbines. The Black & Veatch geotechnical engineer noted that the level of vibration that

will trip these relays is much less than the amount that could cause any structural damage. These relays will effectively protect the injection wells from damage from blasting. Long before vibration from blasting could threaten the integrity of these wells (and certainly the Middle Floridan Confining Unit), the relays would trip, and Applicant would need to deal with the blasting before restarting the turbines.

90. Second, Dr. Missimer examined the work of the Black & Veatch geotechnical engineer as to the extent of vibrations from blasting at the PBA Quarry. Explaining that the economics of blasting necessitates the use of just enough explosive material to loosen the substance to be mined, Dr. Missimer testified that the explosive forces dissipate in intensity and magnitude very quickly from the point of detonation. The maximum depth of the mining is 60 feet. Agreeing with the Black & Veatch analysis, Dr. Missimer determined that the force of blasting would be spent by 10,000 feet, and the nearest blasting will be 14,000 feet from the wells. Dr. Missimer noted that mining typically is allowed to within 500 feet of public supply wells, which are not built to the standards of Applicant's injection wells, and he has not found any documented reports of blasting-induced damage to such wells.

91. Dr. Missimer testified that the force of the PBA Quarry blasting would not affect the Middle Floridan Confining Unit either.

92. Lastly, Petitioners focus on the composition and volume/pressure of the injected fluids. These are important matters for two reasons. Excessive pressures or corrosive elements in the injected fluids could undermine the integrity of the Middle Floridan Confining Unit at the location of the injection wells. Also, the injection of hazardous waste, in addition to violating the Permit, would intensify the consequence of an upward migration of injected fluids. More than once, testimony in support of reasonable assurance justifiably emphasized the common characteristics of the injected fluids and the native groundwater.

93. Notwithstanding its confidence in the integrity of the Middle Floridan Confining Unit at the location of IW-1 and IW-2 and the high transmissivity of the Boulder Zone, DEP has imposed, based on the law, significant restrictions on Applicant in terms of the injection fluids. In all but two respects, Petitioner's concerns as to the composition and volume/pressure of the injected fluids are misplaced because Applicant and the Permit provide reasonable assurance that the composition and volume/pressure of the injected fluids will comply with applicable law and will not cause any injected fluids to migrate

up into the USDW. The two exceptions, for different reasons, are minor and easily corrected.

94. In general, Petitioners' evidence failed to reveal any flaws in the analysis of the experts of Applicant that the pressures in the injection zone will adversely affect the Boulder Zone. However, one issue concerning volume/pressure arises due to what appears to be inadvertence in drafting the Permit.

95. Applicant has applied for approval of two injection wells because it needs one well to serve as a back-up to the other well, not to operate both wells simultaneously. The reliability of the WCEC to produce power is dependent on, among other things, the ability of Applicant to dispose of vast volumes of wastewater produced daily by plant operations. Applicant has not previously predicated the uninterrupted operation of one of its many power plants on the operation of an injection well, so it understandably sought the comfort of redundancy: if one injection well goes out of service, the other well can be activated, and the plant can continue operating without interruption.

96. Applicant has proposed an injection well system with a single-well capacity (although that could be achieved by both wells operating simultaneously at a combined rate not to exceed the permitted rate of a single well). Applicant intends for the

proposed injection well system to pump at a rate of 10 feet per second, not 20 feet per second--or 12 feet per second during emergencies, not 24 feet per second.

97. The 10/12 feet per second pumping rate is consistent with the testimony of Applicant's primary expert on this point. David McNabb, a licensed geologist retained by Applicant, testified that the Boulder Zone could receive water at the rate of 10 feet per second or 12 feet per second during emergencies. Mr. McNabb added that, during the injection test, Applicant would operate only one well at a time. He also calculated the zone of endangering influence using the maximum pumping rate of 10 feet per second, not 20 feet per second. Mr. McNabb specifically confirmed during cross-examination that only one well would be pumping at a time.

98. However, the Permit implies the injection well system is approved for 20 feet per second, as did Mr. May's testimony at one point. The confusion arises for two reasons. First, the Permit nowhere explicitly sets the maximum rate for the injection well system or the two injection wells individually. Second, Permit Specific Condition 5.b.4 states that each well may be tested at 12 feet per second (which is approved by a DEP rule cited below) "since, in a multiple well system, this can be allowed when one of the other injection wells is inoperable due to planned testing or maintenance." It is in this explanation

that the problem arises. The explanation implies that an emergency arises when a well requires service and Applicant can no longer obtain a combined rate of 20 feet per second out of both wells, so it may then at least obtain 12 feet per second out of the well that remains operative.

