

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

IN RE:)

APPLICATION FOR POWER PLANT)
FLORIDA POWER & LIGHT)
COMPANY, MANATEE ORIMULSION)
PROJECT, APPLICATION NO. 94-35)

CASE NO. 94-567SEPP
OGC NO. 94-3191

**STIPULATED WITHDRAWAL OF REQUEST FOR HEARING
TO CONTEST CERTAIN SUFFICIENCY COMMENTS**

Florida Power & Light Company, ("FPL"), and the Florida Department of Environmental Protection, ("DEP"), (collectively, the "Parties"), by and through undersigned counsel, hereby stipulate as follows:

1. On February 21, 1995, DEP sent to FPL a Second Sufficiency Letter finding that the FPL's Site Certification Application (SCA) for the Manatee Orimulsion Conversion Project remains insufficient. DEP's Second Sufficiency Letter contained fifty-four (54) comments from DEP, three (3) comments from SWFWMD, eighteen (18) comments from Manatee County, and four (4) comments from TBRPC, all requesting additional information following FPL's responses to the DEP's First Sufficiency Letter.

2. On March 3, 1995, FPL requested a hearing to contest several of the comments in DEP's letter of February 21, 1995, pursuant to Section 403.5067, F.S., and Rule 17-17.081, F.A.C. Specifically, FPL contested DEP Comment Nos. 32, 34, 36, 37, 41, 43, 46, 47, 48, 49, 50, 51 and 53; SWFWMD Comment No. 3; Manatee County Comment Nos. 4, 5, 6, 7, 8, 12, 16 and 17; and TBRPC Comment Nos. 1, and 4.

3. The Parties have engaged in discussions concerning the contested sufficiency comments. To avoid the expense of a hearing and further delay, and in consideration of the

mutual covenants and agreements herein, the Parties agree to the stipulations set forth in paragraphs 4 through 6 below.

4. FPL withdraws its challenge of DEP Comment Nos. 32, 34, 36, 37, 41, 46, 47, 48, 49, 50, 51 and 53 in DEP's letter of February 21, 1995. FPL will respond to all of the comments contained in DEP's Second Sufficiency Letter, including the contested comments identified in paragraph 2 above.

5. For purposes of sufficiency review, DEP withdraws DEP Comment Nos. 32, 34, 36, 37, 41, 46, 47, 48, 49, 50, 51 and 53 in DEP's letter of February 21, 1995. The Parties agree that DEP Comment Nos. 32, 34, 36, 37, 41, 46, 47, 48, 49, 50, 51 and 53 in DEP's letter of February 21, 1995, do not provide bases for finding the SCA to be insufficient or for future sufficiency comments concerning the matters referenced therein.

6. FPL withdraws its challenge of DEP Comment No. 43 at this time. The Parties agree that FPL reserves the right to reassert its challenge of DEP Comment No. 43 at a later date.

7. This stipulation does not obligate or bind either party as to any future position it may take concerning the certification of the Project, including any recommendations on issuance of final certification or any conditions of certification which either party may propose as part of this certification proceeding.

Respectfully submitted this 27th day of March, 1995.

FLORIDA POWER & LIGHT COMPANY

By: 

Peter C. Cunningham, Esq.
Hopping Green Sams & Smith, P.A.
Post Office Box 6526
Tallahassee, Florida 32314

DEPARTMENT OF ENVIRONMENTAL
PROTECTION

By: 

Richard T. Donelan, Jr., Esq.
Assistant General Counsel
2600 Blair Stone Road
Tallahassee, FL 32399-2400

BEST AVAILABLE COPY

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing has been furnished to the following on
this 27th day of March, 1995:

Richard T. Donelan, Jr., Esquire
Department of Environmental
Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Hamilton S. Oven
Office of Siting Coordination
Department of Environmental Protection
3900 Commonwealth Blvd.
Tallahassee, FL 32399

Michael Palecki, Esquire
Florida Public Service Commission
101 East Gaines Street
Tallahassee, FL 32399-0850

Carolyn S. Holifield, Esquire
Department of Transportation
605 Suwanee Street, M.S. 58
Tallahassee, FL 32399-0458

Doug Leonard, Executive Dir.
Ralph Artigliere, Esquire
Central Florida Regional
Planning Council
409 E. Davidson Street
P.O. Box 2089
Bartow, FL 33830

Vivian Arenas
Assistant General Counsel
Southwest Florida Water
Management District
2379 Broad Street
Brooksville, FL 34609-6899

James V. Antista, Esquire
Florida Game and Fresh Water
Fish Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

H. Hamilton Rice, Esquire
County Attorney
Manatee County Attorney's Office
P.O. Box 1000
Bradenton, FL 34206

Dan Stengle, Esq.
Department of Community Affairs
2740 Centerview Drive
Tallahassee, FL 32399-2100

Roger Tucker, Esq.
Tampa Bay Regional Planning Council
9455 Koger Blvd. Suite 219
St. Petersburg, Fla. 33702-2491

Thomas W. Reese, Esquire
2951 61st Avenue South
St. Petersburg, FL 33712


Attorney

February 21, 1995

Mr. Wayne C. Ondler
Florida Power & Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

RE: Manatee Orimulsion Conversion Project, PA 94-35
Sufficiency Comments

Dear Mr. Ondler:

The Department of Environmental Protection and reviewing agencies have reviewed the January 17, 1995, supplement to the application and have determined that the application for power plant site certification of the Manatee Orimulsion Conversion Project still contains insufficient information to allow an assessment of the project's compliance with regulatory standards. The department requests that you supplement the application with information addressing the following:

1. The additional information indicated that the detection systems for the pipeline can detect a leak of 50 barrels. Please clarify whether or not this is the minimum size leak that can be detected by the various detection systems.
2. Please provide an estimated detection time for a corrosion leak.
3. Please indicate the extent to which the equipment that Bitor tested for corrosion with Orimulsion is similar to the existing FPL pipeline. Can Bitor provide data to support a low corrosion rate with Orimulsion and no internal coating on the pipe?
4. What is the thickness of the metal in the existing pipeline?
5. The information stated that the pipeline had 1/16 in. of design corrosion. Is that internal or external corrosion? Is the design basis oil or Orimulsion?
6. Has a jurisdictional determination been done on the proposed mitigation area? If so, when and by whom? If not, is one proposed to be done?

7. What is the source of the ATV and 4-wheel drive traffic in the proposed mitigation area?

8. What evaluation method was used to arrive at the Functional Value Units quoted in the submitted information?

9. Figure 16 indicates that the majority of the mitigation area is already in the Save Our River (SOR) program. Please clarify how the SOR program relates to the areas owned by FPL on the plant site.

10. Please clarify by what means the mitigation area is to be permanently protected.

11. Please provide additional details regarding the mitigation plan:

a. How will the ATV traffic in the area be controlled?

b. The acreage and areas in which exotic removal is proposed, including plan view drawings showing the areas.

c. The exotic removal methods that are proposed to be used for each species and area.

d. The acreage and areas that are eroded and proposed to be filled, including detailed plan view and cross-section drawings for each eroded area with detailed information on the construction methods to be used to stabilize the area, including access and equipment.

e. The acreage and areas to be planted with native species for each habitat type, including plan view and cross-sectional drawings showing the planting elevations and water levels.

12. DEP-IW1 Insufficient response. Currently all treated wastewaters are land applied within the diked areas. Please provide us with a narrative describing how the treated effluent will be disposed of after the installation of the reinforced liner.

13. DEP-IW6 Insufficient response. The pond is not considered jurisdictional because the process activities at the facility will undergo major modifications and improvements. As such, since the proposed effluent to be discharged to the pond is potentially contaminated, a ground water monitoring plan is required to address any adverse impacts to the quality of the underlying ground waters.

14. DEP-GL2: noted. The existing ground water monitoring wells have been located on a site plan and described as surficial wells.

However, the supplied figure (i.e., Figure DEP-GL2-1) does not label the ground water monitoring wells with their respective identities (e.g., MW-1, MW-1, etc.). An updated figure should be provided with these identities noted.

15. Please discuss the effectiveness of the booms or any other recovery method during high energy storm conditions. Provide a manufacturer's specifications for a 3 meter boom and curtain with any warranty information or effectiveness test results that may be available.

16. Will the booms and recovery equipment be portable in the event of an accidental release outside of the Port such as occurred during the August 1993 collision of two vessels in Tampa Bay?

17. Please discuss any recovery operations and success with spill containment at other port terminals where a bitumen spill has occurred.

18. In your response, reference is made to the FP&L Port Manatee Terminal Spill Contingency Plan having been reviewed and approved by the U. S. Coast Guard. Is this plan the original plan used for No. 6 Fuel Oil or is it a new contingency plan tailored to address the specific response associated with an Orimulsion spill?

19. Re DEP-J2 - Please provide a drawing depicting the apron to be used to capture accidental spillage and how the apron will be secured to the ship and dock. Also provide an illustration of how spill containment booms will be placed on both sides of the unloading arms.

20. What was the specific gravity of the seawater at the time of the 1991 trial spill in England?

21. When will the three-dimensional, time-varying, curvilinear grid, numerical model be available for assessing the extent or impacts of a spill be available?

22. The toxicity information contained within the submission was basically the same historic info received previously, much pertaining to an earlier Orimulsion formulation, and with no new results. The Department concludes that the information elaborating on the toxicity aspects of Orimulsion remains insufficient. When will the University of Massachusetts'/University of Miami analyses be completed?

Fuel related

23. Have tests been performed to determine that 100.00% of the surfactant (nonylphenol ethoxylate) will decompose into carbon dioxide and water, or is this a theoretical

assessment? Considering the large amount of Orimulsion to be fired, even a small percentage of surfactant carried through the process intact could become significant.

24. Table 2-3 of the Air Permit Application references the Orimulsion Fuel Quality Specification (FPL, 1994) for the maximum percentages by weight for ash, sulfur, nitrogen and sulfur, and for the minimum heat content and maximum density. What other parameters, if any, are included in the Orimulsion Fuel Quality Specification (FPL, 1994)? Is there a limit on the percent of surfactant used?

Conceptual Boiler Alterations - Figure 1:

25. Item 1 of the Key to Boiler Alterations in Figure 1 states that the "Boiler is designed for and has provisions to add 2 additional division walls to existing 7 walls". Please give a verbal description of exactly what these provisions consist of.

26. Item 2 of the Key states that the "Boiler is designed for and has provisions to add 10 extra tubes to each of 7 existing division walls". Please give a verbal description of exactly what these provisions consist of. What will be the total number of tubes in each of these 7 existing division walls?

27. What will be the total number of tubes in each of the 2 new division walls?

28. The Legend indicates an area of the boiler as "New Division Wall Surface (Outside panels @ each side only)". It is not clear what this means. Please explain.

29. Item 3 of the Key states "Upgrade existing primary superheater". Does "upgrade" mean "replace" or "an addition"?

30. Item 5 of the Key states "Upgrade selected non-pressure parts, casing and supports". Does "upgrade" mean "replace" or "additions to"?

31. Item 7 of the Key states "Install additional sootblowers and relocate other (see legend)". The legend icons for existing sootblower locations and new sootblower locations seem to indicate 13 new sootblower locations and 15 existing sootblower locations for a total of 25 sootblowers. Is this correct? Which of the existing sootblower locations shown are in relocated positions?

32. Can Orimulsion be efficiently fired without the use of steam atomization?

33. By increasing the surface heating area of the boiler, isn't the boiler steam generating capacity increased if firing fuel oil?

Boiler-related:

34. The insufficiency response to DEP-B3 states that the emission data for 1992 may not be representative of actual plant operation because of planned outages for equipment upgrades that occur about once every 15 years (the units were not operating for about 25 percent of the year). However, in fact, FPL reported total annual hours of operating (the sum of both units hours of operation) to be 9440 for for 1992. The total annual hours of operation reported for 1990, 1991, and 1993, respectively, are: 9812, 10,225, and 10,575. The hours of operation in 1992 do seem to be representative of actual operation.

35. The insufficiency response to DEP-B3 states that the emissions factors in AP-42 do not include include sootblowing emissions. Where is this stated in AP-42? If FPL does not believe that sootblowing emissions are included in the AP-42 emission factor for particulate, why wasn't an additional calculation performed to include sootblowing emissions in the Annual Operating Reports submitted to the Department. FPL is required to report all particulate emissions. Is FPL now admitting to submitting erroneous data to the Department in its Annual Operating Reports? Please show calculations to support the statement that, "... by accounting for sootblowing, the PM emissions are estimated to be 2,953 TPY."

36. Rule 62-212.200(2), F.A.C. does not state that "source specific allowable emissions can be assumed equivalent to actual emissions provided that the source specific allowable emissions are federally enforceable". The rule states that "The Department may presume that unit-specific allowable emissions for an emissions unit are equivalent to the actual emissions of the emission unit provided that, for any regulated air pollutant, such unit-specific allowable emissions limits are federally enforceable." The Department chooses not to presume this equivalency.

37. The insufficiency response to question DEP-B6 states that "...on a short-term basis, the maximum hourly NOx emissions are lower when the plant is firing Orimulsion than existing low sulfur fuel oil." This appears to be incorrect. The maximum tons of Orimulsion per year are projected to be 20,104. Assuming a total maximum of 17,520 hours per year (8760 hours x 2 units), the lowest hourly NOx emissions would be 1.15 tons per hour. The actual annual tons of NOx emitted in 1992 and 1993 averaged 6671. The total actual hours per year averaged 10,008. The average hourly NOx emissions while

firing low sulfur fuel oil is therefore 0.67 tons per hour (which is less than the 1.15 tons per hour emitted while firing Orimulsion).

38. Will there be any problems with operating at very low excess air levels at part load?

39. When the Empirical Kinetics Modeling Approach (EM) model, was used, was it assumed that the Manatee Plant stack plumes dispersed across the entire 2-county area instantaneously?

40. On page DEP-27 of the insufficiency response, the percentage increase of total deposition of N in the Tampa Bay region is said to equal "100 x $\frac{\text{emanate}}{J_{NO_3+NH}}$ ". How was the value of J_{NO_3+NH} determined?

41. Please submit a summary of the emissions tests results of the large-scale single-burner rig testing performed in the United Kingdom this last summer.

42. Please describe examples of regional atmospheric conditions which could cause the plume opacity to exceed 20% opacity on stacks emitting particulate matter at a rate of 0.03 lb/MMBTU input?

Health-related:

43. Why was it assumed that inhalation is expected to produce the greatest potential exposure to an individual? Please prepare a multi-pathway health risk assessment.

44. On which page of the insufficiency response can Table 7-16a be found?

45. In the exposure assessment, were the fuel oil-based air pollutant concentrations based upon actual emissions while operating at an approximate 32% capacity factor, or were the concentrations based upon what would be emitted if the facility were firing fuel oil while operating at an 87% capacity factor?

BACT-related:

46. Will the price of Orimulsion always be the price of coal that is currently available to FPL? Is there a price maximum or minimum?
oil if coal supply is not *57.10MMB's*

47. If SCR is installed, what would be the annual number of ammonia truck deliveries, and what would be the annual number of truckloads of metallic catalyst collected?

48. The 0.51 lb/MMBTU NOx emissions at the Sanford plant were not based on full load firing of Orimulsion (as stated on page 4-21 of the air permit application) but were an average of tested emissions while the plant was running from 50-90% load. Is it accurate to extrapolate a full-load NOx emission for the Manatee Plant from this data?

Fly Ash Handling-related:

49. The Department will require more detailed information regarding the configuration of the ash handling equipment, and the agglomeration and curing processes, for the final conditions of certification.

Limestone Handling-related:

50. The Department will require more detailed information regarding the configuration of the handling and processing equipment, and the bag filters, for the final conditions of certification.

Gypsum Handling-related:

51. The Department will require more detailed information regarding the configuration of the handling and processing equipment, and the bag filters, for the final conditions of certification.

52. The Port Manatee Spill Response Plan and the Corporate Spill Response Plan from FPL submitted on January 17, 1995, was missing Section 3, Hazard Evaluation, and Section 4, Spill Scenarios. The Bureau of Emergency Response (BER) would like to review those sections prior to completing the evaluation of the project. BER would also like to review the results of the proposed tests using Orimulsion to be conducted at Cape Canaveral by the Group V Oil workgroup.

53. How does the proposed expansion of Port Manatee affect the docking procedures, quiescent conditions, Orimulsion dispersion modeling, and spill response plan scenarios?

Attached please find sufficiency statements from Manatee County, Southwest Florida Water Management District, and the Tampa Bay Regional Planning Council.

Sincerely,

Hamilton S. Oven, P.E.
Administrator, Siting
Coordination Office

Attach:

**DEP-A1**

Comment: What is the molecular formula for Orimulsion?

Response: Orimulsion is a mixture of bitumen (approximately 70 percent), water (approximately 30 percent), and additives (< 1 percent) and, therefore, has no single molecular formula. The bitumen in Orimulsion is a complex mixture of hydrocarbons and is similar to any crude oil or residual oil (i.e., liquid hydrocarbons). The similarity to such fuels can be shown by comparing their ultimate analysis on a dry basis (i.e., without the moisture in Orimulsion). The major elements are presented below for Orimulsion, high sulfur fuel oil (HSFO), and low sulfur fuel oil (LSFO) [same data as Tables 2-3, 2-4, and 2-5 in the Air Permit Application (Site Certification Application (SCA), Volume II, Appendix 10.1.5] but adjusted to dry conditions.