99. The subject injection well system will be a multiple well system, but with only one well operating at a time (or both wells operating at the permitted rate of a single well). The DEP rule, quoted below, allows the increased rate of 12 feet per second for testing, maintenance, or emergencies. In the system proposed by Applicant, the servicing of the other well is not an emergency and does not justify operating the activated well at 12 feet per second. This condition is not an emergency because Applicant always intended that the other well, and its 10 feet per second capacity (12 feet per second in an emergency) serve in a backup capacity.

100. This is a minor problem that is easily corrected by adding language to the Permit specifying that the maximum rate of pumping is 10 feet per second (12 feet in an emergency) whether one or both injections are pumping at any given time and the unavailability of one of the wells is not an emergency that would allow pumping at the rate of 12 feet per second.

101. The other issue concerning the composition of the wastewater is more substantial theoretically, but not

practically on the facts of these cases. This issue involves how Applicant is to determine that the wastewater disposed into the injection wells is free of hazardous waste.

102. Except as to hazardous waste, there is no issue as to the composition of the injected fluids or wastewater. Applicant will strive to maintain neutrality in the recycled cooling and process waters to avoid damage to the plant equipment. Too acidic, the water will induce corrosion. Too base, the water will induce scaling. Dr. Missimer testified that the injecting fluid would likely be neutral and not affect the formations into which it comes into contact. Applicant intends to use descalers, which are necessarily acidic, but Dr. Missimer testified that, in the unlikely event that somewhat more acidic water were injected into the Boulder Zone, the predominantly dolomitic Middle Floridan Confining Unit and Boulder Zone would withstand acidity better than would the limestone that prevails at subsurface higher elevations.

103. Nor is the problem here an omission of the prohibition against injecting hazardous waste. Unlike the situation with the maximum pumping rate, the Permit addresses hazardous waste and flatly prohibits its injection into the injection wells. The problem is whether this prohibition, even if coupled with Applicant's succinct description in Attachment G of its approach to hazardous-waste determinations, provides

reasonable assurance that this provision of the Permit will work. If reasonable assurance were satisfied by a mere restatement of the requirements of law, this Permit could have been shortened to: "Applicant may inject wastewater pursuant to law." Or, perhaps a little more generously, the Permit could be reduced to a minor restatement of Specific Condition 1.d: "Pursuant to law, Applicant may inject wastewater, but not so that it causes or allows the movement of fluid into an USDW."

104. Essentially, the Permit addresses hazardous wastes by prohibiting them. The lone provision in the Permit concerning hazardous waste is Specific Condition 6.a.9, which states bravely: "The injectate shall be non-hazardous in nature at all times . . .."

105. The incorporation of Attachment G into the Permit would provide reasonable assurance of actual testing of the chemical cleaning residue and probably of the cooling system water and leak-tracing dyes, which is based on vendors' representations, but would not provide any assurance as to the other wastestreams. Process knowledge of sanitary wastewater treatment, if based on Applicant's knowledge, means little given the fact that Applicant is a power company. For the remaining wastestreams, unidentified analysis of undisclosed "historical data" means nothing and, thus, provides no assurance whatsoever.

106. For all of these wastestreams, including the chemical cleaning wastestream, reasonable assurance requires a plan for periodically obtaining reliable data and conducting valid analysis, or obtaining such data and analysis from other parties such as reliable vendors or governmental agencies; the implementation of such a plan; and the documentation of the implementation, including the recordation of the data sources relied on, the analytic processes undertaken and by whom, the resulting determination as to whether a discrete wastestream is a hazardous waste, and the manner of disposition of any such hazardous waste.

107. The procedures described in the preceding paragraph provide reasonable assurance because, although consistent with DEP's evident reliance on permittees to self-police as to hazardous wastes, they supply reasonably broad guidelines for how permittees are to discharge their hazardous-waste responsibilities, thus improving the likelihood of effective compliance, and some reasonable basis for enforcement, in the event of noncompliance. At present, the Permit's treatment of hazardous wastes leaves Applicant largely on its own and little, if any, opportunity for effective monitoring and enforcement by DEP, given that the wastewater, once injected, is 3000 feet under the surface of the earth where, under the facts of these cases, it will remain for geologic time.

108. For several reasons, the deficiencies in the Permit concerning hazardous waste appear more consequential than they are in reality, based on the present record. First, the source water for the WCEC is not likely to produce hazardous waste. The Upper Floridan Aquifer contains only one substance that is on the hazardous waste list, as it is presently constituted, and the substance does not approach the concentration required for listing. The L-10/L-12 canal contains several listed substances, but, as Dr. Missimer pointed out, the concentrations, even after five cycles through the plant, are several orders of magnitude below the concentrations that are necessary for listing. Although the composition of the canal water, which drains Lake Okeechobee, is far more variable than the composition of the Upper Floridan Aquifer, neither source presents a real risk of introducing hazardous waste into the wastestream to be injected into the Boulder Zone. Additionally, the Permit already requires extensive water-quality testing of the wastewater, although not as extensive as would be necessary to rule out, on the basis of laboratory testing alone, the presence of any hazardous waste in the wastewater.