Element	Orimulsion	HSFO	LSFO
Carbon (C)	81.0%	81.4%	84.6%
Hydrogen (H)	10.0%	10.0%	10.4%
C/H Ratio	8.10	8.14	8.13

As seen by the similarity in carbon and hydrogen concentrations as well as the C/H ratios, all three fuels are similar in hydrocarbon content.

An analysis was performed of both Orimulsion and LSFO samples to determine concentrations of various constituents, including volatile and semivolatile organic compounds, pesticides/polychlorinated biphenyls (PCBs), metals and leachable metals, chlorides, and fluorides. The results of these analyses are shown in Table DEP-A1-1. Table DEP-A1-1 presents those parameters where specific compounds were detectable in either Orimulsion or No. 6 fuel oil. As seen from this table, concentrations of all volatile and semivolatile compounds are higher in No. 6 fuel oil than in Orimulsion. Except for nickel and vanadium, concentrations of metals are also higher in No. 6 fuel oil than in Orimulsion. As presented in the Air Permit Application, nickel and vanadium concentrations are higher in Orimulsion than in No. 6 fuel oil.

Table DEP-A1-1. Summary Analysis of Orimulsion and No. 6 Fuel Oil

Parameter	Orimulsion (mg/kg)	No. 6 Fuel Oil (b) (mg/kg)
Volatile Organic Compounds (EPA Method 8240) (a)		
Benzene	2.7	17.0
Toluene	9.0	100.0
Ethylbenzene	19.0	47.0
Xylenes	28.0	300.0
Semivolatile Organics (EPA Method 8270) (a)		
Naphthalene	<100	740
Phenanthrene	<100	970
Pyrene	<100	1600
Chrysene	<100	820
2-Methylnaphthalene	<100	2800
Total Metals (EPA Method 6010) (c)		
Barium	<1.0	2.8
Chromium	<1.0	1.2
Copper	<2.5	3
Lead (EPA Method 7421)	<0.50	2.3
Nickel	55	37
Vanadium	260	32
Zinc	19	45

(a) All other parameters measured by the cited EPA Method were below detection limit for both Orimulsion and No. 6 fuel oil.

(b) Actual fuel oil currently burned at the Manatee Plant.

(c) All metals analyzed by this method unless noted otherwise.

Source: Savannah Labs, 1994.

X

DEP-A2

Comment: What additives will be used in the Orimulsion, and why? What additives will be used in the High Sulfur Fuel Oil (HSFO), and why? What emissions will result when these are combusted?

Response: The primary additive used in the production of Orimulsion is a water soluble non-ionic surfactant referred to as a nonylphenol surfactant. The chemical formula of the surfactant is $C_9H_{19}C_6H_4O(CH_2CH_2)_nH$ with chemical synonyms termed nonylphenoxypolyethoxyethanol and nonylphenol ethoxylate. Orimulsion is currently produced using 0.17 percent surfactant. The purpose of the surfactant is to assist in the bitumen/water emulsion. The surfactant decomposes within a temperature range of 425 to 450 degrees Fahrenheit (°F) producing carbon dioxide and water. When Orimulsion is combusted, flame and flue gas temperatures will exceed 2,000°F (see Figure 4-2 in Air Permit Application; Appendix 10.1.5 in the SCA). At these temperatures, the surfactant decomposes, producing carbon dioxide and water.

The second additive used in the production of Orimulsion is magnesium nitrate $[Mg(NO_3)_2]$ which is added as the emulsion stabilizer and an inhibitor of high temperature corrosion caused by low melting point compounds.

In the case of LSFO and HSFO, magnesium (typically in the form of magnesium oxide (MgO) or magnesium hydroxide $[Mg(OH)_2]$) is also added to the fuel to inhibit high temperature corrosion caused by low melting point compounds. Typical fuel concentrations with additives range from about 500PPM for HSFO to 200PPM for LSFO. Currently MgO is added to LSFO as authorized in the existing FDEP air operating permit AO41-204804 and AO41-219341.

For Orimulsion, magnesium compounds (most likely magnesium oxide $[MgO]$ or magnesium hydroxide $[Mg(OH)_2]$) will also be injected in the flue gas at the boiler exit to mitigate potential corrosion throughout the flue and air preheater. The concentrations are dependent on the flue gas characteristics and operating conditions.

The magnesium compounds add to the overall particulate matter resulting from the combustion of these fuels and also enhances the collection efficiency of the pollution

control equipment. The net effect on emissions is minimal and has been included in the proposed limit of 0.03 lb/MMBtu.



DEP-A3

Comment: How will fuel usage be measured and recorded?

Response: The existing computer based inventory tracking system (CIFOS) will be used to track Orimulsion inventories. Volume differences between consecutive midnight tank level readings will be used to determine fuel usage during the previous 24-hour operational period. Consistent with existing company procedures and industry standards, these volumes will be temperature corrected to net barrels. These daily records of inventory usage remain on-line in the CIFOS system for three (3) years.

Instantaneous fuel usage will be measured the same way Low Sulfur Fuel Oil is measured currently. The instrumentation used is manufactured by Micro Motion and measures mass flow directly using coriolis force. Micro Motion equipment is presently being used in Venezuela, Canada, Europe and Japan for measuring Orimulsion flow and is the preferred device for reliable flow measurement of non-Newtonian water emulsions.

DEP-A4

Comment: What is the proposed sampling frequency for fuel analysis?

Response: Orimulsion will be tested for compliance with the fuel specification developed between FPL and Bitor upon delivery of each shipment. Density, flash point, apparent viscosity, gross heating value, sediment, asphaltenes, ash, nitrogen, sulfur, vanadium, nickel, sodium, and magnesium values will be determined by the FPL Central Laboratory and any fuel specification non-compliance will be communicated to the Fuel Procurement department for execution of a Claim with Bitor.

Product testing conducted by Bitor has indicated that fuel quality diminishes only if the Orimulsion is exposed to extreme temperatures, cold or hot. Based on our designs, we do not expect to experience fuel quality problems which would warrant a "shelf-life" testing program.

DEP-A5

Comment: What is the Orimulsion Fuel Quality Specification (FPL, 1994) referenced in Table 2-3?

Response: The Orimulsion Fuel Quality Specifications are the contractual requirements that must be met by Bitor (Bitumenes Orinoco, S.A.) for supplying Orimulsion to the Manatee Plant. The fuel specifications provide minimum and maximum "as delivered" X quality specifications.

DEP-A6

Comment: What are the typical concentrations of nickel and magnesium in HSFO?

Response: Concentrations of nickel and magnesium in high sulfur fuel oil (HSFO) will vary slightly depending upon the supplier. Typical nickel concentrations in residual oil range from 6 to 73 parts per million (ppm) (EPA, 1989). Low sulfur fuel oil (LSFO) currently burned in the Manatee Plant (see response to Comment DEP-A1) has a nickel concentration of 37 ppm. The maximum specified "as delivered" fuel quality concentration for nickel is 90 ppm by weight; for magnesium, the expected concentration varies within a range of 175 to 500 ppm.

REFERENCE:

EPA, 1989. Estimating Toxics Emissions from Coal and Oil Combustion Sources.

EPA-450/2-89-001.

DEP-A7

Comment: What low-temperature working fluids are the existing in-line fuel heaters currently fed with? How are they heated?

Response: Port Manatee Terminal has two 10 million British thermal units per hour (MMBtu/hr) oil-fired heaters to provide Orimulsion heating. These heaters are constructed with a bank of cylindrical coils through which the heat transfer fluid (working fluid) is circulated and heated by the combusted heater fuel (No. 6 fuel oil, No. 2 fuel oil, or mineral oil). This heat transfer fluid is THERMINOL-55, a Monsanto product. The Material Safety Data Sheet is provided in Appendix DEP-A7 in Volume II.

DEP-B1

Comment: Please provide detailed engineering drawings showing proposed equipment modifications (e.g., addition of soot blowers, tube changes, burner nozzle changes, etc.) and any recent modifications (e.g., steam atomization).

Response: Please refer to Figure 1 for conceptual sootblower, tube surface, burner and non-pressure part alterations as well as the recent steam atomization alterations (which were installed for reasons other than Orimulsion). There will likely be some fine tuning of these arrangements during the detailed design phase of the project. Figure DEP-B1-2 shows cross sections of the existing 1940's vintage burners and a typical low NO_x burner featuring staged combustion, with a typical advanced fuel gun atomizing tip (nozzle).

CONCEPTUAL BOILER ALTERATIONS
FIG. NO. 1

KEY TO BOILER ALTERATIONS

- 1 BOILER IS DESIGNED FOR AND HAS PROVISIONS TO ADD 2 ADDITIONAL DIVISION WALLS TO EXISTING 7 DIVISION WALLS.
- 2 BOILER IS DESIGNED FOR AND HAS PROVISIONS TO ADD 10 EXTRA TUBES TO EACH OF 7 EXISTING DIVISION WALLS.
- 3 UPGRADE EXISTING PRIMARY SUPERHEATER.
- 4 INSTALL ADDITIONAL ECONOMIZER LOOPS.
- 5 UPGRADE SELECTED NON-PRESSURE PARTS, CASING AND SUPPORTS.
- 6 REPLACE 1940'S VINTAGE BURNERS WITH STATE OF THE ART LOW NOx BURNERS (REFERENCE FIGURE 2).
- 7 INSTALL ADDITIONAL SOOTBLOWERS AND RELOCATE OTHERS (SEE LEGEND).
- 8 STEAM ATOMIZATION SUPPLY LINES INSTALLED IN 1994. (NON-ORIMULSION RELATED).

BOILER SURFACE CHANGES
(CONCEPTUAL-PER UNIT)

COMPONENT DESCRIPTION	EXISTING SURFACE	NEW SURFACE	PERCENT CHANGE
SUPERHEATER	151,000 SF	179,000 SF	18.5%
REHEATER	171,000 SF	171,000 SF	0.0%
ECONOMIZER	199,000 SF	207,000 SF	4.0%
WATER WALLS	29,000 SF	29,000 SF	0.0%
TOTAL	550,000 SF	586,000 SF	6.5%

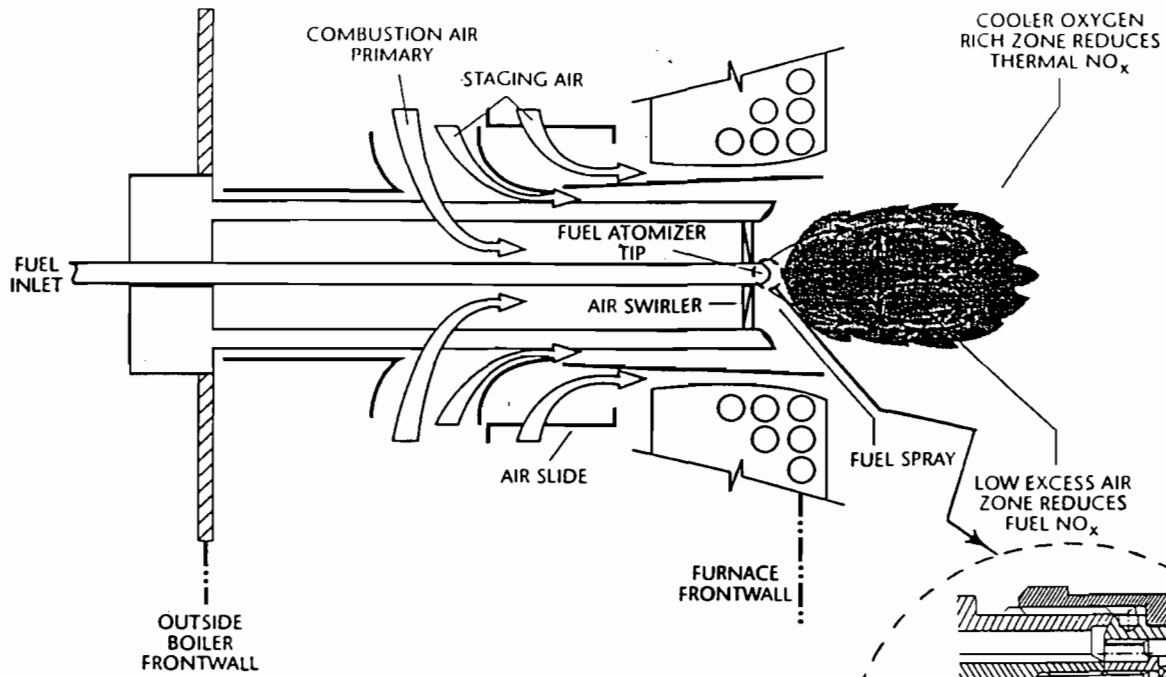
LEGEND

- EXIST. BOILER SURFACE
- NEW ECONOMIZER SURFACE
- NEW DIVISION WALL SURFACE (OUTSIDE PANELS • EACH SIDE ONLY)
- NEW DIVISION WALL SURFACE
- NEW PRI. SUPERHEATER SURFACE
- EXIST. SOOTBLOWER LOCATION
- NEW SOOTBLOWER LOCATION
- NEW COMPONENTS

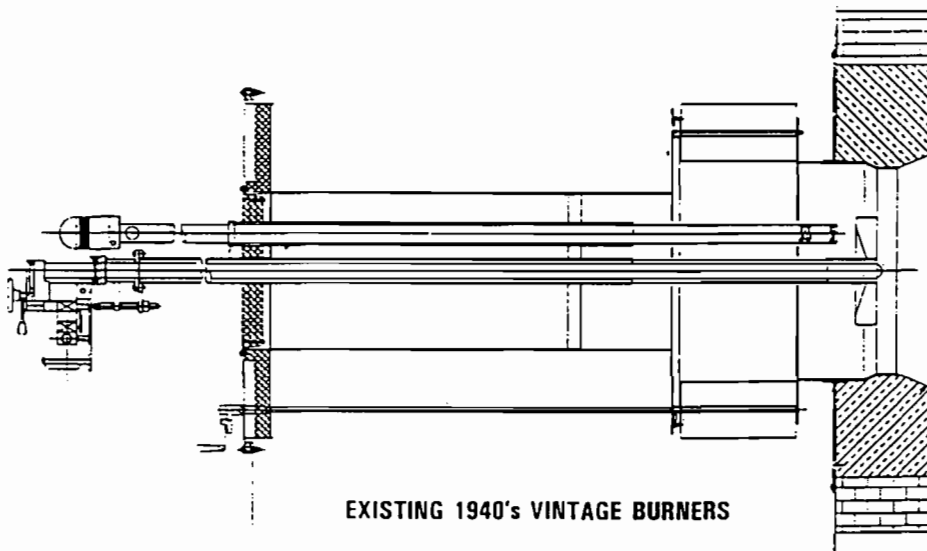
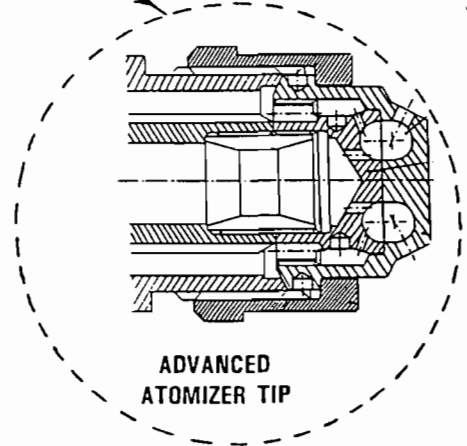
EXISTING STEAM ATOMIZATION PIPING
RECENTLY INSTALLED

DATE: 12/22/94

BOILER CROSS SECTION



TYPICAL STATE OF THE ART LOW NO_x BURNER
(Features Staged Combustion)



EXISTING 1940's VINTAGE BURNERS

DEP-B2

Comment: The Department understands that Pure Air will own and operate the emissions control system. Is Wayne C. Ondler the authorized representative for Pure Air? If the emissions control system is not operated and maintained properly, will FPL be responsible for any permit violations? If not, who will be?

Response: Florida Power & Light Company (FPL) will be the sole permittee for the new facilities to be constructed or installed as part of the Manatee Orimulsion Conversion Project. As the owner of the project, FPL will be solely responsible for compliance with the terms and conditions of the final certification and other related permits. Pure Air will provide pollution control services under the fuel supply contract that FPL has entered into with Bitor America Corp., the supplier of Orimulsion. Pure Air will design, construct, own, and operate the pollution control equipment and the byproduct handling and disposal systems as part of that contractual arrangement between FPL and Bitor America Corp. However, FPL will remain responsible for insuring that construction and operation of these facilities comply with all permit conditions for the project and, in that capacity, will be responsible for any permit violations. Wayne Ondler is a properly authorized representative and employee of FPL for purposes of seeking permits for this project. Since no permit or certification will be issued to or held by Pure Air for this project, all permit issues, questions, and compliance matters should be directed to FPL. Since Pure Air is not applying for any permits or approvals for this project, it is not necessary to have an authorized representative for Pure Air sign these documents.

DEP-B3

Comment: The application states the current actual emissions to be the **highest** emissions while firing low sulfur fuel oil (LSFO), although actual emissions are defined in Rule 62-212.200(2) (a), FAC., to be "in general, actual emissions as of a particular date shall equal the **average** rate, in tons per year, at which the source actually emitted the pollutant during a two year period which precedes the particular date and which is representative of the normal operation of the source". Using the date of application, September 30, 1994, as the "particular date" please provide the actual emissions for the two-year period preceding it. Include your calculations, revise any tables as necessary, and revise or add any modeling as necessary. For example, a review of FPL's annual operating report data, which was submitted for 1992 and 1993, indicates that the increase in particulate matter and PM10 is PSD-significant.