109. Second, Applicant does have considerable knowledge, if not of sanitary wastewater treatment processes, of the process involved in the production of energy. For those relatively few components that come into direct contact with

cooling or process water, reasonable assurance as to hazardous wastes does not require much from Applicant. Initially and when introducing new equipment that comes into contact with the wastestream, Applicant may easily document, based on vendors' representations, that the substances contributed from these components into the wastewater are not listed or, if listed, are not contributed at rates approaching the listed concentrations. For wastewater from the package plant, Applicant may undertake the same process, again relying on the expertise of vendors or other parties, unless Applicant can demonstrate expertise in sanitary wastewater that it has not demonstrated in this record.

110. Third, the volume of water to be disposed of daily is vast. Aside from the depth of the wells and the difficult-to-conceive vastness of the Lower Florida Aquifer, the fact that best describes the scale of this project is the vertical height of the injecting zone, which will be at least 200 feet high, or the height of a 20-story building. From this scale, one can infer the scale of the amount of wastewater that Applicant will be disposing of daily. This is not to suggest that a little hazardous waste is not especially important given the vastness of scale of this project. Rather, it is to acknowledge that it is extremely unlikely that these high volumes of wastewater, at the moment of entry into the injection well, would ever contain a hazardous waste due to the fact that the characteristic

wastes, listed for toxicity, are expressed in concentrations, although the wastes may reach listed concentrations at early points, such as in the boiler immediately after chemical cleaning or in the package plant.

111. For these three reasons, the failure of the Permit to provide reasonable assurance as to hazardous wastes is a minor deficiency, more of theoretical than actual importance, and is easily remedied by a few Permit additions, whose phrasing is properly left to the discretion of DEP.

CONCLUSIONS OF LAW

112. The Division of Administrative Hearings has jurisdiction over the subject matter. §§ 120.569 and 120.57(1), Fla. Stat. (2007).

113. For standing, Petitioners must show that they have suffered an injury in fact of sufficient immediacy to entitle them to a Section 120.57(1) hearing and that their substantial injury is of a type or nature that the proceeding was designed to protect. Agrico v. Department of Environmental Regulation, 406 So. 2d 478, 482 (Fla. 2nd DCA 1981). For an association, Petitioner Coalition must demonstrate that a substantial number of its members would have standing. Friends of Everglades, Inc. v. Board of Trustees of the Internal Improvement Trust Fund, 595 So. 2d 186, 188 (Fla. 1st DCA 1992).

114. In hindsight, based on the review of a complete evidentiary record, the only petitioner who adequately pleaded standing was Petitioner Larson. As contrasted to the sale of conservation land used recreationally by environmentally minded association members, Friends of Everglades, supra, the present cases involve permitted activities 3000 feet beneath the surface of earth. Even if the Middle Floridan Confining Unit were to fail to retain the injected fluids, the impact would be to the Upper Floridan Aquifer, which is itself hundreds of feet below the surface of the earth. Water quality of this aquifer would suffer, but it is impossible to trace, from this effect, any impact at all on the National Wildlife Refuge or the users of this natural resource. In the event of upward migration of injected fluids to the Upper Floridan Aquifer or even the surficial aquifer, the groundwater impacts to the National Wildlife Refuge would be negligible, at most. If upward migration were limited to the Upper Floridan Aquifer, the water quality within the National Wildlife Refuge would also remain unaffected. If upward migration were extended to the surficial aquifer, given the extensive period of time involved, the water quality within the National Wildlife Refuge would likely remain unaffected. Therefore, claims of standing based on such impacts and the use of this unique natural resource must necessarily fail the first prong of the two-pronged Agrico test. But see

Calcasieu League for Environmental Action Now v. Thompson, 661 So. 2d 143 (La. 1st Cir.), cert. denied, 664 So. 2d 459 (La. 1995).

115. The only petitioner offering an alternative basis for standing is Petitioner Larson, who claims a substantial injury-in-fact from the effect of such upward migration on her potable water well in the surficial aquifer. Clearly, as Applicant concedes in its proposed recommended order, her claim satisfies the second prong of the Agrico test, as the permitting regime at issue in these cases is designed to protect groundwater quality, in particular USDWs, of which the surficial aquifer is one. The question is whether Petitioner Larson can satisfy the first prong of the Agrico test.

116. Petitioner Larson adequately pleaded standing under the first prong of the Agrico test. Her pleadings claim deficiencies in the proposed construction and operational testing of IW-1 and IW-2 that would injure her in fact. South Florida Water Management District v. St. Cloud, 550 So. 2d 551 (Fla. 5th DCA 1989). But Petitioner Larson has not proved standing. The two demonstrated deficiencies in the Permit do not go toward the integrity of the Middle Floridan Confining Unit, but toward the permissible operating conditions of IW-1 and IW-2 and the permissible composition of the injected fluids into the Boulder Zone. The issue involving the maximum

permitted well pressure could go to the integrity of the Middle Floridan Confining Unit and the accuracy of the zone of endangering influence. But the small amount of additional pressure, the vastness of the Boulder Zone, the thickness of the Middle Floridan Confining Unit, the lack of another well into the Boulder Zone and that might require corrective action within miles of the WCEC, and the presence of another confining unit between the Middle Floridan and Petitioner Larson's well preclude the possibility that Petitioner Larson has proved any injury in fact.

117. However, the remaining conclusions of law are appropriate for two reasons. First, as required by Florida Administrative Code Rule 62-110.106(7)(d), the Intent to Issue Notice warns parties, including Applicant, that "[b]ecause the administrative hearing process is designed to formulate agency action, the filing of a petition means that the Department final action may be different from the position taken by it in this notice." Cf. Beverly Enterprises-Florida, Inc. v. Department of Health and Rehabilitative Services, 573 So. 2d 19, 23 (Fla. 1st DCA 1990); Hopwood v. Department of Environmental Regulation, 402 So. 2d 1296 (Fla. 1st DCA 1981). But cf. St. Joe Paper Co. v. Department of Community Affairs, 657 So. 2d 27 (Fla. 1st DCA 1995), rev. denied, 667 So. 2d 774 (Fla. 1996).

118. In its proposed recommended order, DEP misapplies to these cases the Agrico mandate that, after a judicial determination that permit challengers lack standing, the agency must issue the permit. This is true after judicial review, but not here, where DEP has yet to enter a final order and issue the Permit. At this relatively early stage in the permitting process, the authority cited in the previous paragraph still applies.[10]

119. Second, subsequent review may determine that one or more petitioners have standing. Given the fact that the parties have already participated in a full evidentiary hearing, the issuance of findings of fact and conclusions of law on all issues would serve administrative efficiency and likely render any erroneous standing determinations harmless error. Gregory v. Indian River County, 610 So. 2d 547, 554-55 (Fla. 1st DCA 1992); First Hospital Corporation v. Department of Health and Rehabilitative Services, 589 So. 2d 310, 313 (Fla. 1st DCA 1991).

120. Pursuant to 42 U.S.C. § 300h-1(a), the United States Environmental Protection Agency has authorized Florida to administer an underground injection control program. 40 C.F.R. § 147.500. This program is described in Florida Administrative Code Chapter 62-528. Section 403.061(7), Florida Statutes, authorizes DEP to adopt rules consistent with this federal law.

121. Florida Administrative Code Rule 62-528.100(1) provides:

> The purpose of Chapter 62-528, F.A.C., Underground Injection Control (UIC), is to protect the quality of the State's underground sources of drinking water and to prevent degradation of the quality of other aquifers adjacent to the injection zone that may be used for other purposes. This purpose is achieved through rules that govern the construction and operation of injection wells in such a way that the injected fluid remains in the injection zone, and that unapproved interchange of water between aquifers is prohibited.

122. Florida Administrative Code Rule 62-528.110(2) states:

> It is the intent of this chapter that the injection of wastes underground shall not adversely interfere with any designated use of ground water as specified in subsection 62-520.410(1), F.A.C., or cause violations of water quality standards in underground sources of drinking water.

123. Florida Administrative Code Rule 62-528.300(1)(a)2 identifies as a Class I injection well any "industrial and municipal . . . disposal wells which inject fluids beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water."

124. Florida Administrative Code Rule 62-528.300(2) provides that DEP shall identify as a USDW any part of an aquifer meeting the requirements of Florida Administrative Code Rule 62-528.200(66). This rule defines such an aquifer as one

actually providing drinking water or one containing a TDS concentration of less than 10,000 mg/L.

125. Florida Administrative Code Rule 62-528.300(4) and (5) requires an applicant for a Class I injection well permit to take "corrective action" on wells that penetrate the injection zone within the "Area of Review," which is the land surface overlying the "zone of endangering influence." As defined by Rule 62-528.300(4)(a), this zone is the "lateral area in which the buoyant forces or increased pressures in the injection zone may cause the migration of the injected or formation fluid into an underground source of drinking water." Pursuant to Rule 62-528.300(4)(b), the Area of Review must encompass at least a one-mile radius around the injection well. Rule 62-528.300(5) provides that the corrective action is to ensure that the applicant takes such measures, with respect to any wells penetrating the injection zone within the Area of Review, to "prevent fluid movement into [a USDW]."