Response: The emission data for the two units at the Manatee Plant presented in the Site Certification Application (SCA) represent actual emission data for the two units for 1993 and 1994. As discussed in the SCA, the 1994 data were based on actual fuel consumption through July 31, 1994, and prorated to the remainder of the year. These data were considered to represent the emissions from the normal operation of the two units for a 2-year period. Although another 2-year period might also be considered, the net changes in actual emissions from the units exceed the PSD significant emission rates for only nitrogen oxides (NO_x) and carbon monoxide (CO), regardless of which 2-year period is considered representative. The net changes in actual emissions are similar even if the last 3 years are considered in the evaluation. As a result, the PSD applicability analyses and review process do not change from those presented in the SCA. The suggestion that the increases in particulate matter and PM10 emissions are PSD-significant is incorrect.

Comparisons of actual annual emissions for the existing units at the Manatee Plant were performed by evaluating fuel usage data over the last 3 years, (1992 through 1994). As requested, an evaluation was performed for September 1992 through September 1994, the 2-year period preceding the application submittal date of September 30, 1994; an evaluation has also been performed for 1993 and 1994 using actual fuel use data for August through December 1994 that was not available at the time of SCA submittal. Summaries of the fuel usage and annual capacity factors for each unit are presented in Table DEP-B3-1 for the period of September 1992 through September 1994; and Table DEP-B3-2 for the years 1993 and 1994. These tables are comparable to Table A-10 presented in the Appendix 10.1.5, Volume II of the SCA.

Comparisons of the maximum estimated annual emissions for existing low sulfur fuel oil (LSFO) and the proposed firing of Orimulsion for the selected periods are presented in Table DEP-B3-3. Emissions are shown for sulfur dioxide, particulate matter, nitrogen oxides, carbon monoxide, volatile organic compounds, and lead. Emissions of other regulated pollutants presented in the SCA (i.e., sulfuric acid mist, fluorides, mercury, beryllium, and arsenic) were added together and summarized. As shown, although there are some differences in the net emission changes for all pollutants among the evaluations, NO_x and CO continue to be the only two pollutants for which there is a PSD-significant net emission increase. For the other regulated pollutants, there is a net decrease in emissions requiring no PSD review. As shown in the footnote, the average annual capacity factors for the plant for the evaluated time periods are within 3 percent, indicating the relatively minor differences in plant operation among the time periods. It should be noted that the emission data for 1992 may not be representative of actual plant operation because of planned outages for equipment upgrades that occur about once every 15 years (the units were not operating for about 25 percent of the year). Therefore, the use of emission data for this year is not necessarily representative of annual plant emissions.

The maximum emissions estimated for the AORs are different than those presented in the Air Permit Application. The information reported in the AORs are based on average emission factors obtained from the EPA document, "Compilation of Air Pollutant Emission Factors," which is referred to as AP-42. These factors do not account for "excess emissions" which are allowed under DEP regulations (Rule 62-210.700, Excess Emissions) and were incorporated in the air permit for each unit. For example, under steady-state operating conditions, each unit has a PM emission limit of 0.1 lb/MMBtu. However, during sootblowing and load changing, each unit can emit up to 0.3 lb/MMBtu for 3 hours in a 24-hour period. As an example, PM emissions for 1992 and 1993 reported in the AORs were estimated to be 1,896 TPY. For this same-time period, by accounting for sootblowing, the PM emissions are estimated to be 2,953 TPY. Also, source specific allowable emissions can be assumed equivalent to actual emissions provided that the source specific allowable emissions are federally enforceable (see Rule 62-212.200(2)). These federally enforceable emission limiting standards are codified in Rule 62-296.405 for PM,

SO₂, and NO_x. As a result, the emission limits for these pollutants were used in estimating actual emissions when each unit is firing LSFO.

It should be noted that even using the AORs for 1992 and 1993, PSD applicability for PM/PM10 would not change. As noted above the AORs presented average annual PM/PM10 emissions of 1,896 TPY for 1992/1993. The representative actual PM/PM10 emissions when firing Orimulsion would be 1,749 TPY which is a 147 TPY decrease in PM/PM10 emissions even though sootblowing emissions were not expressly accounted for in the AORs; thus, PSD applicability would not be triggered.

No additional air modeling is required because the impacts due to firing Orimulsion or HSFO assumed the maximum emission rate for each pollutant and did not account for the difference in emissions between firing these fuels and LSFO. For example, the air quality modeling analyses for the Manatee Plant after conversion to Orimulsion that addressed compliance with the NO₂ maximum allowable PSD Class II and I increments did not include the existing Manatee Plant (see Section 7.3 and 7.4, Appendix 10.1.5, Volume II of the SCA). As a result, the increment consumption would be lower than the maximum value reported (increment consumption due to the Manatee Plant is the difference in impacts between the proposed future operations and actual existing operations).

Table DEP-B3-1. Existing Fuel Oil Usage at the FPL Manatee Plant (9/29/92 to 9/28/94)

Parameter	Values for FPL Units	
	Unit 1	Unit 2
Fuel Usage (bbls)		
9/29/92 to 9/28/94	6,639,726	7,951,034
Average	3,319,863	3,975,517
(allowable?) Maximum	11,877,957	11,877,957
Capacity Factor (a)		
9/29/92 to 9/28/94	27.95%	33.47%
Average	27.95%	33.47%
Sulfur Content:		
1992	0.989%	0.986%
1993	0.973%	0.973%
1994	0.973%	0.976%

(a) Based on maximum heat input of 8,650 MMBtu/hr per unit and fuel oil with heat content and density of 18,300 Btu/lb and 8.3 lb/gal, respectively.

Table DEP-B3-2. Existing Fuel Oil Usage at the FPL Manatee Plant (1993/1994)– Actual Fuel Use

Parameter	Values for FPL Units	
	Unit 1	Unit 2
Fuel Usage (bbls)		
1993	3,242,067	4,230,092
1994	3,508,117	4,265,164
Average	3,375,092	4,247,628
Maximum	11,877,957	11,877,957
Capacity Factor (a)		
1993	27.29%	35.61%
1994	29.53%	35.91%
Average	28.41%	35.76%
Sulfur Content:		
1993	0.973%	0.973%
1994	0.973%	0.976%

(a) Based on maximum heat input of 8,650 MMBtu/hr per unit and fuel oil with heat content and density of 18,300 Btu/lb and 8.3 lb/gal, respectively.

Table DEP-B3-3. Comparison of Maximum Estimated Annual Emissions for Existing Low Sulfur Fuel Oil (Actual) and Proposed Orimulsion Representative Actual) Firing at FPL Manatee Units 1 and 2

Pollutant	Emissions (TPY)– Existing Units	Emissions (TPY)– Orimulsion		PSD Significant Net Emission Rate (TPY)	Significant Net Emission Increase ?
	Low Sulfur Fuel Oil	2 Units	Difference (Orimulsion–LSFO)		
<u>Actual Emissions Based on 1993/1994 – presented in SCA (1)</u>					
Sulfur Dioxide	27,617	13,635	–13,982	40	No
Particulate Matter	3,159	1,749	–1,410	25	No
Particulate Matter (PM10)	2,274	1,749	–525	15	No
Nitrogen Oxides	7,581	17,491	9,910	40	Yes
Carbon Monoxide	16,026	18,948	2,922	100	Yes
Volatile Organic Compounds	126.4	117.6	–8.8	40	No
Lead	0.708	0.163	–0.544	0.6	No
Other Regulated Pollutants (2)	1,162	420	–743	(2)	No
<u>Actual Emissions Based on 1993/1994 Actual Fuel Usage (3)</u>					
Sulfur Dioxide	26,573	13,635	–12,938	40	No
Particulate Matter	3,039	1,749	–1,290	25	No
Particulate Matter (PM10)	2,188	1,749	–439	15	No
Nitrogen Oxides	7,294	17,491	10,196	40	Yes
Carbon Monoxide	15,420	18,948	3,528	100	Yes
Volatile Organic Compounds	121.7	117.6	–4.1	40	No
Lead	0.681	0.163	–0.518	0.6	No
Other Regulated Pollutants (2)	1,119	420	–699	(2)	No
<u>Actual Emissions Based on 9/92 to 9/94 (4)</u>					
Sulfur Dioxide	25,432	13,635	–11,797	40	No
Particulate Matter	2,909	1,749	–1,160	25	No
Particulate Matter (PM10)	2,094	1,749	–345	15	No
Nitrogen Oxides	6,981	17,491	10,510	40	Yes
Carbon Monoxide	14,758	18,948	4,190	100	Yes
Volatile Organic Compounds	116.4	117.6	1.2	40	No
Lead	0.652	0.163	–0.488	0.6	No
Other Regulated Pollutants (2)	1,071	420	–651	(2)	No

(1) See Table 3–3 and Table A–11, Appendix 10.1.5, Volume II, Site Certification Application; fuel usage from 1993 and 1994 (fuel usage through 7/31/94 prorated to entire year).

(2) Other regulated pollutants include sulfuric acid mist (7 TPY), fluorides (3 TPY), mercury (0.1 TPY), beryllium (0.0004 TPY), and arsenic (0 TPY) [Numbers in parentheses in this footnote are the PSD significant emission rates for each specific pollutant].

(3) Based on actual fuel usage from 1993 and 1994.

(4) Based on maximum allowable emission rates/test data from SCA and fuel usage from September 29, 1992 through September 28, 1994.

DEP-B4

Comment: Please add the following information to Table A-10 for the two-year period preceding September 30, 1994: the average fuel usage, the average operating load (%), the average capacity factor (%), and the average sulfur content, by weight.

Response: The information requested was submitted in response to Comment DEP-B3.

The average operating load (net MW basis) for the two-year period preceding September 30, 1994, was 57.3 percent; the capacity factor (net MW basis) was 33.5 percent.

DEP-B5

Comment: Please explain how FPL can justify increasing actual emissions of nitrogen oxides (NO_x) to the current allowable levels, when an increase would be contrary to the Federal goal of reducing emissions of NO_x as specified in Section 407 of Title IV in the Clean Air Act Amendments of 1990?

Response: The Manatee Orimulsion Conversion Project is completely consistent with the goal of Section 407 of the Clean Air Act Amendments of 1990. Title IV of the 1990 Amendments was enacted by Congress to address concerns about acid deposition on a national basis by requiring reductions in total annual loading of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) to the atmosphere. Under Section 407, the U.S. Environmental Protection Agency (EPA) is required to establish emission limits for coal-fired generating units reflecting the use of low NO_x burner technology. The EPA regulations promulgated pursuant to Section 407 prescribe an emission reduction to 0.45 pound per million British thermal units (lb/MMBtu) for certain types of coal-fired generating units. There is no statutory basis or authority under Section 407 for limiting NO_x emissions for fossil fuels other than coal.

Manatee Units 1 and 2 currently meet a NO_x emission limit of 0.30 lb/MMBtu, and FPL has proposed to continue to meet this emission limit after conversion to Orimulsion. The Manatee Plant units are currently allowed to emit 22,732 tons of NO_x per year under the FDEP air permits issued in 1993. The increase in actual annual NO_x emissions from the Manatee Plant after conversion to Orimulsion results solely from the projected increase in utilization of the units due to the lower cost of this fuel.

On a systemwide basis, when the Manatee Plant is fired with Orimulsion, the plant will displace power that would be otherwise generated by other power plant units within the FPL system. Typically, those units firing residual oil will be reduced in capacity by this transfer of power production. Those units, such as those associated with FPL Sanford, Cape Canaveral, Fort Myers, Port Everglades, and Turkey Point plants, have significantly higher NO_x emissions than those currently allowed for the Manatee units (i.e., greater than 0.5 lb/10⁶ Btu for other FPL units firing residual oil compared to 0.3 lb/10⁶ Btu for the Manatee Plant units). The Manatee Orimulsion Conversion Project will result in a net systemwide decrease of more than 14,000 tons per year (TPY) of NO_x emissions. This net

decrease accounts for about a 10,000 TPY increase at the Manatee Plant when firing Orimulsion and a decrease of about 24,000 TPY from other FPL units due to the power replacement from the Manatee Plant and its lower emissions. A large portion of the NO_x emission reductions will occur at FPL units located in the ozone nonattainment counties in southeast Florida.

DEP-B6

Comment: Please address potential adverse effects of your proposed large NO_x emissions increase in relation to the Hillsborough County/Pinellas County ozone nonattainment area redesignation request.

Response: The nitrogen oxide (NO_x) emissions increase from the Orimulsion Conversion Project represents a relatively low level of NO_x emissions compared to total emissions from sources that could contribute to ozone concentrations in the Hillsborough/Pinellas nonattainment area. Based on 1990 emission data presented in the State Implementation Plan redesignation request and attainment/maintenance for the Tampa Bay nonattainment area, the total NO_x emissions from all sources (stationary and mobile) within the Tampa Bay Airshed and surrounding areas amounted to approximately 659 tons per day (TPD). Complete inventories for stationary and mobile sources were developed for Hillsborough, Pinellas, Pasco, and Hernando counties. Emission inventories were also developed for major stationary sources located within 25 miles of the nonattainment area. The 25-mile zone for major stationary sources included sections of DeSoto, Hardee, Sarasota, Sumter, Polk, and Manatee counties (which includes the Manatee Plant).

The increase in NO_x emissions for the Manatee Plant firing Orimulsion is projected to be approximately 9,910 tons per year (TPY) or 27.2 TPD or about 4.1 percent of the total NO_x emissions for the Tampa Bay Airshed and surrounding areas. By comparison, there are two power plants with roughly the same generating capacity as the Manatee Plant, which, in 1990, emitted 81,000 tons of NO_x (or an average of 222 TPD) according to the emission inventory used in FDEP's SIP redesignation request.

Two Phase I Big Bend & ?

As part of the proposed revision to the State Implementation Plan to redesignate the area as attainment, the Florida DEP has recently performed air quality modeling analyses for the Hillsborough County/Pinellas County ozone (O₃) nonattainment area. The purpose of the analyses was to determine if projected increases in NO_x emissions would significantly affect potential maximum O₃ concentrations. The air quality modeling was based on using the EPA-approved Empirical Kinetics Modeling Approach (EKMA) model with emission inventories of NO_x, volatile organic compounds (VOC), and carbon monoxide (CO) developed by each county for the years 1988, 1990, and 2005. The EKMA model, which is an empirical model that can be applied to urban ozone analyses, uses the same chemical

kinetic mechanisms used in the more complex and detailed Urban Airshed Model. The DEP analyses were based on developing model input data (i.e., emissions, meteorology, ambient pollutant concentrations) for 3 days in 1988 that had high measured O₃ concentrations and then using the data to assess O₃ concentrations for 1990 and 2005. The emission inventories were projected for the subsequent years.

Although the Manatee Plant will increase annual NO_x emissions after conversion to firing Orimulsion due to increased annual operating capacity, the plant's maximum emissions over a 24-hour period will change to a lesser degree. In fact, on a short-term basis, the maximum hourly NO_x emissions are lower when the plant is firing Orimulsion than existing low sulfur fuel oil (LSFO). By incorporating the NO_x, VOC, and CO from the Manatee Plant in the EKMA model (i.e., adding the plant's emissions to the base case emissions developed by DEP), an assessment can be made to determine the relative change in potential O₃ impacts that the Manatee Plant may have on the nonattainment area. To determine the model sensitivity of emission changes to maximum O₃ formation, several modeling scenarios were performed:

1. The Manatee Plant was assumed to operate at maximum capacity using the highest short-term NO_x, VOC, and CO pollutant emissions from firing LSFO;
2. The Manatee Plant was assumed to be firing LSFO but actual operating load data were used to estimate emissions (in this case, the operating data were developed for the three days in 1988 that were the bases for DEP's analysis); and
3. The Manatee Plant was assumed to operate at maximum capacity using the highest short-term pollutant emissions when firing Orimulsion.

A summary of the air quality impacts predicted for these scenarios as well as the base case developed by DEP is as follows:

<u>Predicted Maximum 1-hour Ozone Concentrations (ppm)</u>			
<u>Scenario</u>	<u>Day</u>	<u>1990</u>	<u>2005</u>
Base Case (without Manatee)	137	0.106	0.104
	155	0.130	0.128
	175	0.088	0.086
LSFO/ Maximum Load	137	0.104	0.102
	155	0.127	0.125
	175	0.086	0.084
LSFO/ Actual Load	137	0.105	0.103
	155	0.129	0.127
	175	0.088	0.086
Orimulsion/ Maximum Load	137	0.104	0.102
	155	0.128	0.125
	175	0.086	0.084

These results indicate that the Manatee Plant marginally decreases ozone concentrations in the nonattainment area. Because the Manatee Plant has been operating on LSFO during the days of high measured O₃ concentrations, the concentrations are expected to be similar to those produced when the plant is firing Orimulsion or high sulfur fuel oil since the short-term emissions are similar or less than those when the plant is firing LSFO.

Based on the above discussion, the increase in actual NO_x emissions resulting from increased utilization of the Manatee Plant will have no adverse effects in relation to the Hillsborough County/Pinellas County ozone nonattainment area redesignation request. Furthermore, the Orimulsion Conversion Project will not cause or contribute to ozone levels in excess of the AAQS in the Hillsborough County/Pinellas County area.

DEP-B7

Comment: The Tampa Bay Estuary Study has implicated NO_x deposition as a significant contributor to the bay's nutrient problems. What effect will the increased NO_x emissions have on the nitrogen loading of Tampa Bay?