126. Florida Administrative Code Rule 62-528.300(6)(a) states that an injection well exhibits "mechanical integrity" if there is "no leak in the casing, tubing, or packer" and "no fluid movement into a. . . [USDW] through channels adjacent to the injection well bore." Rule 62-528.300(6)(b) requires Applicant to monitor the tubing-casing annulus pressure or pressure test the inner casing or tubing to demonstrate that the

injection well has no leak in the casing, tubing, or packer. Rule 62-528.300(6)(c) requires Applicant to use a temperature or noise log and, if not a threat to a USDW, a radioactive tracer survey to demonstrate that there is no fluid movement into an USDW through channels adjacent to the injection well bore.

127. Florida Administrative Code Rule 62-528.315 requires DEP to give the public notice of Class I permits. Florida Administrative Code Rule 62-528.325 requires DEP to hold a public meeting whenever a proposed permit has a significant degree of public interest. Florida Administrative Code Rule 62-528.330 requires DEP to respond to public comments. Florida Administrative Code Rule 62-528.335 requires DEP to prepare a fact sheet on a proposed permit when it is the subject of widespread public interest or raises major issues.

128. Florida Administrative Code Rule 62-528.360 prohibits the injection of "hazardous waste" through any well, except as provided in Rule 62-528.400. As applicable to these cases, Florida Administrative Code Rule 62-528.400(1) flatly prohibits the injection of "hazardous waste." Florida Administrative Code Rule 62-528.200(35) incorporates the definition of "hazardous waste" found in Florida Administrative Code Rule 62-730.030, which, in turn, incorporates the provisions of 40 C.F.R. Part 261 (2006), with certain revisions.

129. Florida Administrative Code Rule 62-528.405(1)(a) requires Applicant to demonstrate that, pursuant to Rule 62-528.440(2)(c), the:

> hydrogeologic environment is suitable for waste injection . . .. Suitability means that the injection will not "cause. . . or allow. . . movement of fluid into [USDWs], if such fluid movement may cause a violation of any primary drinking water standard under 40 C.F.R. 141 (1994), or may otherwise adversely affect the health of persons.

130. Florida Administrative Code Rule 62-528.405(1)(a) also requires Applicant to demonstrate that waste injection will not "modify. . . the ambient water quality of other aquifers overlying the injection zone."

131. Addressing the confining zone, Florida Administrative Code Rule 62-528.405(2)(a) requires Applicant to show that the confining zone(s) above the injection zone have "sufficient areal extent, thickness, lithologic and hydraulic characteristics to prevent fluid migration into [USDWs]." Rule 62-528.405(2)(c) requires Applicant to propose methodology for testing the confining zone and provide sufficient data, such as geophysical logs, lithologic cores, and water samples, to prove the confining characteristics of the confining zone. This rule also requires a "monitoring system" to include "one or more on-site monitoring well(s), designed to confirm the long-term effectiveness of the confining zone."

132. Addressing the injecting zone, Florida Administrative Code Rule 62-528.405(3)(a) requires Applicant to demonstrate that the proposed injection zone has "sufficient extent, thickness, lithologic and hydraulic characteristics to adequately receive waste." Rule 62-528.405(3)(b) adds that the applicant must propose a sufficient methodology for testing the injection zone's capacity for receiving injecting fluid:

> The applicant shall demonstrate the suitability of a proposed zone by determining the hydraulic characteristics, lithology, thickness, extent, and compatibility of injection and formation fluids. Testing of the injection zone shall include a pumping injection test at a flow rate of not less than the maximum design capacity of the well, and of such duration that can demonstrate the trend of the injection pressure on the long-term operating conditions.

133. Addressing the construction of a Class 1 well, Florida Administrative Code Rule 62-528.410 provides:

> (1) General Design Considerations.
>
> (a) All Class I and III wells shall be cased and cemented to prevent the movement of fluids into or between underground sources of drinking water, and to maintain the ground water quality in aquifers above the injection zone that may be used for monitoring or other purposes.
> (b) All Class I wells shall be designed and constructed so that they inject into a formation which is beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.

> (c) In the design specifications for a Class I well, the applicant shall address the problem of corrosion, proposed protective measure(s), and, when appropriate, proposed methods of monitoring. The applicant shall consider thickness and type of cement, number and thickness of casings, casing material, casing coatings, formation fluid (water) quality, injection fluid quality and life expectancy of the well.
>
> (d) For Class I wells all outer surfaces of uncemented casings or portions of casings shall be coated or otherwise protected against corrosion. This protection shall extend for a minimum distance of thirty feet above and below the uncemented portion of the casing.
>
> (e) All Class I injection wells, except those municipal wells (publicly or privately owned) injecting noncorrosive wastes, shall inject fluids through tubing with a packer set immediately above the injection zone, or tubing with an approved fluid seal as an alternative. . . .