Response: In order to assess the potential impact of increased nitrogen (N) emissions from the Manatee Plant, increases in both dry and wet deposition of nitrogen oxides (NO_x) (and ultimately HNO_3) must be considered. Wet deposition increases can be inferred from predicted rates of dry deposition using wet:dry ratios developed by Baker (1991) for NO_3^- . Since HNO_3 has a higher deposition velocity than NO_x , this approach should yield somewhat higher estimates of total deposition than likely will occur. Baker (1991) estimates that the dry:wet deposition ratio for Florida is 0.96, which is essentially identical to the ratio of 1.0 used by Hinga *et al.* (1991) as their best estimate for the dry:wet deposition ratio.

This equates to total deposition increases of 1.62 and 2.01 meq/m²-yr. Using wet deposition measurements developed by the Florida Acid Deposition study (FADS), Pollman and Canfield (1991) estimated a total deposition rate of inorganic nitrogen (*i.e.*, NH_4^+ and NO_3^-) for the Tampa region equal to 46.96 meq/m²-yr. The FADS deposition estimates for Tampa, which were derived from data collected from Zephyrhills (40 km from Tampa) between 1982 and 1986.

N deposition in Tampa Bay can be segregated into two components: a super-regional component reflecting long-range transport into the local area of interest; and a local component derived from local emissions:

$$J_{\text{total}} = J_{\text{regional}} + J_{\text{local}}$$

where J_{total} is the total depositional flux of NO_3^- for the region, J_{regional} is the background or super-regional NO_3^- deposition component, and J_{local} is the local NO_3^- deposition component. Based on FADS data for Archbold Biological Station near Lake Annie in south central Florida, Pollman and Canfield (1991) have calculated a background or super-regional deposition component for NO_3^- of 20.6 meq/m²-yr. The deposition of NO_3^- in the Tampa Bay watershed, based on FADS data from Zephyrhills is 30.1 meq/m²-yr. Thus, the deposition component in Tampa arising from local sources is approximately

9.5 meq/m²-yr (30.1 - 20.6 meq/m²-yr). An estimate of the increase in magnitude of local deposition resulting from the Manatee Plant conversion is thus calculated as:

$$J_{\text{Manatee}} = (\text{Increase in NO}_x \text{ emissions} / \text{Current NO}_x \text{ emissions}) \times J_{\text{local}}$$

where J_{Manatee} is the local increase in NO₃⁻ deposition owing to the Manatee Plant conversion. The increase in local NO_x emissions attributable to the Manatee Plant conversion is *ca.* 5 percent. Thus, J_{Manatee} is 0.05 x 9.5 meq/m²-yr or 0.5 meq/m²-yr. The percentage increase of total deposition of N in the Tampa Bay region thus equals:

$$\% \text{Increase} = 100 \times J_{\text{Manatee}} / J_{\text{NO}_3 + \text{NH}_4}$$

or 1 percent. Thus, the increase in N loading to Tampa Bay resulting from the Manatee Plant conversion is most likely below 1 percent, and clearly should result in no measurable changes to the biological community of the bay.

DEP-B8

Comment: What economic benefit will FPL obtain by reducing the sulfur dioxide (SO₂) emissions and, therefore, requiring fewer Phase II allowances? Has this savings been included when calculating the total cost of the project?

Response: Florida Power & Light Company (FPL) will not receive any economic benefit for reducing the first 90 percent of the plant's sulfur dioxide (SO₂) emissions. The actual SO₂ emission rate for 1993 and 1994 at the plant was 27,617 tons per year (TPY) (see Table 3-3 in Appendix 10.1.5, Air Permit Application, in Volume II of the Site Certification Application), which is approximately equivalent to the plant's Clean Air Act (CAA) SO₂ allowance of 26,235 units (TPY). This yearly tonnage equates to approximately an SO₂ removal efficiency of approximately 90 percent when burning Orimulsion. The allowances obtained from any additional removal of SO₂, in excess of 90 percent, will go to Pure Air of Manatee. Transfer of these allowances was factored into Pure Air of Manatee's competitive bid and was, therefore, included in the project's total cost.

DEP-B9

Comment: Tables 2-6 and 2-7 do not list values for PM10 (particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns). What will be the maximum emissions of PM10 while firing Orimulsion and while firing high sulfur fuel oil (HSFO)?

Response: The particulate matter (PM) emissions listed in Tables 2-6 and 2-7 in SCA Appendix 10.1.5, Air Permit Application, for Orimulsion and high sulfur fuel oil (HSFO), respectively, are the particulate matter with an aerodynamic diameter equal to or less than 10 micrometers (PM10) emission rates. PM from each unit will be controlled through the use of two dual-chamber electrostatic precipitators (ESPs). Each ESP will have a design control efficiency of 90 percent and will achieve a PM/PM10 emission rate of 0.03 pound per million British thermal units (lb/MMBtu) when firing Orimulsion and HSFO.

DEP-B10

Comment: What are the expected maximum emissions (lbs/hour and tons/year) of the following pollutants when firing HSFO: antimony, arsenic, barium, beryllium, cadmium, chromium, copper, manganese, nickel, phosphorous, selenium, silver, vanadium, and zinc?

Response: The expected maximum emissions when firing high sulfur fuel oil (HSFO) are presented in Appendix 10.1.5, Air Permit Application, of Volume II of the Site Certification Application, Tables A-4 through A-6 and Tables A-11 through A-13 of Attachment A. For the specific pollutant identified, the expected maximum emissions for the two units are as follows:

Pollutant	Maximum Emission Rate (2 units)	
	lb/hr	TPY
Antimony	0.202	0.719
Arsenic	0.164	0.586
Barium	0.116	0.414
Beryllium	0.00726	0.0259
Cadmium	0.0272	0.0969
Chromium	0.0364	0.130
Copper	0.484	1.73
Manganese	0.045	0.161
Nickel	2.18	7.78
Phosphorus	0.101	0.360
Selenium	0.646	2.30
Silver	0.0282	0.101
Vanadium	14.7	52.6
Zinc	0.116	0.414

The maximum emission rate, lb/hr, is presented in Tables A-4 through A-6 and is based on the maximum heat input rate of 8,650 million British thermal units per hour (MMBtu/hr). The annual emission rate, tons per year (TPY), is presented in Tables A-11 through A-13 and is based on each unit operating at an 87 percent capacity with an average heat input rate of 8,100 MMBtu/hr for the entire year. It should be noted that most of these pollutants will be controlled through the use of electrostatic precipitators (ESPs) which will have a design control efficiency of 90 percent.

DEP-B11

Comment: What was the basis for the estimates of the maximum emissions of lead and fluorides while firing Orimulsion?

Response: The maximum emissions of lead and fluorides when firing Orimulsion were estimated using emission factors developed by the U.S. Environmental Protection Agency (EPA) for fuel oil combustion (for lead, *Estimating Air Toxics Emissions from Coal and Oil Combustion Sources*, EPA-450/2-89-001; for fluorides, *Emissions Assessment of Conventional Stationary Systems: Volume III, External Combustion Sources of Electricity Generation*, EPA-600/7-81-003a). The EPA emission factor for lead when firing residual oil was used since the Sanford tests found lead emissions to be undetectable (see Attachment A in Appendix 10.1.5, Air Permit Application, Volume II of the SCA). Because test results when firing Orimulsion were not available for fluoride, the EPA emission factor for residual oil was used. The emission factors for residual oil combustion are considered conservative emissions when firing Orimulsion due to the similarities in fuel characteristics between Orimulsion and residual fuel oil.

DEP-B12

Comment: In Table A-1, why is the heat input rate in the maximum annual operations column listed as 7650 MMBtu/hr instead of 8100 MMBtu/hr?

Response: The average heat input rate of 7,650 million British thermal units per hour (MMBtu/hr) represents the maximum continuous operating condition and was used as the long-term or annual average condition. The heat input rate of 8,100 MMBtu/hr represents the optimum or maximum heat input of each unit that can be achieved for short-term averaging periods. The annual heat input rate of 7,650 MMBtu/hr was used to estimate annual emissions, in tons per year, while the maximum heat input rate of 8,100 MMBtu/hr was used to estimate the maximum short-term emissions, in lb/hr.

DEP-B13

Comment: In Table A-1, how was the uncontrolled EF (emission factor) of 0.3 lb/MMBtu for particulate matter and PM10 derived? Does this include soot-blowing?

Response: The uncontrolled PM emissions rate when firing Orimulsion was based on the results of the Sanford test burn with provisions for contingency (i.e., emission rates which may be slightly higher due to some differences in the units). This uncontrolled emission rate includes soot-blowing which will occur more frequently when firing Orimulsion (see response to Comment DEP-B16).

DEP-B14

Comment: In Table A-1, the uncontrolled EF for NO_x is listed as 0.3 lb/MMBtu. Does the use of low-NO_x burner (LNB) technology, off-stoichiometric combustion/burners out of service (OSC/BOOS), overfire air (OFA), and flue gas recirculation (FGR), guarantee this level of NO_x reduction?

Response: The information in Table A-1, Appendix 10.1.5, Air Permit Application, of the SCA, presents an emission factor for nitrogen oxides (NO_x) of 0.3 pound per million British thermal units (lb/MMBtu), reflecting the use of combustion controls (see Section 4.8 of the Air Permit Application, SCA Appendix 10.1.5). This emission level is proposed as an enforceable emission limit as described in Section 4.10.3 of the Air Permit Application. An emission rate guarantee has not been obtained since a contract for a low-NO_x burner manufacturer has not been signed. A performance specification of achieving a maximum NO_x emission rate of 0.3 lb/MMBtu will be a requirement of the low-NO_x burner contract.

DEP-B15

Comment: In Table A-1, what is the basis of the carbon monoxide emission factor of 0.325 lb/MMBtu?

Response: The carbon monoxide (CO) emission factor of 0.325 pound per million British thermal units (lb/MMBtu) when firing Orimulsion reflects the expected emission rate including combustion controls to achieve a NO_x emission rate of 0.3 lb/MMBtu. The emission factor is based on the results of the large-scale single-burner rig testing performed in the United Kingdom this last summer.

DEP-B16

Comment: What percent of operating time is expected to be used for soot-blowing? Is the opacity expected to exceed 20% opacity during soot-blowing? If so, why?

Response: Sootblowing is critical for the proper operation of a fossil fired unit since it is the only means available to manage boiler tube fouling and the corresponding loss in heat transfer. Results from FPL's Sanford Orimulsion test and worldwide experience in burning Orimulsion demonstrated the importance of an optimally placed and reliable sootblowing system, not only for maintaining heat transfer efficiency but also for providing operational flexibility in controlling emissions.

The Manatee unit's sootblowing systems will be operated from approximately 70 percent to 100 percent of the Orimulsion firing time. This estimate includes all phases of sootblowing and fly ash production. Maximum fly ash production will occur during approximately 40 percent of the sootblowing cycle with the unit at high load operation. The electrostatic precipitator (ESP) is designed for these maximum fly ash production periods with a removal efficiency of 90 percent and a maximum emission limit of 0.03 lb/MMBtu.

The proposed PM/PM10 emission limit is 0.03 lb/MMBtu heat input and will be demonstrated based on an annual compliance test using EPA Method 5 or 17. There may be periods that the opacity will exceed 20 percent as a result of the effects of regional atmospheric conditions on stack plume characteristics. However, at no time will the opacities be greater than the proposed emission limits of no greater than 40 percent opacity except not more than 60 percent opacity up to 3 hours in a 24-hour period and up to four 6-minute periods of up to 100 percent except as provided in Rule 62-210.700, F.A.C., for startup, shutdown, and malfunction.

DEP-B17

Comment: What percent excess air will be used when firing Orimulsion? When firing HSFO? When firing LSFO?

Response: When firing Orimulsion, the expected excess air would range from 1.5 percent to 4.0 percent (excess O₂ concentration 0.3 to 0.8 percent). The Sanford test burn demonstrated that Orimulsion could be burned at almost stoichiometric conditions with almost complete carbon burn-out due to the unique properties of the bitumen-water emulsion. In contrast, the excess air when firing either high sulfur fuel oil (HSFO) or low sulfur fuel oil (LSFO) will range from 3.5 to 7.0 percent (excess O₂ concentration 0.7 to 1.4 percent). The above excess air levels would be measured downstream of the economizer exit.

DEP-B18

Comment: What methods are planned to be used to monitor for NO_x, SO₂, and CO₂ (carbon dioxide)?

Response: Flue gas emissions (i.e., SO₂, NO_x, and CO₂) emitted by firing Orimulsion, LSFO, and HSFO will be monitored continuously in accordance with 40 CFR Part 75. Currently, certified continuous emission monitors (CEMs) for these emissions are in place at Manatee Plant, as part of Title IV of the 1990 Clean Air Act. A copy of the CEM monitoring plan, which was submitted to EPA and DEP, is provided in Appendix DEP-B18 in Volume II.

DEP-B19

Comment: The footnote (b) on Table 3-3 states that the emissions listed are based on burning Orimulsion at 100 percent operating load and 87 percent annual capacity factor. How was the 87% annual capacity factor arrived at? Why do these projected PM and PM10 emissions based on an 87% annual capacity factor not correspond to the annual emissions listed in Table A-1 which are based on an 100% annual capacity factor?

Response: The 87 percent annual capacity factor is the projected "representative actual" annual operation of the Manatee Plant when firing Orimulsion or high sulfur fuel oil (HSFO) in the future and is used to estimate future annual emissions. For an electric utility steam generating unit that is undergoing prevention of significant deterioration (PSD) review, the "actual emissions" of the unit are defined to be the "representative actual annual emissions" following a physical or operational change, subject to future reporting of information on the actual emissions over a 5-year period from the date the unit resumes regular operation (a longer period, not to exceed 10 years, may be required by the Department if it is determined that such a period is more representative of the normal post-change operations of the unit). See Rule 62-212.200(2)(d), F.A.C. and 40 CFR 52.21(b)(33).

The projected net change in particulate matter (PM) and particulate matter with an aerodynamic diameter equal to or less than 10 micrometers (PM10) emissions [tons per year (TPY)] presented in Table 3-3 of the Air Permit Application (Appendix 10.1.5 in the SCA) for the plant's conversion to burn Orimulsion is shown incorrectly and should be switched (see attached revised Table 3-3). The projected PM and PM10 emissions based on an 87 percent annual capacity factor correspond to the representative actual annual emissions presented in Table A-11 (in the Air Permit Application). The annual emissions listed in Table A-1 (in the Air Permit Application) are based on a 100 percent annual capacity which does not represent the capacity of the plant operation expected on an annual average.

The 87 percent capacity factor was derived by taking into account forced outages, maintenance outages, and planned outages as needed to maintain a reliable and efficient unit.

<u>Estimated Projections</u>	<u>Unit 1</u>	<u>Unit 2</u>
Forced Outage Factor	1.81%	2.00%
Maintenance Outage Factor	4.21%	4.18%
Planned Outage Factor	6.27%	6.27%
Equivalent Availability Factor	87.7%	87.5%

87 percent was assumed maximum probable capacity factor when considering load changing between maintenance and forced outage periods.

Table 3-3. Expected Net Change in Emissions After Conversion to Burn Orimulsion Compared to the PSD Significant Emission Rates (Revised 1/13/95)

Pollutant	Actual Annual Emissions ^a	Emissions (TPY)		
		Projected Emissions After Conversion ^b	Significant Net Emission Rate	Significant Net Emission Increase?
Sulfur Dioxide	27,617	-13,982	40	No
Particulate Matter [PM(TSP)]	1896 37159	1749 -1,410 -147	25	No
Particulate Matter (PM10)	2,274	-525	15	No
Nitrogen Oxides	7,581	9,910	40	Yes
Carbon Monoxide	16,026	2,922	100	Yes
Volatile Organic Compounds	126	-8.82	40	No
Lead	0.70	-0.54	0.6	No
Sulfuric Acid Mist	1,162	-581.4	7	No
Total Fluorides	0.16	-0.12	3	No
Total Reduced Sulfur	NEG	NEG	10	No
Reduced Sulfur Compounds	NEG	NEG	10	No
Hydrogen Sulfide	NEG	NEG	10	No
Asbestos	NEG	NEG	0.007	No
Beryllium	0.11	-0.11	0.0004	No
Mercury	0.081	-0.075	0.1	No
Vinyl Chloride	NEG	NEG	1	No
Benzene	NEG	NEG	0	No
Radionuclides	NEG	NEG	0	No
Inorganic Arsenic	0.48	-0.41	0	No

Note: NEG = Negligible.

^a Based on actual emissions for Manatee Units 1 and 2 estimated using 1993 and 1994 fuel data. See Attachment A for the details of the bases for the emission calculations.^b Emission reduction due to installation of ESP and FGD system; increase in NO_x and CO a result of only an increase in capacity factor not in emission rate. Emissions are based on Manatee Units 1 and 2 burning Orimulsion at 100 percent operating load and 87 percent annual capacity factor.

DEP-C1

Comment: It is the Department's responsibility to ensure that levels of air quality are achieved and maintained as will protect human health and safety. From the information submitted, the additive cancer risk of the metals emitted is 0.94×10^{-6} . This risk level requires further analysis of the emissions, including the organic hazardous air pollutants. Please prepare a multi-pathway health risk assessment.

Response: Based on guidance received in a discussion with Ms. Cindy Phillips and Mr. John Glunn of the Florida Department of Environmental Protection (FDEP) Division of Air held on December 12, 1994, a comparative risk assessment was performed to evaluate and compare the potential additive cancer risk to humans exposed to potential air emissions of metals and organic hazardous air pollutants from the Manatee Plant firing low sulfur fuel oil (LSFO) and Orimulsion. Because the Manatee Plant is an existing facility that is currently authorized to burn LSFO, a comparative risk analysis was considered to be appropriate by FDEP staff. The potential cancer risks were also determined for individuals exposed to the air concentration threshold limits specified by Florida's No-Threat Levels (NTLs) for Air Toxics [see Section 3.4, Appendix 10.1.5, Air Permit Application, Volume II of the Site Certification Application (SCA)]. The NTLs are used to determine whether any emission of a hazardous or toxic air pollutant could potentially pose a possible health risk to the public. If the maximum predicted concentration for any hazardous pollutant is less than the corresponding NTL, that emission is considered not to pose a significant risk. It should be noted that NTLs are now referred to as air reference concentrations.

Four steps are involved in the risk assessment: identification of air pollutants of concern, exposure assessment, toxicity assessment, and risk characterization. For this analysis, risk ranges were developed for an individual with "typical" exposure conditions (representing 50th percentile) and for a reasonable maximum exposed (RME) individual representing upper-bound exposure conditions (90th to 95th percentiles). The risk estimate based on Florida's NTL does not include polycyclic organic matter (POM) since Florida has not established an NTL for POM.

1. Air Pollutants of Concern

Air pollutants of concern were selected from the list of metals and organic hazardous air pollutants expected to be emitted during the combustion of Orimulsion or fuel oil.

The metals that are expected to be emitted by the plant and that are considered carcinogenic by the U.S. Environmental Protection Agency (EPA) include arsenic, beryllium, cadmium, chromium, and nickel. The organic hazardous air pollutants include a variety of organic compounds that are identified as POM. The pollutant concentrations for the Manatee Plant were estimated using the Industrial Source Complex Short-Term (ISCST2) model which is the standard air model recommended for use and accepted by the Florida Department of Environmental Protection (FDEP) for addressing air quality impacts due to emission sources, such as the stacks at the Manatee Plant. The annual average concentrations were used to address the potential long-term exposure of an individual. The maximum annual average concentrations predicted for the plant firing Orimulsion are presented in Table 7-16, Appendix 10.1.5, Volume II of the SCA; concentrations predicted with firing fuel oil are presented in Table 7-16a,² which is included in this response. Because POM emission factors were not available for Orimulsion, the emission factors for fuel oil firing were used in estimating POM emissions when firing Orimulsion.

2. Exposure Assessment

The most direct exposure pathway for an individual in the risk assessment is by inhalation of emitted air pollutants by persons living near the plant. This pathway is expected to produce the greatest potential exposure to an individual. As a result, this is the only pathway included in this risk assessment. Exposure through inhalation of air pollutants is calculated according to the following equation:

$$\text{Intake (mg/kg/day)} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT}$$

where: CA = air pollutant concentration (milligrams per cubic meter, mg/m³);

IR = inhalation rate = 0.83 cubic meter per hour (m³/hr);

ET = exposure time = 16 hours/day for typical exposed individual,
24 hours/day for RME individual;

EF = exposure frequency = 350 days/year;

ED = exposure duration = 9 years for typical exposed individual, 30 years
for RME individual;

BW = body weight = 70 kilograms (kg); and

AT = averaging time = 25,550 days (70 years).

The inhalation rate of 0.83 m³/hr (20 m³/day) is applied for both typical exposed and RME individuals. Both scenarios assume exposure to air emissions on a daily basis. However, the typical exposure assumes a person is away from home 8 hours a day (i.e., 16 hours of exposure per day), whereas the RME assumes exposure 24 hours per day. An exposure frequency of 350 days per year is applied assuming the typical person takes 15 days of vacation per year (EPA, 1991). Exposure duration for each scenario is based on national statistics for length of time at one residence. The typical length of time spent at one residence is 9 years, and the 90th percentile for time spent at one residence is 30 years (EPA, 1989).

3. Toxicity Assessment

Health risk estimates in this report are based primarily on carcinogenic slope factors (or potency factor) as reported by the Integrated Risk Information (IRIS, on-line database), the EPA Health Effects Assessment Summary Tables (EPA, 1990), and the EPA Superfund Public Health Evaluation Manual (EPA, 1986). Inhalation cancer slope factors and EPA weight of evidence are presented in Table DEP-C1-1. The cancer slope factors, developed by EPA's Carcinogen Assessment Group (CAG), are used in this assessment to quantitatively estimate the excess lifetime cancer risks associated with various levels of exposure to potential human carcinogens. The word "excess" means that the risk from such exposure is in addition to the risk of cancer from other sources. EPA notes that actual cancer risks are unlikely to be higher than those estimated based on these factors but could be considerably lower. The cancer slope factor is a constant based on the assumption of a linear dose-response at low levels of exposure. The slope factor represents the probability, at the 95th percent confidence level, that an individual will develop cancer after continuous lifetime exposure to a dose of 1 mg/kg/day of the pollutant. EPA estimates of carcinogenic potency are intentionally conservative to protect public health. Thus, the actual risk of developing cancer is less than that calculated using the slope factor. The slope factor, expressed in units of (mg/kg/day)⁻¹, is multiplied by an individual's lifetime

intake of a pollutant (in mg/kg/day) to yield the upper-bound excess lifetime cancer risk associated with exposure at that dose.

4. Risk Characterization

Potential additive cancer risks to individuals via inhalation exposure are presented in Table DEP-C1-2 for Orimulsion, and in Table DEP-C1-3 for fuel oil. The potential cancer risks through inhalation of air concentrations at the Florida NTL are estimated in Table DEP-C1-4. Comparison of risk estimates for the three scenarios are presented in Table DEP-C1-5. The risk estimates for POM are extremely conservative since all POMs are assumed to be carcinogenic. As shown in Table DEP-C1-5, the theoretical excess cancer risk levels estimated for individuals living in the immediate vicinity of the plant are less when the plant is firing Orimulsion than fuel oil. For both Orimulsion and fuel oil scenarios, the excess cancer risk levels are much lower than the risk associated with the Florida NTL. For both fuels, the potential additive cancer risk are much lower than 10^{-6} (i.e., one in a 1 million chance that a chronically exposed individual may develop cancer). This value is used by EPA and other regulatory agencies as a guideline or target level for determining acceptable risks for environmentally related pollutant exposures. The 10^{-6} cancer risk level is considered by EPA and other regulatory agencies to be an acceptable level of exposure to individual as well as multiple pollutants. Pollutants with a cancer risk level of 10^{-6} or less are considered safe to human health. Even for a maximum exposed (RME) individual in this analysis, the excess cancer risks for lifetime exposure to the Manatee Plant firing Orimulsion or fuel oil are not expected to exceed a level of 10^{-6} .

REFERENCES:

- U.S. Environmental Protection Agency (EPA). 1986. Superfund Public Health Evaluation Manual. OSWER Directive 9285.4-1. EPA/540/1-86/060.
- U.S. Environmental Protection Agency (EPA). 1989. Risk Assessment Guidance for Superfund, Volume 1. Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

- U.S. Environmental Protection Agency (EPA). 1990. Health Effects Assessment Summary Tables (HEAST). Fourth Quarter, FY-1990. Environmental Criteria and Assessment Office, Cincinnati, OH.
- U.S. Environmental Protection Agency (EPA). 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.
- U.S. Environmental Protection Agency (EPA). 1992. Integrated Risk Information System (IRIS). On-line database.

Table DEP-C1-1. Summary of Carcinogenic Slope Factors for Air Pollutants of Concern

Chemical	EPA Weight of Evidence	Inhalation Slope Factor (mg/kg/day)⁻¹
Arsenic	A	5.0E+01
Beryllium	B2	8.4E+00
Cadmium	B1	6.3E+00
Chromium VI	A	4.2E+01
Nickel	A	1.2E+00
Polycyclic Organic Matter	B2	6.1E+00

Note: EPA Weight of Evidence:

- A** = Human Carcinogen (sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer).
- B1** = Probable Human Carcinogen (limited evidence of carcinogenicity in humans from epidemiologic studies).
- B2** = Probable Human Carcinogen (sufficient evidence of carcinogenicity in animals, inadequate evidence of carcinogenicity in humans).

Table DEP-C1-2. Potential Carcinogenic Risks through Inhalation-- Manatee Plant Firing Orimulsion

Typical Exposure

Metal	Concentration (mg/m ³)	Typical Intake (mg/kg/day)	Slope Factor 1/(mg/kg/day)	Cancer Risk Typical Exposure
Arsenic	1.18E-08	2.76E-10	5.00E+01	1.38E-08
Beryllium	5.92E-11	1.38E-12	8.40E+00	1.16E-11
Cadmium	5.48E-09	1.28E-10	6.30E+00	8.07E-10
Chromium	3.24E-09	7.58E-11	4.20E+01	3.18E-09
Nickel	3.52E-06	8.23E-08	1.20E+00	9.88E-08
POM	7.04E-08	1.65E-09	6.10E+00	1.00E-08
Total Cancer Risk				1.27E-07

Reasonable Maximum Exposure (RME)

Metal	Concentration (mg/m ³)	RME Intake (mg/kg/day)	Slope Factor 1/(mg/kg/day)	Cancer Risk RME
Arsenic	1.18E-08	1.38E-09	5.00E+01	6.90E-08
Beryllium	5.92E-11	6.92E-12	8.40E+00	5.82E-11
Cadmium	5.48E-09	6.41E-10	6.30E+00	4.04E-09
Chromium	3.24E-09	3.79E-10	4.20E+01	1.59E-08
Nickel	3.52E-06	4.12E-07	1.20E+00	4.94E-07
POM	7.04E-08	8.23E-09	6.10E+00	5.02E-08
Total Cancer Risk				6.33E-07

Table DEP-C1-3. Potential Carcinogenic Risks through Inhalation-- Manatee Plant Firing Low Sulfur Fuel Oil

Typical Exposure

Metal	Concentration (mg/m ³)	Typical Intake (mg/kg/day)	Slope Factor 1/(mg/kg/day)	Cancer Risk Typical Exposure
Arsenic	7.51E-08	1.76E-09	5.00E+01	8.78E-08
Beryllium	1.66E-08	3.88E-10	8.40E+00	3.26E-09
Cadmium	6.21E-08	1.45E-09	6.30E+00	9.15E-09
Chromium	1.42E-08	3.32E-10	4.20E+01	1.39E-08
Nickel	4.98E-06	1.16E-07	1.20E+00	1.40E-07
POM	3.32E-08	7.77E-10	6.10E+00	4.74E-09
Total Cancer Risk				2.59E-07

Reasonable Maximum Exposure (RME)

Metal	Concentration (mg/m ³)	RME Intake (mg/kg/day)	Slope Factor 1/(mg/kg/day)	Cancer Risk RME
Arsenic	7.51E-08	8.78E-09	5.00E+01	4.39E-07
Beryllium	1.66E-08	1.94E-09	8.40E+00	1.63E-08
Cadmium	6.21E-08	7.26E-09	6.30E+00	4.58E-08
Chromium	1.42E-08	1.66E-09	4.20E+01	6.97E-08
Nickel	4.98E-06	5.82E-07	1.20E+00	6.99E-07
POM	3.32E-08	3.88E-09	6.10E+00	2.37E-08
Total Cancer Risk				1.29E-06

Table DEP-C1-4. Potential Carcinogenic Risks through Inhalation -- Based on Florida's No Threat Levels for Air Toxics

Typical Exposure

Metal	Concentration (mg/m ³)	Typical Intake (mg/kg/day)	Slope Factor 1/(mg/kg/day)	Cancer Risk Typical Exposure
Arsenic	2.30E-07	5.38E-09	5.00E+01	2.69E-07
Beryllium	4.20E-07	9.82E-09	8.40E+00	8.25E-08
Cadmium	5.60E-07	1.31E-08	6.30E+00	8.25E-08
Chromium	8.30E-08	1.94E-09	4.20E+01	8.15E-08
Nickel	4.20E-06	9.82E-08	1.20E+00	1.18E-07
Total Cancer Risk				6.33E-07

Reasonable Maximum Exposure (RME)

Metal	Concentration (mg/m ³)	RME Intake (mg/kg/day)	Slope Factor 1/(mg/kg/day)	Cancer Risk RME
Arsenic	2.30E-07	2.69E-08	5.00E+01	1.34E-06
Beryllium	4.20E-07	4.91E-08	8.40E+00	4.13E-07
Cadmium	5.60E-07	6.55E-08	6.30E+00	4.13E-07
Chromium	8.30E-08	9.71E-09	4.20E+01	4.08E-07
Nickel	4.20E-06	4.91E-07	1.20E+00	5.89E-07
Total Cancer Risk				3.17E-06

Table DEP-C1-5. Summary of Potential Carcinogenic Risks due to the Manatee Plant Firing Orimulsion and Low Sulfur Fuel Oil

Scenario	Potential Cancer Risk Typical Exposure	RME
Orimulsion	1.27E-07	6.33E-07
Fuel Oil	2.59E-07	1.29E-06
Florida NTL	6.33E-07	3.17E-06

Note: Typical exposure refers to an individual exposed to typical conditions represented by 50th percentile exposure data. RME refers to a reasonable maximum exposed individual represented by upper-bound exposure conditions (90th to 95th percentile).

The risk estimate for Florida NTL does not include POM since Florida has not established an NTL for POM.

DEP-D1

Comment: What model of Mitsubishi Electrostatic Precipitator (ESP) will be used? Which type of discharge electrode will be used? Is the unit insulated?

Response: The Mitsubishi ESP will be a dry type precipitator housed in a rectangular casing. There will be two dual chambers per each 800-MW boiler unit. The question requested "which model ESP will be used," and the response is each unit is custom designed, engineered, manufactured and constructed for individual specific applications, thus there is no numerical model designation such as a #3000 GT Mitsubishi unit. The design data is supplied in paragraph 3.4.4 of Volume I, Chapter 3 of the SCA. The specific type of discharge electrode will be the Mitsubishi exclusive long spike rigid frame electrode known as the DF-15 configuration. This type of electrode is very well suited for Orimulsion fly ash service and is in current successful commercial operation on Kashima Kita Power Station's (581 tph steam rate) and Mitsubishi Chemicals Mizushima (453 tph steam rate) Orimulsion fired boilers.

The precipitators are thermally insulated to protect personnel and prevent condensation.

DEP-D2

Comment: What will be the net plate area (in square feet) per ESP? Are the design parameters, presented on page 4-5, specifications for a single chamber of a dual-chamber ESP, or for each single dual-chamber ESP, or for each set of two dual-chamber ESPs?

Response: Paragraph 3.4.2.1 of Volume I, Chapter 3 of the Site Certification Application describes the general features of the ESP. Further, paragraph 3.4.4 of Vol. I, Chapter 3 describes the design data in ranges for ranges of operation. This question requests "net plate areas per ESP"; the design data of paragraph 3.4.4 describes this same element as "collecting electrode area of 675,000 - 825,000 ft²," which is the total net area per each 800 MW boiler unit. There are four ESP chambers for each of the two boiler units. These chambers are arranged in pairs, with a common wall between chambers. This total area is divided equally between the two dual chamber ESP's.

The basis for other design parameters is as follows:

Particle Removal:	overall for each boiler unit, independently.
Gas Velocity:	average within each chamber
Specific Collection Area:	for each chamber
Collecting Electrode Spacing:	general design parameter
Total Number of Gas Passages:	per boiler unit

DEP-D3

Comment: Will any chemical additives be used to change the fly-ash resistivity? If so, what are they, and in what amounts will they be used?

Response: No chemical additives are planned to be used to change the Orimulsion fly ash resistivity. The basis of the ESP design is Orimulsion ash at operating temperature ranges with no improvement in resistivity from chemical additives. This basis is consistent with the overall conservative ESP design philosophy of 90 percent particulate removal.

DEP-D4

Comment: What is the power consumption of each dual-chamber ESP?

Response: Power consumption will be evenly distributed between each dual chamber ESP during normal operation. The amount is expected to be less than 0.25 percent of the total output of the plant.

DEP-D5

Comment: The "Range of Particles Size Collected" is listed as "95% > 10 microns". Does this mean that 95% of the particles collected are > 10 microns, or does this mean that 95% of the particles > 10 microns are collected?

Response: The ESP is capable of collecting and removing from the flue gas stream 95 percent of all airborne particles greater than 10 micron aerodynamic diameter.

However, the actual particle size distribution of Orimulsion fly ash particulate entering the ESP inlet is such that essentially all of the particles are less than 10 microns. Since the ESP will remove 90 percent of all the particulates entering it, 90 percent of the particles less than 10 microns will be collected.

DEP-D6

Comment: How was a 90% efficiency selected? Why not 95%? Is this an overall particulate matter removal efficiency which includes PM10? What is the removal efficiency for PM10? How does this correlate to the assumption that 71% of the particulate matter emissions will be PM10?

Response: The 90 percent efficiency reflects the general removal efficiency expected to achieve an emission rate 0.03 lb/MMBtu and the expected uncontrolled emission rate for Orimulsion of 0.3 lb/MMBtu. The uncontrolled emission rate was determined during the Sanford test burn. An emission rate of 0.03 lb/MMBtu was selected as the design criterion since this emission level reflects the particulate emission limit equivalent to New Source Performance Standards (NSPS) for "new" fossil fuel fired steam electric generators. The NSPS emission limit was selected as the criterion for the Manatee Conversion Project even though NSPS limits would not apply.