* * *

134. Florida Administrative Code Rule 62-528.410(2) requires an exploratory pilot hole for any Class I well. Rule 62-528.410(3) requires a step-by-step drilling plan for Class I wells. Rule 62-528.410(4) requires that the casings for each Class I be designed for the life expectancy of the well. This rule requires that the final length of casing be made of seamless steel pipe with at least a 1/2-inch wall thickness.

135. Florida Administrative Code Rule 62-528.410(5)(a) requires that the cement used in the construction of the well be designed for the life expectancy of the well and must be

compatible with injection fluids, native fluids, and the formation, but in no case shall be less than ASTM Type 2 or its equivalent. Rule 62-528.410(5)(g)1 requires that a temperature survey be run within 48 hours after cementing.

136. Florida Administrative Code Rule 62-528.410(6)(a)1 requires deviation checks during drilling to avoid misalignment that might create a vertical channel for the upward migration of fluids from the injection zone.

137. Florida Administrative Code Rule 62-528.410(7) specifies the testing that must take place upon completion of construction of a Class I well. These tests include a cement evaluation survey, temperature survey, pressure test of the final casing, video survey from top to bottom of the well, injection tests, withdrawal tests, and a radioactive tracer survey.

138. Addressing the operating requirements for Class I wells, Florida Administrative Code Rule 62-528.415 prohibits such injection pressure that would initiate new fractures or extend existing fractures in the injection zone, initiate fractures in the confining zone, significantly alter the fluid-containment capabilities of the confining zone, or cause the movement of injection or formation fluids into an USDW or monitoring zone.

139. Florida Administrative Code Rule 62-528.415(1)(f) restricts the peak hourly flow of the injection well to ten feet per second, unless the applicant demonstrates that higher velocities would not compromise the integrity of the well. However, an injection system may be designed to allow 12 feet per second during testing, maintenance, or emergency conditions.

140. Florida Administrative Code Rule 62-528.415(3) requires operation and maintenance manuals, which is subject to DEP approval under Florida Administrative Code Rule 62-4.240.

141. Addressing monitoring requirements for Class I wells, Florida Administrative Code Rule 62-528.425(1)(a) requires the "analysis of the injected fluids at a frequency specified in the permit to yield representative data on their characteristics." Rule 62-528.425(1)(b) requires the continuous and recorded monitoring of flow rate, flow volume, injection pressure, and pressure on the annulus between the tubing and final casing. Rule 62-528.425(1)(f) requires the determination of the background water quality of the injection zone and monitoring zone prior to injection.

142. Florida Administrative Code Rule 62-528.425(1)(g) requires that monitoring wells allow the monitoring of the absence of fluid movement adjacent to the well bore and the long-term effectiveness of the confining zone. Rule

62-528.425(1)(g)3 requires that monitoring wells be located within 150 feet of the injection well. Rule 62-528.425(1)(g)4 requires the monitoring of a zone below the base of the USDW and at least one zone within, and near the base of, the USDW. Rule 62-528.425(1)(g)5 provides that, if needed for reasonable assurance of the monitoring, DEP shall require continuous monitoring for pressure changes in the first aquifer overlying the confining zone, continuous monitoring for pressure changes in any monitoring well, periodic monitoring of groundwater quality in the first aquifer overlying the injection zone, periodic monitoring of groundwater quality in the lowermost USDW, and periodic additional monitoring to determine whether fluid movement caused by injection activity is occurring into or between USDWs.

143. Addressing the information that an applicant must provide DEP with its application for a permit for construction and operational testing, Florida Administrative Code Rule 62-528.450(2)(f)3 requires the identification of the "source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids . . .." This rule adds:

> For Class I wells injecting domestic effluent, a demonstration that the effluent quality meets the standards specified in subparagraph 62-600.420(1)(d)1 and Rule

> 62-600.540, F.A.C.; or for new wells, the minimum treatment requirements set forth in 40 C.F.R. §§ 146.15 and 146.16, . . . hereby adopted and incorporated by reference. For all other Class I wells, a demonstration that the effluent quality meets the standards specified in paragraph 62-660.400(1)(o), F.A.C.

144. Addressing operational testing of Class I wells, Florida Administrative Code Rule 62-528.450(3) imposes requirements on an applicant seeking DEP approval to commence operational testing. In general, the rule requires a "period of temporary injection operation for the purposes of long term testing." The rule requires, prior to commencement of operational testing, that the applicant complete the construction and testing of the injection well, the submittal of various types of information, including "wastestream analysis," and the consideration by DEP of the "compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone[.]" Rule 62-528.450(3)(e) restricts the duration of operational testing periods for Class I wells to two years.

145. Applicant has the burden of proving that it has provided the necessary reasonable assurance. Department of Transportation v. J. W. C. Company, Inc., 396 So. 2d 778 (Fla. 1st DCA 1981). With two minor exceptions, Applicant has met its burden, and DEP should issue the Permit. DEP may easily revise

the Permit to address these two flaws and may make these revisions at this stage of the proceeding, consistent with the holding in Hopwood, supra.

146. The legal bases for requiring a statement in the Permit concerning maximum well injection rates are set forth above. As stated in the findings of fact, the assurances based on the zone of endangering influences and impact of the injected fluids on the injection zone require identification of the rate of injection, and these were all based on 10 feet per second or 12 feet per second in an emergency.

147. The legal bases for requiring more elaborate treatment of hazardous waste in the Permit include authority in addition to that set forth above. In general, 40 C.F.R. § 261.3(a)(2) recognizes two broad categories of hazardous wastes: "listed" and "characteristic." A "listed" waste is one that "is listed in Subpart D of this part and has not been excluded from the lists in Subpart D of this part under Sec. Sec. 260.20 and 260.22 of this chapter." 40 C.F.R. § 261.3(a)(2)(ii).

148. Listed wastes are at 40 C.F.R. §§ 261.31, 261.32, and 261.33. It does not appear that any of the wastes of a power plant will qualify as listed hazardous wastes.

149. A "characteristic" waste is one that "exhibits any of the characteristics of hazardous waste identified in subpart C

of this part." 40 C.F.R. § 261.3(1)(2)(i). The characteristics are "ignitability," "corrosivity," "reactivity," and "toxicity." 40 C.F.R. §§ 261.21, 261.22, 261.23, and 261.24.

150. The only characteristic waste that appears relevant is toxicity. The enumerated wastes that qualify as hazardous are listed at 40 C.F.R. §261.24, Table 1. The only items on the list that are reported in the water of the L-10/L-12 canal or the Upper Floridan Aquifer, with the qualifying concentrations in parentheses, are arsenic (5.0 mg/L), barium (100 mg/L), cadmium (1 mg/L), chromium (5.0 mg/L), lead (5 mg/L), mercury (0.2 mg/L), selenium (1.0 mg/L), and silver (5 mg/L). The only one of these items found in the Upper Floridan Aquifer is barium; the rest are found exclusively in the canal water.

151. At hearing, the parties claimed that Applicant may apply "process knowledge" to determine if a substance is hazardous, but this means is not within the part of the Code of Federal Regulations that DEP has incorporated into Florida law. Pursuant to 40 C.F.R. § 262.11(c)(1), Applicant could use testing, as provided in 40 C.F.R. Part 261, or process knowledge, which is "[a]pplying knowledge of the hazard characteristic of the waste in light of the materials or processes used". Interestingly, the provisions for testing are in 40 C.F.R. Part 261, but the provision for "process knowledge" is in 40 C.F.R. Part 262. As noted above, Florida

Administrative Code Rule 62-730.030 incorporates 40 C.F.R. Part 261, but not 40 C.F.R. Part 262.[11]

152. The failure of DEP to adopt by rule process knowledge as a means of proving that a substance is not a hazardous waste is significant only in that Applicant may not simply rely on a rule authorizing the use of process knowledge. Applicant may still provide reasonable assurance as to hazardous waste by any effective means that it chooses, including process knowledge, but, absent a rule, it may have to justify the process by which it acquired the knowledge that a particular material or process does not contain or generate hazardous waste. This is not an inordinate burden. Similarly, 40 C.F.R. § 262.11 imposes the burden on the person who generates a solid waste, which may include a wastestream, to determine if the waste is a hazardous waste.

153. The point reduces to a matter of proof of reasonable assurance. In Florida, when it comes to hazardous waste, saying that something is a hazardous waste does not necessarily make it so. Kerper v. Department of Environmental Protection, 894 So. 2d 1006, (Fla. 5th DCA 2005) (court declined to sustain determination of hazardous waste based exclusively on testimony of DEP expert, who testified that liquid "felt like used oil"). And, presumably, saying something is not hazardous waste does not necessarily make it not hazardous waste.

RECOMMENDATION

It is

RECOMMENDED that the Department of Environmental Protection enter a final order issuing Permit No. 247895-007-UC or issuing Permit No. 247895-007-UC with the recommended revisions.

DONE AND ENTERED this 3rd day of March, 2008, in Tallahassee, Leon County, Florida.