The 90 percent efficiency has been demonstrated with electrostatic precipitator (ESP) performance on Orimulsion fly ash on a 100 MW unit in Japan. Based on this knowledge, 90 percent is a reasonable design basis. The ESP is designed for removal of 90 percent of all Orimulsion fly ash entering the ESP.

An emission criterion of less than 0.03 lb/MMBtu was not considered appropriate, since Orimulsion has much lower ash concentrations (i.e., maximum of 0.15 percent by weight) than other fuels where the NSPS criterion may apply (e.g., coals with ash contents of 15 percent or higher). In addition, the relatively low uncontrolled emission rate coupled with small particle size when firing Orimulsion make particulate removal more difficult at higher removal efficiencies.

The overall particulate removal of 90 percent includes PM10, since essentially all of the uncontrolled PM emissions when firing Orimulsion are less than 10 micrometers.

Therefore, the removal efficiency of PM10 is expected to be 90 percent.

The AP-42 emission factor of 71 percent of particulate matter as PM10 emissions was used for oil firing. It was assumed that all uncontrolled emissions when firing Orimulsion were PM10. This assumption reflects the tests results observed from the Sanford test burn.

DEP-D7

Comment: How will equipment malfunctions be detected, and what will be the average response time needed for any particulate matter exceedances to be stopped?

Response: Pure Air, the ESP equipment supplier will install opacity monitors on the outlet of each ESP chamber. These opacity monitors will be are used for process control purposes only, to detect the relative level of ESP performance, and not for compliance measurements. Response times will vary depending upon the cause of the malfunction; average response times are expected to be within the allowances provided in Florida DEP regulations, F.A.C. 62-210.700 for startup, shutdown, malfunctions, or fuel switching. Additional measures up to and including shutdown of the boiler unit will be taken if excess emissions are expected to extend beyond such time periods.

DEP-D8

Comment: Please submit a copy of the proposed maintenance program for the ESP.

Response: Pure Air will prepare a maintenance program as a part of precommissioning activities. A maintenance program is an ongoing dynamic process that is refined periodically over the life of the project. Such a program will include the follow elements: lubrication schedules, electrode alignment, plate and electrode cleaning, plate warpage detection, electrical clearance maintenance, rapper inspections, TR set checks, automatic voltage control maintenance, hopper level instrumentation, and electrical heat tracing inspections.

DEP-E1

Comment: The Pure Air Advanced Flue Gas Desulfurization System (FGD) has been commercially proven for units up to 600 MW. Is a 95% efficiency guaranteed for a 800 MW unit (nameplate rating of 863 MW)?

Response: Boiler MW ratings can be used as a relative indication of Flue Gas Desulfurization (FGD) system size. However, comparison on this basis can be misleading. Differences in excess air, fuel heating value and moisture, and boiler and turbine efficiency can lead to large differences in the amount of flue gas generated by power plants with the same electrical output.

A more accurate measure of the capability of an FGD system is the inlet flue gas flow. The technology used by Pure Air has been proven in systems with up to 2,300,000 Actual cubic feet per minute (Acfm) inlet gas flow. In addition, systems using the Pure Air technology have been designed for an inlet gas flow of up to 3,400,000 Acfm. For comparison, the FPL system has a design inlet gas flow of 2,580,000 Acfm. With over 100 units in operation throughout the world, Pure Air is confident that there will be no problems with this small scale-up from commercially proven experience.

In addition to the above, it should be noted that the Pure Air technology has a proven track record of providing up to 95 percent SO₂ removal in systems with inlet SO₂ concentrations of 800 to 3,700 ppm. The FPL project has an inlet SO₂ concentration of 2,340 ppm, well within the demonstrated range.

The proposed SO₂ emission limit is 0.234 lb/MMBtu. This corresponds to approximately 95 percent SO₂ removal efficiency at design conditions on an annual basis. Actual SO₂ removal efficiency will vary depending on operating conditions. However, at all times the SO₂ emissions will be less than or equal to 0.234 lb/MMBtu as monitored by CEMs.

DEP-E2

Comment: The efficiency for FGD is listed as 95% for the contaminants particulate matter/sulfur dioxide (PM/SO₂). Does this mean that 95% of the particulate matter entering the FGD (after leaving the ESP) is removed, or is an additional amount equal to 5% of the original exhaust stream particulate matter removed in the ESP, or does the 95% PM efficiency denote the reduction in acid mist carry-over?

Response: This is a typographical error. The claim of 95 percent particulate matter removal in the FGD as stated in Appendix 10.1.5, Air Permit Application, Section III, Part D of DER Form 17-1.202(1)/13366C8/APS (page 5 of 12) is incorrect. Although a small amount of particulate removal in the FGD is expected, it is not necessary to achieve 0.03 lb/MMBtu.

DEP-E3

Comment: What will be the operating range (maximum and minimum) pressure drop across the scrubber?

Response: The pressure drop through the scrubber will range from 0 to 10 inches. It should be noted that the Pure Air scrubber differs from other wet scrubbers in several aspects that affect pressure drop. The gas and slurry both flow downward through the tower, which reduces pressure drop. The mist eliminators are mounted such that flow through them is horizontal, rather than vertical, thus high differential pressure will not "hold up" liquid on the mist eliminator slats, which leads to fouling (and carryover) in countercurrent designs. As with other systems, the pressure drop across the scrubber will vary based upon mass air flow through the system, however, SO₂ removal efficiency is not directly related to pressure drop.

DEP-E4

Comment: From Table A-15, it appears that the annual consumption of limestone will be 550,000 tons. What amount is used for FGD and what amount is used for flyash stabilization?

Response: Approximately, 540,000 tons per year of limestone is used in the FGD and approximately 10,000 tons per year would be used if fly ash were to be stabilized for onsite disposal.

DEP-E5

Comment: What additives will be used and what air emissions will result from their use?

Response: The FGD system was designed without the need for SO₂ removal enhancement or scale reduction additives such as dibasic acid or sodium thiosulfate. Therefore, there will be no air emissions from FGD additives.

DEP-E6

Comment: How will equipment malfunctions be detected, and what will be the average response time needed for any emissions exceedances to be stopped?

Response: The FGD will be monitored with a digital control system which is connected to field sensors. This system will monitor critical flows, temperatures, pressures, as well as inlet and outlet SO₂ concentrations by continuous emission monitors (CEM). This digital control system can detect failures of critical individual components in the FGD system such that corrective measures can be taken before SO₂ removal efficiency is compromised. Thus, emission exceedances are not expected, except as authorized by FDEP rules for startup, shutdown, malfunctions (Chapter 62-210.700, F.A.C.).

DEP-F1

Comment: What is the social impact of the proposed Best Available Control Technology (BACT)?

Response: The basis for this question is not clear since the Florida Department of Environmental Protection (FDEP) best available control technology (BACT) rule requires consideration of the "energy, environmental, and economic impacts, and other costs" of potential control technologies. See definition of "Best Available Control Technology" at Chapter 62-212.200(16), F.A.C. These factors are addressed in detail in Section 4.0 of the Air Permit Application [Appendix 10.1.5 of the Site Certification Application (SCA)].

The nitrogen oxide (NO_x) control technology proposed by Florida Power & Light Company (FPL) (low-NO_x burners and overfire air) will allow the Manatee Plant units to continue to meet a NO_x emission limit of 0.30 pounds per million British thermal units (lb/MMBtu). With this emission rate, the maximum predicted impact of the Manatee Plant will be only 3.1 percent of the ambient air quality standard for NO₂ established to protect public health and welfare. Moreover, the proposed NO_x control technology represents true "pollution prevention" because it will minimize NO_x emissions in the combustion process and does not involve "backend cleanup." In contrast, use of selective catalytic reduction (SCR) would require transportation (e.g., increased truck traffic), handling, and storage of large amounts of ammonia and disposal of metallic catalyst. The hazardous nature of these materials could present threats to public health or welfare of Manatee County's residents. To the extent that these factors are considered to represent "social impacts," FPL's proposed NO_x control technology would minimize such impacts better than SCR.

DEP-F2

Comment: How many cost estimates were received for each of the pollution control devices reviewed?

Response: The cost estimate for selective catalytic reduction (SCR) was developed from three vendor budget quotations for applications using a medium sulfur coal of 2.8 percent. These quotations were used since the combustion gas characteristics are similar and there is limited experience with Orimulsion. These vendor budget estimates were used to develop the capital cost of the SCR Associated Equipment, Vendor Installation, and SCR Catalyst (Materials and Labor) in Table 4-8 of Appendix 10.1.5, Air Permit Application, Volume II of the Site Certification Application (SCA). The vendor supplied cost per unit was estimated at \$24,000,000 including engineering costs. Subsequent to the filing of the SCA, a budget quotation for an SCR system was obtained from Mitsubishi Heavy Industries America, Inc. (MHIA). The capital cost per unit (i.e., budget price) provided by MHIA was \$26,000,000, which is consistent with that provided in the Air Permit Application. Please note that the MHIA budget quotation was based on the flue gas characteristics developed for the Manatee units.

DEP-F3

Comment: What is the contracted price of Orimulsion per gallon? What is the price of HSFO per gallon? What is the price of LSFO per gallon?

Response: Fuel prices are based on the heat content of the particular fuel and not on the volumetric measurement (i.e. gallons or barrels).

The price of Orimulsion delivered to FPL is equivalent to the price of coal in dollars per million British Thermal Units (\$/MMBtu). In 1994 FPL's average cost of coal is approximately \$1.56/MMBtu.

The price of 3.0 percent sulfur residual fuel oil at the U.S. Gulf Coast on December 15, 1994 was approximately \$2.02/MMBtu. The price of 1.0 percent sulfur residual fuel oil at the U.S. gulf coast on December 15, 1994 was approximately \$2.22/MMBtu.

DEP-F4

Comment: In Table 4-8, what does the superscript "j" refer to at the end of the word "quotations"?

Response: The "j" on page 2 of 2 of Table 4-8 in Appendix 10.1.5, Air Permit Application, of the Site Certification Application is a typographical error and should be deleted.

DEP-G1

Comment: What are the makes and model numbers of the particulate matter control devices?

Response: The Flyash Handling Dust Collectors will conform to a particulate emission limit of 0.003 grains per ACF of air. There are numerous experienced potential manufacturers for the particulate matter control devices. Among those to be considered are the following:

Airtrol, St. Louis, Missouri

Johnson March Systems, Ivyland, Pennsylvania

American Air Filter (AAF), Louisville, Kentucky

Sly, Inc., Cleveland, Ohio

Air Cure, Inc., Minneapolis, Minnesota

Amerex, Inc., Woodstock, Georgia

The particular manufacturer will be determined after specification, preparation and issuance of inquiry packages to bidders, and evaluation of proposals. Models vary among the various manufacturers and will be determined later. Bid packages will be issued after the certification and permitting of the project.

DEP-G2

Comment: What are the process rates of the handling equipment?

Response: The nominal rate of fly ash production is anticipated to be 1.5 to 6 tons per hour per unit. However, the design rate for the handling/conveying equipment will be at the same rate plus a conservative design margin. The fly ash from each unit will be individually conveyed to the fly ash silo.

DEP-G3

Comment: Please submit engineering drawings showing the configuration of the handling and processing equipment and the bag filters.

Response: Configuration (general arrangement) drawings of the fly ash handling system showing this level of detail have not been prepared at this early stage of the project. The detail drawings will conform to the conceptual design presented in Sections 3.4.1 and 3.4.2.4 of the SCA.

FPL proposes that the engineering drawings of the handling and processing equipment and the bag filter be submitted pursuant to detailed conditions of certification. These final drawings and information will also not be prepared until later during final project design. FPL will submit such information to the Department for its final review for consistency with the final conditions of certification.

DEP-G4

Comment: Please provide more detailed information on the agglomeration and curing processes. Are any chemical additives used? If so, what, and in what quantities? Is heat applied during the curing process? If so, how is the heat supplied?

Response: The Power Chip process involves physical compression of the gypsum/fly ash mixture and heat curing of the resulting chips. The heat for this process can be provided either as waste heat from the boiler or in a direct fired gas burner. The Power Chip process is patented under US patent number 5,362,471. Other agglomeration and fixation processes specific to Orimulsion fly ash are being investigated at this time. They too are expected to be patented. Public disclosure at this time may jeopardize the patentability of these processes. The estimated emissions for these processes have been accounted in the Site Certification Application (SCA), see Table 3.4.1-4 in Chapter 3 of the SCA and in the Air Permit Application.

DEP-G5

Comment: What quantities of lime, cement, and limestone will be used for flyash stabilization?

Response: Stabilization of the fly ash would only be required to prepare the material for disposal. A maximum of 15,000 tons of lime, cement, and limestone will be mixed with 22,000 tons of fly ash per year in order to stabilize the ash to an unconfined compressive strength of 2,000 psf, and the permeability necessary to insure leachate of acceptable quality for recycling to the PCE as process make-up.

10,000 (see p. DEP-64)

DEP-H1

Comment: What are the makes and model numbers of the particulate matter control devices?

Response: The Limestone Handling Dust Collectors will conform to a particulate emission limit of 0.003 grains per ACF of air. There are numerous experienced potential manufacturers for the particulate matter control devices. Among those to be considered are the following:

Airtrol, St. Louis, Missouri
Johnson March Systems, Ivyland, Pennsylvania
American Air Filter (AAF), Louisville, Kentucky
Sly, Inc., Cleveland, Ohio
Air Cure, Inc., Minneapolis, Minnesota
Amerex, Inc., Woodstock, Georgia

The particular manufacturer will be determined after specification, preparation and issuance of inquiry packages to bidders, and evaluation of proposals. Models vary among the various manufacturers and will be determined later. Bid packages will be issued after the certification and permitting of the project.

DEP-H2

Comment: What are the process rates of the handling equipment?

Response: In the area of limestone preparation (near day bins and tower mills), the nominal rate of handling will be 25 to 50 tons per hour per boiler unit or 50 to 100 tons per hour for both units combined. In the area of limestone unloading and receiving, and then conveying to day bin storage, the nominal rate will be approximately 500 to 1,000 tons per hour. These rates may vary somewhat depending upon the particular limestone/limerock that will be used. The design rates of the system components will be derived based upon 100 percent capacity i.e. there will be no deduction the equipment design rates. In addition, adequate margins will be provided for each item of equipment.

DEP-H3

Comment: Please submit engineering drawings showing the configuration of the handling and processing equipment and the bag filters.

Response: Configuration (general arrangement) drawings of the limestone handling system showing this level of detail have not been prepared at this early stage of the project. The detail drawings will conform to the conceptual design presented in Sections 3.4.1 and 3.4.2.4 of the Site Certification Application.

FPL proposes that the engineering drawings of the handling and processing equipment and the bag filter be submitted pursuant to detailed conditions of certification. These final drawings and information will also not be prepared until later during final project design. FPL will submit such information to the Department for its final review for consistency with the final conditions of certification.

DEP-H4

Comment: What will be the capacity and frequency of the trucks (or railcars) bringing limestone to the facility?

Response: Depending on the limestone supply source, and a truck capacity of 25 tons, approximately 25,000 shipments of limestone would be delivered to the plant each year. Alternatively, up to two 50-car unit trains could be utilized, as stated in Site Certification Application, Section 3.9.2.2, for delivery of limestone.

DEP-I1

Comment: What are the makes and model numbers of the particulate matter control devices?

Response: The Gypsum Handling Dust Collectors will conform to a particulate emission limit of 0.003 grains per ACF of air. There are numerous experienced potential manufacturers for the particulate matter control devices. Among those to be considered are the following:

Airtrol, St. Louis, Missouri

Johnson March Systems, Ivyland, Pennsylvania

American Air Filter (AAF), Louisville, Kentucky

Sly, Inc., Cleveland, Ohio

Air Cure, Inc., Minneapolis, Minnesota

Amerex, Inc., Woodstock, Georgia

The particular manufacturer will be determined after specification, preparation and issuance of inquiry packages to bidders, and evaluation of proposals. Models vary among the various manufacturers and will be determined later. Bid packages will be issued after the certification and permitting of the project.

DEP-I2

Comment: What are the process rates of the handling equipment?

Response: The nominal rate of raw synthetic gypsum production will be 50 to 100 tons per hour per unit or 100 to 200 tons per hour for both units combined. The nominal rate of gypsum removal from the centrifuges or other dewatering equipment and conveying to the raw gypsum storage area will be conservatively be several times greater than this. This will accommodate both discharges from the individual dewatering devices. The capability of reclaiming gypsum from the storage area will be 500 to 1,000 tons per hour.

DEP-I3

Comment: Please submit engineering drawings showing the configuration of the handling and processing equipment and the bag filters.

Response: Configuration (general arrangement) drawings showing this level of detail have not been prepared at this early stage of the project. The detail drawings will conform to the conceptual design presented in Sections 3.4.1 and 3.4.2.4 of the Site Certification Application.

FPL proposes that the engineering drawings of the handling and processing equipment and the bag filter be submitted pursuant to detailed conditions of certification. These final drawings and information will also not be prepared until later during final project design. FPL will submit such information to the Department for its final review for consistency with the final conditions of certification.

DEP-I4

Comment: Will the five chip mills be operational when the plant starts up the FGD, or is construction of the mills on a later time schedule?

Response: Five chip mills would be required to convert all of the gypsum production to chip form. Two mills would be installed as spares. At the time of certification, we do not intend to install all seven mills, since approximately 90 percent of the gypsum would be sold to a single wallboard facility, which will be converting their material handling systems to process gypsum in the powdered form.

Space has been reserved in the plant design for installation of up to seven chip mills, to bring the total to seven, should it become necessary to convert all of the by-product to chip form. This would be necessary if the present customer decides not to convert their materials handling equipment or if the byproduct gypsum is sold to another customer.

DEP-15

Comment: What is the source of heat for the curing tunnels? Please provide the equipment specifications.

Response: The heat source for the curing tunnels could be low pressure steam from the FPL power plant, heated air make-up extracted downstream of the FPL air preheater or from gas fired burners. No new equipment is anticipated for the steam or hot air systems. If gas heating is required, estimates of emissions for gas fired burners are included in Chapter 3 of the Site Certification Application (see Table 3.4.1-4).

DEP-I6

Comment: What will be the capacity and frequency of the trucks (or railcars) taking away the gypsum?

Response: The primary transportation mode of gypsum is anticipated to be truck given the close proximity of wallboard manufacturers to the Manatee Plant. At a truck capacity of 25 tons, approximately 31,000 shipments of gypsum would be shipped from the plant each year. In the event markets for the utilization of PowerChips (gypsum or ash/gypsum mix) in the cement industry are developed, rail shipments may become feasible. In that circumstance, a single unit train of 30 cars would leave the site weekly.

DEP-I7

Comment: What specific control measures will be used to minimize unconfined particulate matter emissions?

Response: The gypsum produced in the FGD process is a wet cake that is dewatered in centrifuges or other dewatering equipment to produce a material that is nominally 10 percent moisture. Consequently, the material does not generally present a particulate emissions problem. Moreover, much of the transfer operation occurs in enclosed structures as can be seen in the general arrangement drawing, Drawing 10.14.8, Sheet 1, included in the Site Certification Application (SCA). Plastic curtain enclosures at the loading areas will be provided to minimize any fugitive particulate emissions which may result in that area. Estimates of these fugitive losses were estimated and were included in the SCA Chapter 3 (see Table 3.4.1-5).

DEP-J1

Comment: What will be the capacity and frequency of the ships bringing fuel into Port Manatee? What will be the volatile organic compound (VOC) fugitive emissions associated with fuel unloading?

Response: Bitor America, the fuel supplier, is responsible for transporting the fuel to Port Manatee. The specific vessels for transport have not been selected by Bitor at this time, although contractually the vessels will be double hulled. The maximum total cargo on any of the vessels will be limited by the minimum draft in the shipping channels of Tampa Bay, which is 37 ft. Based on this restriction, the vessel is expected to be between 40,000 and 60,000 dead-weight tons (DWT) with an average cargo of 250,000 to 300,000 barrels. Based on an average cargo size of 250,000 barrels and a plant capacity factor of 87 percent, the total number of fuel deliveries yearly will be approximately 110 (one vessel every 3 to 4 days).

The TANKS2 program, developed by the U.S. Environmental Protection Agency (EPA), was used to estimate potential volatile organic compound (VOC) emissions from unloading Orimulsion/fuel oil at Port Manatee. The TANKS2 program incorporates the emission factors presented in EPA's document, AP-42, *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources*. VOC emission factors are provided to estimate storage and working losses due to storage and filling or emptying of tanks containing volatile organic liquids. Storage loss is the expulsion of vapors from a tank through vapor expansion and contraction due to changes in ambient temperature and pressure. Working loss is the expulsion of vapors due to evaporation from filling and emptying a tank.

To estimate potential VOC emissions for unloading Orimulsion, the emission factor for working losses was used from the TANKS2 program. For calculation purposes, the tanker was assumed to have a storage height of about 24 ft and an effective diameter of 279 ft. Fuel characteristics for Orimulsion were assumed to be the same as those for No. 6 fuel oil. As a result, the calculated VOC emissions are conservative (i.e., higher than expected) since Orimulsion consists of about 30 percent water and is less volatile than fuel oil. Also, the working losses include the VOC emissions from filling the tanker which will not occur at the Manatee Terminal. The detailed output of the TANKS2 program containing the

assumptions and results are presented is presented in Appendix DEP-J1 in Volume II.

Using this approach, the VOC emissions from working losses incurred during emptying Orimulsion from the tankers are conservatively estimated to be approximately 219.2 pounds per year (lb/yr), or about 0.1 ton per year (TPY).

DEP-J2

Comment: What additional equipment or equipment modifications will be required at the port facility? What will be the additional tank VOC breathing losses and other fugitive emissions as a result of the increased fuel usage?

Response: As explained in SCA Section 3.3.2, the following modifications/improvements will be made at Port Manatee:

Orimulsion will be unloaded from double-hulled vessels using new 10-inch unloading hoses which will replace existing 8-inch hoses. An apron (or other equivalent device) will be placed underneath the hose to capture accidental spillage and convey it to the dock for capturing and recycling. In order to contain any potential spills during unloading operations, a spill containment boom or appropriate containment device will be placed on both sides of the unloading arms between the dock and vessel. See also response to Comment DEP-IW1.

The FPL's Port Manatee Terminal will be modified as stated in SCA Sections 3.3.2 (page 3.3.2-1) and 3.6.1.1.1 (page 3.6.1-4); and SCA Drawing 10.14.11. The modifications include replacement of three existing 300-hp rotary screw main line pumps with three new larger pumps, new magnetic-type flow meters, and the addition of a new Bitumen/Water Separation System (similar to the new treatment system which will be installed at the Manatee Plant).

In addition, FPL will be installing reinforced liners, such as fiberglass or other compatible material, at the bottom of the existing 500,000-barrel fuel storage tanks at the Port Manatee Terminal and the Manatee Plant.

Similar to the response to DEP-J1, volatile organic compound (VOC) emissions from the storage of Orimulsion at Port Manatee can be estimated using the TANKS2 program. The TANKS2 program provides emission factors for estimating storage and working losses for the storage of volatile organic liquids. Storage loss is the expulsion of vapors from a tank through vapor expansion and contraction due to changes in ambient temperature and pressure. Working loss is the expulsion of vapors due to evaporation from filling and emptying a tank.

Orimulsion will be stored at the Manatee Terminal in the two existing fuel storage tanks, each with a storage capacity of 500,000 barrels or 21 million gallons. Each tank has a height of about 46.5 ft and a diameter of 279 ft. With the Manatee Plant operating at 7,650 MMBtu/hr at an 87 percent annual capacity factor, the throughput of Orimulsion is estimated to be 1,113 million gallons for the entire year. Fuel characteristics for Orimulsion were assumed to be the same as those for No. 6 fuel oil. As a result, the calculated VOC emissions are conservative (i.e., higher than expected) since Orimulsion consists of about 30 percent water and is less volatile than fuel oil. The detailed output of the TANKS2 program containing the assumptions and results is presented in Appendix DEP-J2 in Volume II. Using this approach, the VOC emissions from the unloading of Orimulsion are conservatively estimated to be approximately 432.4 pounds per year (lb/yr), or about 0.22 ton per year (TPY). Based on the existing units' actual annual capacity factor of about 30 percent for the existing units (i.e., firing approximately 320 million gallons, average for 1993 and 1994), the increase of VOC emissions for unloading of Orimulsion instead of fuel oil is approximately 300 lb/yr or about 0.15 TPY.

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

12/28/94
PAGE 1

Identification

Identification No.: FPL
City: Manatee Terminal- Tanker
State: FL
Company: FPL- Drimulsion- Tanker
Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft): 24
Diameter (ft): 279
Liquid Height (ft): 24
Avg. Liquid Height (ft): 24
Volume (gallons): 10500000
Turnovers: 106
Net Throughput (gal/yr): 1113000000

Paint Characteristics

Shell Color/Shade: Gray/Light
Shell Condition: Poor
Roof Color/Shade: Gray/Light
Roof Condition: Poor

Roof Characteristics

Type: Cone
Height (ft): 24.00
Radius (ft) (Dome Roof): 0.00
Slope (ft/ft) (Cone Roof): 0.1720

Breather Vent Settings

Vacuum Setting (psig): 0.00
Pressure Setting (psig): 0.00

Meteorological Data Used in Emission Calculations: Tampa, Florida

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
LIQUID CONTENTS OF STORAGE TANK

12/28/94
PAGE 2

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk	Vapor Pressures (psia)			Vapor	Liquid	Vapor	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.	Temp. (deg F)	Avg.	Min.	Max.	Mol. Weight	Mass Fract.	Mass Fract.		
Residual oil no. 6	All	80.98	71.00	90.96	74.78	0.0001	0.0001	0.0001	190.000			190.00	Option 4: A=10.1040, B=10475.0

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/28/94
PAGE 3

Annual Emission Calculations

Standing Losses (lb):	40.6439
Vapor Space Volume (cu ft):	489080.9
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.073860
Vented Vapor Saturation Factor:	0.999960

Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	489080.9
Tank Diameter (ft):	279
Vapor Space Outage (ft):	8.00
Tank Shell Height (ft):	24
Average Liquid Height (ft):	24
Roof Outage (ft):	8.00

Roof Outage (Cone Roof)	
Roof Outage (ft):	8.00
Roof Height (ft):	24.000
Roof Slope (ft/ft):	0.17204
Shell Radius (ft):	140

Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.000094
Daily Avg. Liquid Surface Temp. (deg. R):	540.65
Daily Average Ambient Temp. (deg. R):	531.67
Ideal Gas Constant R (psia cuft / (lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	534.45
Tank Paint Solar Absorptance (Shell):	0.63
Tank Paint Solar Absorptance (Roof):	0.63
Daily Total Solar Insolation Factor (Btu/sqftday):	1492.00

Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.073860
Daily Vapor Temperature Range (deg.R):	39.93
Daily Vapor Pressure Range (psia):	0.000068
Breather Vent Press. Setting Range (psia):	0.00
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.000094
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.000065
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.000134
Daily Avg. Liquid Surface Temp. (deg R):	540.65
Daily Min. Liquid Surface Temp. (deg R):	530.67
Daily Max. Liquid Surface Temp. (deg R):	550.63
Daily Ambient Temp. Range (deg.R):	18.90

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/28/94
PAGE 4

Annual Emission Calculations

Vented Vapor Saturation Factor

Vented Vapor Saturation Factor:	0.999960
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.000094
Vapor Space Outage (ft):	8.00

Withdrawal Losses (lb):

219.2220

Vapor Molecular Weight (lb/lb-mole): 190.000000

Vapor Pressure at Daily Average Liquid

Surface Temperature (psia): 0.000094

Annual Net Throughput (gal/yr): 1113000000

Turnover Factor: 0.4625

Maximum Liquid Volume (cuft): 1467268

Maximum Liquid Height (ft): 24

Tank Diameter (ft): 279

Working Loss Product Factor: 1.00

Total Losses (lb):

259.87

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/28/94
PAGE 5

Annual Emissions Report

Liquid Contents	Losses (lbs.):		Total
	Standing	Withdrawal	
Residual oil no. 6	40.64	219.22	259.87
Total:	40.64	219.22	259.87

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

12/28/94
PAGE 1

Identification

Identification No.: FPL
City: Manatee Terminal
State: FL
Company: FPL- Orimulsion
Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft): 47
Diameter (ft): 279
Liquid Height (ft): 46
Avg. Liquid Height (ft): 46
Volume (gallons): 21000000
Turnovers: 53
Net Throughput (gal/yr): 1113000000

Paint Characteristics

Shell Color/Shade: Gray/Light
Shell Condition: Poor
Roof Color/Shade: Gray/Light
Roof Condition: Poor

Roof Characteristics

Type: Cone
Height (ft): 47.00
Radius (ft) (Dome Roof): 0.00
Slope (ft/ft) (Cone Roof): 0.3369

Breather Vent Settings

Vacuum Setting (psig): 0.00
Pressure Setting (psig): 0.00

Meteorological Data Used in Emission Calculations: Tampa, Florida

10000000

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
LIQUID CONTENTS OF STORAGE TANK

12/28/94
PAGE 2

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk Temp. (deg F)	Vapor Pressures (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Residual oil no. 6	All	80.98	71.00	90.96	74.78	0.0001	0.0001	0.0001	190.000				190.00 Option 4: A=10.1040, B=10475.0

BEST AVAILABLE COPY

Standing Losses (lb):	84.6731
Vapor Space Volume (cu ft):	1018943
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.073860
Vented Vapor Saturation Factor:	0.999917
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	1018943
Tank Diameter (ft):	279
Vapor Space Outage (ft):	16.67
Tank Shell Height (ft):	47
Average Liquid Height (ft):	46
Roof Outage (ft):	15.67
Roof Outage (Cone Roof)	
Roof Outage (ft):	15.67
Roof Height (ft):	47.000
Roof Slope (ft/ft):	0.33692
Shell Radius (ft):	140
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.000000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.000094
Daily Avg. Liquid Surface Temp. (deg. R):	540.65
Daily Average Ambient Temp. (deg. R):	531.67
Ideal Gas Constant R	
(psia cuft / (lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	534.45
Tank Paint Solar Absorptance (Shell):	0.63
Tank Paint Solar Absorptance (Roof):	0.63
Daily Total Solar Insolation	
Factor (Btu/sqftday):	1492.00
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.073860
Daily Vapor Temperature Range (deg.R):	39.93
Daily Vapor Pressure Range (psia):	0.000068
Breather Vent Press. Setting Range(psia):	0.00
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.000094
Vapor Pressure at Daily Minimum Liquid	
Surface Temperature (psia):	0.000065
Vapor Pressure at Daily Maximum Liquid	
Surface Temperature (psia):	0.000134
Daily Avg. Liquid Surface Temp. (deg R):	540.65
Daily Min. Liquid Surface Temp. (deg R):	530.67
Daily Max. Liquid Surface Temp. (deg R):	550.63
Daily Ambient Temp. Range (deg.R):	18.90

FIGURE COMPARISON OF BURNING LOSS
 ESTIMATION METHODS - DAILY AVERAGE
 DAILY BURNING LOSS

FIGURE 2
 15-588124

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/28/94
PAGE 4

Annual Emission Calculations

Vented Vapor Saturation Factor

Vented Vapor Saturation Factor:	0.999917
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.000094
Vapor Space Outage (ft):	16.67

Withdrawal Losses (lb): 347.7669

Vapor Molecular Weight (lb/lb-mole):	190.000000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.000094
Annual Net Throughput (gal/yr):	1113000000
Turnover Factor:	0.7338
Maximum Liquid Volume (cuft):	2812264
Maximum Liquid Height (ft):	46
Tank Diameter (ft):	279
Working Loss Product Factor:	1.00

Total Losses (lb): 432.44

BEST AVAILABLE COPY

Liquid Content	Losses (lbs.):		Total
	Standing	Withdrawal	
Residual oil no. 6	84.67	347.77	432.44
Total:	84.67	347.77	432.44

DEVELOPMENT OPERATIONS (75-12)
EMISSIONS REPORT - DEVELOPMENT
1975-1976

PAGE 4
15/08/76

Call Gary

DRAFT

13366D/RTC2/DEP-38
03/22/95

CONCEPTUAL BOILER ALTERATIONS-FIGURE 1

(2DEP-25 through 2DEP-31)

In FPL's response to sufficiency comment DEP-B1, Figure 1 was provided to graphically show the boiler enhancements which would be performed in order to optimize performance when burning Orimulsion. The majority of these enhancements involve the installation of additional sootblowers and the increase of heat transfer surface area in the superheater and economizer areas of the boiler. Due to decreased radiant heat availability and increased convective heat availability when firing Orimulsion these enhancements are necessary in order to optimize boiler performance by 1) improving heat transfer by preventing the build up of ash and 2) improving the heat transfer by the addition of surface area.

None of the boiler enhancements require modification to the basic structure or major components of the boilers, which were designed, manufactured and erected by Foster Wheeler Energy Corporation, as nominal 800MW unit.

The following clarifications are provided in response to sufficiency comments 2DEP-25 through 2DEP-31. Please note that the alterations depicted in Figures 1 and 2 are conceptual and are subject to optimization during detailed engineering.

2DEP-25

Comment: Item 1 of the Key to Boiler Alterations in Figure 1 states that the "Boiler is designed for and has provisions to add 2 additional division walls to existing 7 walls". Please give a verbal description of exactly what these provisions consist of.

Response: The provisions to add two (2) additional division wall panels to the existing seven (7) panels are depicted in Figure 2 and are described as follows:

As originally designed and constructed, the division wall inlet manifold located in the front of the boiler has nine (9) equally spaced division wall inlet header stubs. Only seven (7) of these nine (9) header stubs (#2 thru #8 positions) are used to supply steam to seven (7) division wall panels located in the top of the furnace. The two inlet header stubs (#1 and #9 positions) that are present but are not currently connected to headers are located at each end of the inlet manifold.

In the original design, the space in the windbox directly above the unconnected inlet header stubs was left free of obstacles for installation of additional inlet headers.

The division wall panels in the top of the furnace are equally spaced with the exception of the left and right sides which are double spaced. These areas were left vacant when the units were originally constructed to allow for the installation of two (2) panels resulting in nine (9) equally spaced division wall panels.

The space in the penthouse directly above the future division wall panels (#1 and #9) also was left free of obstacles for installation of additional outlet headers and supports.

The inlet connections to the upper spray headers in the penthouse have unused tube stubs for the purpose of attaching transfer tubes coming from the new division wall outlet headers (#1 and #9).

2DEP-26

Comment: Item 2 of the Key states that the "Boiler is designed for and has provisions to add 10 extra tubes to each of 7 existing division walls". Please give a verbal description of exactly what these provisions consist of. What will be the total number of tubes in each of these 7 existing division walls?