S

ROBERT E. MEALE
Administrative Law Judge
Division of Administrative Hearings
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Filed with the Clerk of the
Division of Administrative Hearings
this 3rd day of March, 2008.

ENDNOTES

1 The Order Closing Files states that the Administrative Law Judge is relinquishing jurisdiction over Permit No. 247895-006-UC, which, as noted below, is the proposed permit for DZMW-1. The Order Closing Files notes that the ruling does not affect DOAH Case Nos. 07-5047, 07-5062, and 07-5063, "which challenge Permit No. 247895-007-UC." As noted above, this is the permit for IW-1 and IW-2.

The amended petition of each petitioner challenged "the permit" for IW-1, IW-2, and DZMW[-1]. On November 28, 2007,

Petitioner Christensen filed a Motion for Rehearing, which asked for an Order reinstating his challenge to DZMW[-1]. By Order Denying Motion for Rehearing entered November 30, 2007, the Administrative Law Judge denied the motion. The Order states that the only timely filed petition to Permit No. 247895-006-UC was filed by the petitioner in DOAH Case Nos. 07-3881 and 07-4744. It appears from the pleadings that DEP issued proposed Permit No. 247895-006-UC substantially prior to issuing proposed Permit No. 247895-007-UC and that the petitions that commenced DOAH Case Nos. 07-5047, 07-5062, and 07-5063 were untimely as to the earlier-issued proposed permit.

2 FPL Exhibit No. 16, Attachment P reports the packer test data by test number, not depth. FPL Exhibit No. 16, Table 6 reports the depths of each of five packer tests. The Administrative Law Judge has inferred, especially due to the low TDS reported for the first packer test, that the tests are listed in Attachment P from shallowest to deepest.

3 Specifically, .00000074 cm/second at 1956 feet, .0000036 cm/second at 1960 feet, and .00000091 cm/second at 1962 feet.

4 Specifically, .0016 cm/second at 2048 feet, .0000000084 cm/second at 2062 feet, and .000000094 cm/second at 2065 feet.

5 Specifically, .0000039 cm/second at 2193 feet and .00017 cm/second at 2200 feet.

6 Specifically, .000000054 cm/second at 2828 feet.

7 40 C.F.R. §§ 146.15 and 146.16 are inapplicable to this Permit because they pertain exclusively to municipal injection wells, not industrial injection wells. Pursuant to Florida Administrative Code Rules 62-528.200(45) 62-528.300(1)(a)2, a municipal injection well may be privately owned, but, under Rule 62-528.200(45), a municipal injection well injects "fluids that have passed through the head of a permitted domestic wastewater treatment facility and received at least secondary treatment pursuant to Rule 62-600.420."

Judging from the facts that DEP and Applicant have treated the proposed injection wells an industrial disposal wells, not municipal disposal wells, and that both parties knew from Application, Attachment G of the intent to dispose of sanitary wastewater through the injection wells, the small amount of treated sanitary wastewater that Applicant will dispose of

through IW-1 and IW-2 is not sufficient to convert these industrial wells into municipal wells.

Additionally, §§ 146.15 applies only to existing municipal injection wells, and 146.16 seems to apply only to existing municipal injection wells.

8 Although another key point in the article is to analyze the likely composition of the fluid that migrates through the confining unit and into the Upper Floridan Aquifer. In the article, Dr. Missimer notes that pathogenic microorganisms in injected wastewater are not detectable after two or three years, so, even where vertical migration was most rapid, these microorganisms would be inactivated before they reached the USDW, although the deactivation rates, and rate of absorption into aquifer and confining rock, of endocrine disrupting compounds and pharmaceuticals vary. In fact, at the hearing, Dr. Missimer noted that he originally tried to define the plume as "components of the plume"--i.e., freshening and "minor components" like ammonium--but editors required a unitary treatment of the plume, without differentiation among components.

9 Petitioners contend only that the mine blasting may damage the well, such as the interface between the casing and the formation wall. They do not contend, nor would the record in any way support, that the mine blasting may be of such force as to fracture the Middle Floridian Confining Unit.

10 For these cases, the more apt message from Agrico may be the court's next statement, after the above-noted mandate to the Department of Environmental Regulation: "We note that Agrico's sulphur-handling facility, when and if constructed, will then be subject to rigorous testing before the operational permit can be issued." Agrico, 406 So. 2d at 482. As in Agrico, the issue in the present cases is for a permit for operational testing, with a maximum term of two years, not operation.

11 The only mention of "process knowledge" or any combination of these words with "hazardous" in DEP's rules is Florida Administrative Code Rule 62-740.040(2) and (5) (producer may use process knowledge to determine whether petroleum contact water is a hazardous waste).

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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 must be filed with the agency that will issue the final order in these cases.