Response: Provisions to add ten (10) extra tubes to each of the existing seven (7) division wall are depicted in Figure 2 and are described as follows:

As originally designed and constructed, space in the upper windbox, furnace and penthouse was intentionally left vacant to accommodate the addition of ten (10) extra tubes per division wall panel.

Accordingly, ten (10) currently unused tube stubs are present at the top of each of the seven (7) existing vertical division wall inlet headers.

and

Ten (10) currently unused tube stubs are present on the existing horizontal division wall outlet headers in the penthouse for each of the seven (7) division walls.

The existing number of tubes in each of the seven (7) division walls is seventy six (76). After the addition of ten (10) tubes each, the total number of tubes per existing division wall panel will be eighty six (86).

2DEP-27

Comment: What will be the total number of tubes in each of the 2 new division walls?

Response: The total number of tubes in each of the two (2) new division walls (#1 and #9) will be eighty six (86) and will be identical to the seven (7) existing division walls after the additional ten (10) tubes have been added to them (76+10+86).

2DEP-28

Comment: The Legend indicates an area of the boiler as "New Division Wall Surface (Outside panels @ each side only)". It is not clear what this means. Please explain.

Response: As noted in response to sufficiency comment 2DEP-25 above and depicted in Figure 2, the "new division wall panels will be added at stubs #1 and #9", hence the note "outside panels @ each side only".

2DEP-29

Comment: Item 3 of the Key states "Upgrade existing primary superheater". Does "upgrade" mean "replace" or "an addition"?

Response: The design temperature limits for the existing primary superheater are marginal for current oil firing (i.e. higher temperatures on oil firing than anticipated in the original design). The existing primary superheater will be replaced with a new primary superheater that has a material more resistant to higher temperatures. The surface area will also be increased to optimize the boiler efficiency while firing Orimulsion.

2DEP-30

Comment: Item 5 of the Key states "Upgrade selected non-pressure parts, casing and supports". Does "upgrade" mean "replace" or "additions to"?

Response: "Upgrade selected non-pressure parts, casing and supports" in the Key for Figure 1 means for the most part replace selected components with higher strength materials which are

more resistant to high temperatures. In some areas, however, reinforcement of existing components in lieu of replacement is planned.

2DEP-31

Comment: Item 7 of the Key states "Install additional sootblowers and relocate other (see legend)". The legend icons for existing sootblower locations and new sootblower locations seem to indicate 13 new sootblower locations and 15 existing sootblower locations for a total of 25 sootblowers. Is this correct? Which of the existing sootblower locations shown are in relocated positions?

Response: Figure 1 has been revised to clarify the sootblower alterations. There are currently a total of sixteen (16) sootblower pairs in the Furnace and Heat Recovery Area (HRA) of the boiler. Eleven (11) pairs are planned to be added bringing the total to twenty seven (27) pairs. One (1) of the existing pairs is shown at a new location. The sootblower pair that is to be relocated is the second from the top of the four (4) that are arranged vertically over the tip of the bullnose (between the division wall and finishing superheaters). It is being moved up to allow addition of a new sootblower pair directly below it. There are currently three (3) sootblower pairs over the tip of the bullnose. One of the sootblower pairs at the top of the bullnose between the finishing superheater and furnace rearwall screen was inadvertently shown as being relocated on Figure 1 Rev 0. On Figure 1 Rev 1 it is shown correctly as being an existing sootblower at an existing location.

2DEP-32

Comment: Can Orimulsion be efficiently fired without the use of steam atomization?

Response: No, Orimulsion can not be burned efficiently without the use of steam atomization.

The Manatee units have recently been converted to steam atomization in an effort to better control the combustion process while firing residual oil (better carbon conversion, better combustion efficiency at lower excess air and reduction of CO, etc.).

2DEP-33

Comment: By increasing the surface heating area of the boiler, isn't the boiler steam generating capacity increased if firing fuel oil?

Response: No, the steam generating capacity of the boiler on oil firing will not increase. The output of the unit is limited by the boilers ability to evaporate water (the water wall surface area and superheater spray capacity will not change), metal temperature limits for boiler components, pollution control equipment limitations, and turbine limitations. The surface changes will be implemented due to increased convective heat availability and decreased radiant heat availability during Orimulsion firing.

CONCEPTUAL BOILER ALTERATIONS

FIGURE NO. 1

REV. 1

KEY TO BOILER ALTERATIONS

- 1 BOILER IS DESIGNED FOR AND HAS PROVISIONS TO ADD 2 ADDITIONAL DIVISION WALLS TO EXISTING 7 DIVISION WALLS.
- 2 BOILER IS DESIGNED FOR AND HAS PROVISIONS TO ADD 10 EXTRA TUBES TO EACH OF 7 EXISTING DIVISION WALLS.
- 3 UPGRADE EXISTING PRIMARY SUPERHEATER.
- 4 INSTALL ADDITIONAL ECONOMIZER LOOPS.
- 5 UPGRADE SELECTED NON-PRESSURE PARTS, CASING AND SUPPORTS.
- 6 REPLACE 1940'S VINTAGE BURNERS WITH STATE OF THE ART LOW NO_x BURNERS (REFERENCE FIGURE 2).
- 7 INSTALL ADDITIONAL SOOTBLOWERS AND RELOCATE OTHERS (SEE LEGEND).
- 8 STEAM ATOMIZATION SUPPLY LINES INSTALLED IN 1994. (NON-ORIMULSION RELATED).

BOILER SURFACE CHANGES

(CONCEPTUAL-PER UNIT)

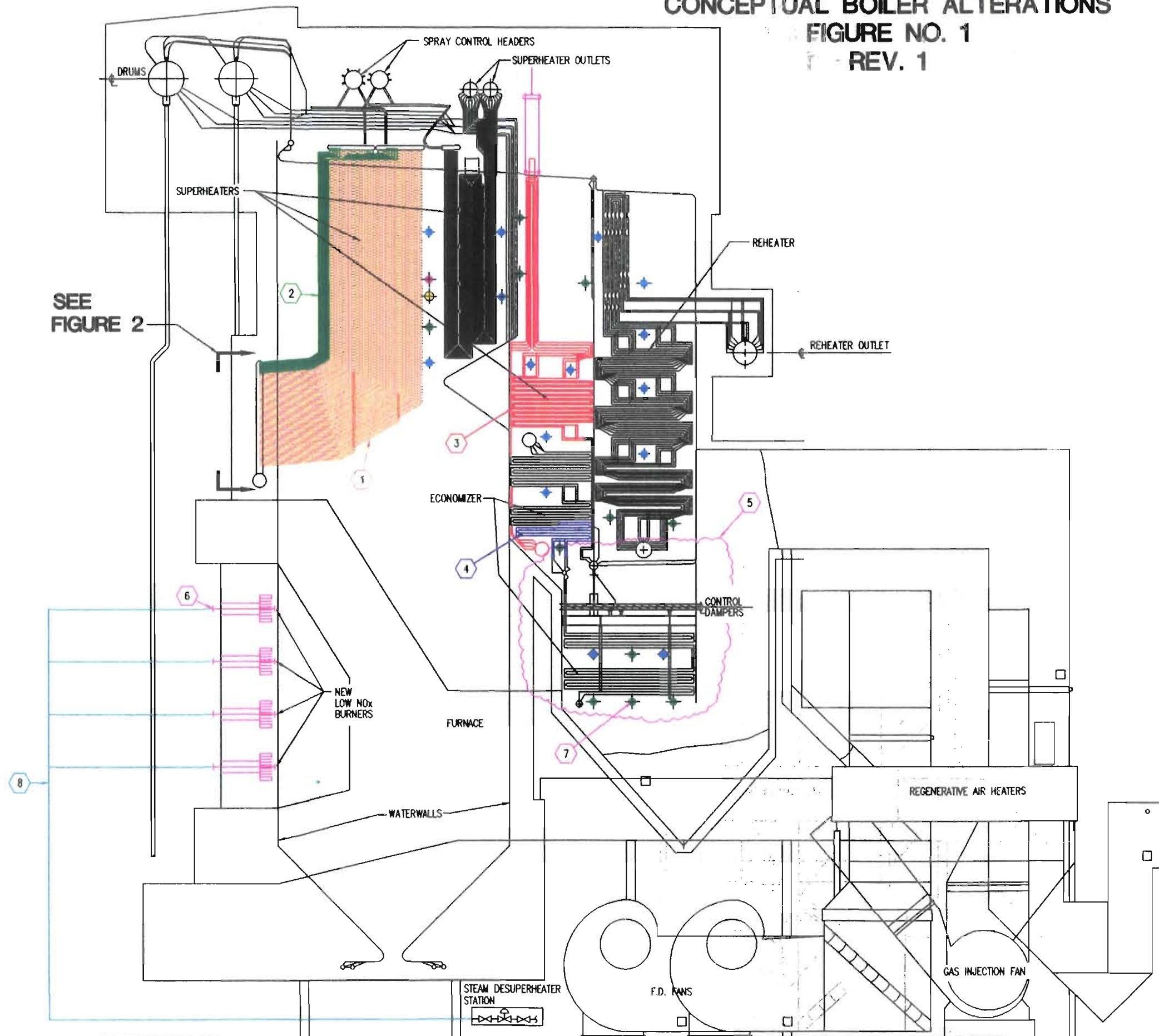
COMPONENT DESCRIPTION	EXISTING SURFACE	NEW SURFACE	PERCENT CHANGE
SUPERHEATER	151,000 SF	179,000 SF	18.5%
REHEATER	171,000 SF	171,000 SF	0.0%
ECONOMIZER	199,000 SF	207,000 SF	4.0%
WATER WALLS	29,000 SF	29,000 SF	0.0%
TOTAL	550,000 SF	586,000 SF	6.5%

LEGEND

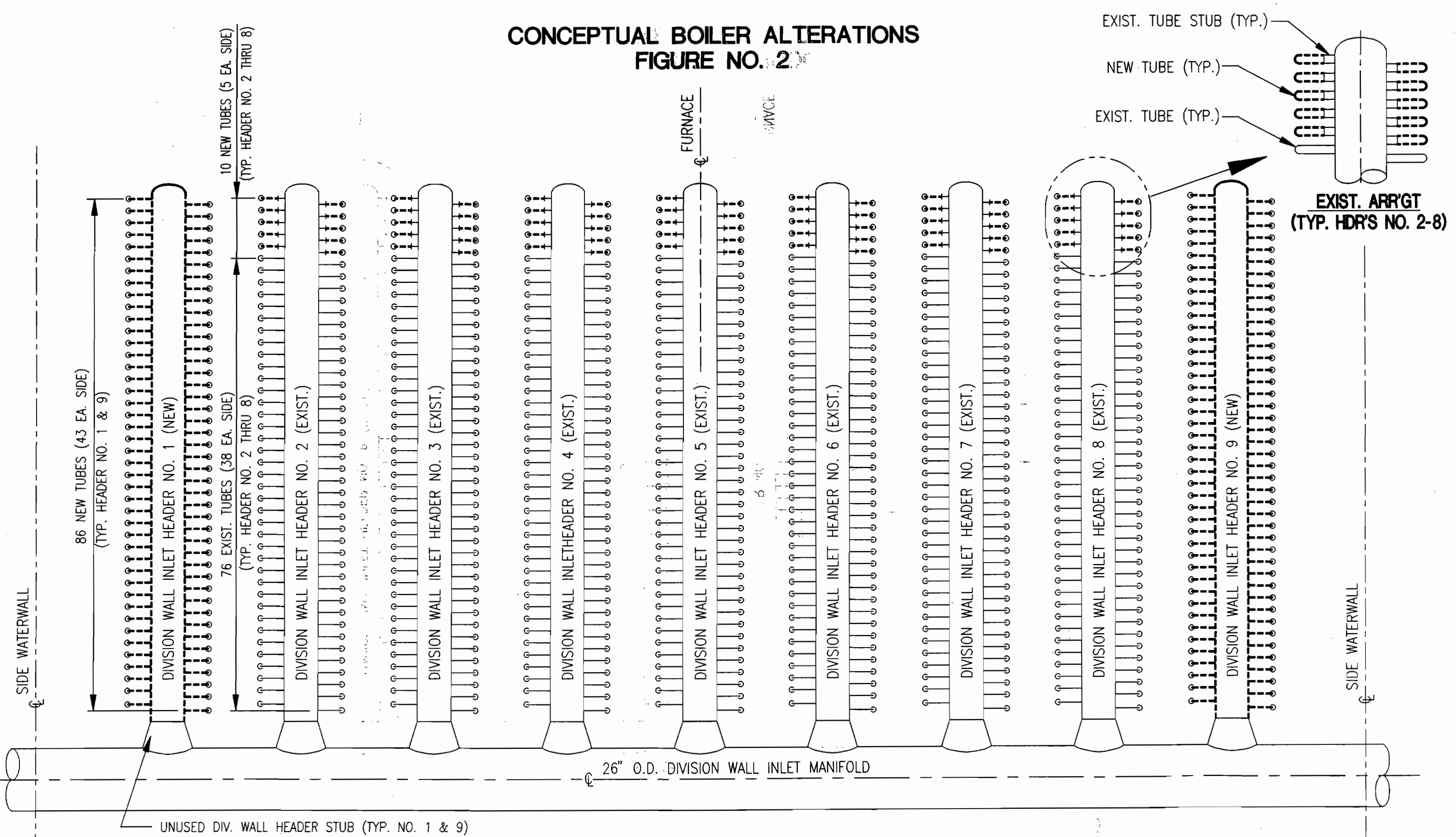
- EXIST. BOILER SURFACE
- NEW ECONOMIZER SURFACE
- NEW DIVISION WALL SURFACE (OUTSIDE PANELS @ EACH SIDE ONLY)
- NEW DIVISION WALL SURFACE
- NEW PRI. SUPERHEATER SURFACE
- ABANDONED SOOTBLOWER LOCATION (SOOTBLOWER MOVED)
- EXIST. SOOTBLOWER AT EXIST. LOCATION
- EXIST. SOOTBLOWER AT NEW LOCATION
- NEW SOOTBLOWER AT NEW LOCATION
- NEW COMPONENTS
- EXISTING STEAM ATOMIZATION PIPING
- RECENTLY INSTALLED

DATE: 3/17/95

BOILER CROSS SECTION



CONCEPTUAL BOILER ALTERATIONS FIGURE NO. 2



**FRONT VIEW OF DIVISION WALL INLET HEADERS/MANIFOLD CONCEPTUAL BOILER ALTERATIONS
SHOWING PROVISIONS FOR ADDITIONAL SURFACE
(NOT TO SCALE-SEE FIGURE 1 FOR LOCATION)**

Conservation Element

Policy 3.1.1.2 Encourage and facilitate a reduction in total air emissions by all sources listed for Manatee County on the FDER Air Pollution Inventory System.

As discussed in Section 1.4.3 of the SCA, reductions in the total actual annual emission levels will result from conversion to Orimulsion, despite the anticipated higher utilization rate (average capacity factor) of 87 percent compared to the historical average annual capacity factor of approximately 30 percent with fuel oil. Emissions of all pollutants will go down compared to actual emissions except nitrous oxides (NO_x) and carbon monoxide (CO). Reductions in other pollutants, including sulfur dioxide (SO₂), particulates, volatile organic compounds (VOCs), and "air toxics" such as arsenic, beryllium, cadmium, lead, mercury, nickel, vanadium, etc. will more than offset the increase in NO_x, resulting in a net overall reduction in emissions. The Manatee Orimulsion Conversion Project will further Manatee County's objectives concerning the improvement of air quality.

Policy 3.1.1.3 Evaluate all land development activities which will require a permit under chapter 17-2, F.A.C., with regard to appropriateness of location.

As discussed in Chapter 1 of the SCA, the Manatee Plant was chosen as the preferred Orimulsion conversion project location because it represents a significant opportunity to increase the use of existing plant capacity and generate significant fuel cost savings that will be passed on to FPL's customers, with less impact than would occur with development of a greenfield site. Also, the use of Orimulsion at the Manatee Plant will increase fuel diversity within the electric generating system and reduce FPL's dependence on oil. The Manatee Plant was preferred over other locations because of the existing facilities that are available to support the conversion and keep fuel transportation costs low. Those facilities include a nearby deep-water port, an existing pipeline, and rail service to the site. Since the conversion project will not increase the plant's generating capacity, other existing support facilities, such as the cooling pond and transmission network, remain adequate for operation of the plant on Orimulsion.

Policy 3.1.1.6 Condition all land development approvals to implement best management practices for reduction of erosion, fugitive dust, and air emissions related to the construction of the development.

Section 3.8.2 of the SCA discusses the management of construction phase stormwater runoff, including the use of erosion and sedimentation controls such as staked silt fences and hay bales. Proposed Best Available Control Technology (BACT) for the control of fugitive emissions from material handling is discussed in Section 4.6 of the Air Permit Application, included in Appendix 10.1.5 of the SCA. Limestone will be delivered to the site in covered trucks or by rail and pneumatically transferred to storage silos. The storage silos and limestone feed systems will be equipped with a dust collector system, and the preparation area will be enclosed. Similar to limestone handling, the fly ash and flue gas desulfurization byproduct handling and processing systems will have dust collectors where necessary. The byproducts handled in the open environment will either have sufficient moisture or be stabilized prior to handling, thus minimizing fugitive emissions.

Control of fugitive dust emissions during construction is discussed in Section 4.5.2 of the SCA. Control measures will include minimal site clearing, revegetation or paving of lightly traveled areas, stabilization of unpaved laydown areas and roads with shell or rock, and watering of highly traveled areas on an as-needed basis.