PROGRESS ENERGY CAROLINA

LEVY ADVANCED REACTOR UNITS 2&3

Project No. 11945-013

Report No. LNG-CFS-GER-001, Rev 0

Non Nuclear Safety Related

Evaluation of Oxygen Scavenger, pH Control Agent, Potable Water Biocide, and Cooling Water Chemicals

Prepared by Sargent & Lundy LLC

Prepared By:	Jeri C. Penrose	**Date: 3-31-08**
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1. PURPOSE/OBJECTIVE

This evaluation is performed to determine the following:

(1) To select the oxygen scavenger agent for the Feedwater (FWS) and Condensate (CDS) systems

(2) To select the pH control agent for the FWS and CDS systems

(3) To select the specific biocide for the Potable Water system (PWS)

(4) To select water treatment chemicals for the Circulating Water system (CWS) and Service Water system (SWS)

2. BACKGROUND

The proposed Levy Nuclear Power Plant will be located in the state of Florida, and will have two new AP1000 units.

Secondary Water Oxygen Scavenging and pH Adjustment

As described in the AP1000 Design Control Document (DCD), the objectives of the secondary water chemistry program are to:

- Minimize general corrosion in the steam generators, turbine, and feedwater system by maintaining proper pH control and by minimizing oxygen ingress coupled with oxygen scavenging
- Minimize local corrosion in the steam generators, turbine, and feedwater system by minimizing chemical contaminant ingress and by controlling contaminant levels through condensate polishing and steam generator blowdown

The secondary side water system is designed to utilize all volatile treatment (AVT) per Steam Generator Owner's Group recommendations. The chemical addition is intended to establish and maintain an environment that minimizes system corrosion. Oxygen concentrations are kept low by injecting an oxygen scavenger. The pH is controlled by injection of a volatile pH adjustment chemical in addition to the oxygen scavenger.

These chemicals are injected by the Turbine Island Chemical Feed system (CFS). Oxygen scavenger and pH adjuster are injected into the condensate system downstream of the condensate polishers and are injected into the feedwater system at the feedwater booster pump suction piping.

The COL applicant is required to address the oxygen scavenging agent and the pH adjuster per DCD Section 10.4.12.2.

Potable Water Biocide

As described in DCD, the potable water system is designed to furnish water for human consumption in compliance with EPA National Primary Drinking Water Standards bacteriological and chemical quality requirements. The potable water system (PWS) is supplied by filtered water from the raw water system and stored in the potable water storage tank. This supply is disinfected at the inlet to the storage tank and a residual chlorine level of 0.5 ppm is maintained.

The COL applicant is required to address the specific biocide per DCD Section 10.4.12.3.

Cooling Water Chemical Treatment

As described in the DCD, the Circulating Water (CWS) and Service Water (SWS) systems are recirculating systems with cooling towers. Cooling water chemistries are controlled to limit corrosion, scaling, and fouling of system components. This is accomplished by regulating system blowdown flow rates to control the cycles of concentration at the cooling towers and by injecting treatment chemicals to inhibit corrosion and scale formation and limit biological growth in the circulating waters.

These chemicals are injected by the Turbine Island Chemical Feed system (CFS). Six categories of chemicals can be used: pH adjustor, corrosion inhibitor, scale inhibitor, dispersant, biocide, and algicide.

The COL applicant is required to address specific chemicals selected for the pH adjuster, corrosion inhibitor, scale inhibitor, dispersant, biocide, and algicide per DCD Section 10.4.12.1.

3. METHODOLOGY AND CRITERIA

This engineering evaluation was performed by reviewing system design criteria as described in AP1000 DCD, applicable industry standards, and current industry practices.

4. INPUT

Input for the technical evaluation is taken from the following:

1. AP1000 Design Control Document
2. EPRI Guidelines
3. National Drinking Water Standards
4. Well water composition; Levy test wells
5. Seawater composition; typical from 2003 Crystal River NPDES renewal
6. Conceptual Design and Calculations for Levy Circulating Water and Raw Water Systems for Levy Nuclear Plant Units 1 & 2, Report No. LNG-CWS-GER-001
7. Circulating Water Chemical Analysis – Calculation LNG-CWS-GEC-002
8. SPX Cooling Technologies – Cooling Tower Water Condition Limits
9. Crystal River Cooling Tower Operating Experience

5. ASSUMPTIONS

None

6. COMPUTATIONS

Not applicable

7. EVALUATION AND RESULTS

7.1 Oxygen Scavenger

A reducing environment must be maintained in the secondary water system to minimize corrosion and stress corrosion cracking. This is accomplished by minimizing ingress of

oxygen from inleakage at the condenser, by mechanically deareating feedwater, and by use of chemicals to react with residual dissolved oxygen.

PWR's typically use hydrazine as an oxygen scavenger. This chemical reacts with oxygen to form water and nitrogen gas. Hydrazine has a long history of successful use in the power industry and is considered accepted practice for oxygen scavenging at PWR's.

Use of hydrazine is consistent with EPRI Secondary Water Chemistry Guidelines and with the AP1000 Design Control Document. The AP1000 DCD provides guidelines for Secondary Side water chemistry and includes limits for dissolved oxygen in Condensate and Feedwater. The guidelines call for elevated hydrazine treatment of feedwater. Specified feedwater hydrazine levels are greater than or equal to 100 ppb. Hydrazine is the only oxygen scavenger specifically named in the AP1000 guidelines, but an alternative oxygen scavenger may be used in lieu of hydrazine. EPRI Secondary Water Chemistry Guidelines also permit use of an alternative oxygen scavenger if qualified by the utility.

Although there is concern about handling hydrazine due to its toxicity, the alternative oxygen scavenger carbohydrazide can decompose to release carbon dioxide. The carbon dioxide can adversely influence secondary water pH. Also, carbohydrazide will increase chemical costs. There are no other alternative oxygen scavengers appropriate for the Levy operating temperatures and pressures. Therefore, there is insufficient justification for use of an alternative oxygen scavenger at the Levy Advanced Reactor Units.

Consequently, hydrazine is the recommended oxygen scavenger for the proposed AP1000 units at the Levy Advanced Reactor Units.

7.2 pH Adjustment Agent

Alkaline conditions must be maintained throughout the secondary water system to protect steel components against corrosion.

Thermal decomposition of hydrazine (used as the oxygen scavenger) produces ammonia which aids in increasing pH levels, but the amount of ammonia contributed by hydrazine is not sufficient for adequate corrosion control. Historically, additional amounts of ammonia have been injected. Ammonia is economical and does not produce decomposition products. However, operating experience at PWR stations showed ammonia has not adequately protected carbon steel at acceptable dosages and pH levels. Flow assisted corrosion (FAC) has been observed with transport of iron corrosion products to the steam generators.

As a result, the industry has converted from ammonia to alternate organic amines. Morpholine was widely used initially. Operating experience has generally been

successful. There have been concerns about morpholine degradation to form organic acids such as acetate or formate, but negative effects have not been observed. Carryover of morpholine in the steam phase can be a concern in systems using condensate polishing.

More recently, other amines including ethanolamine (ETA), dimethylamine, dodecylamine, and methoxypropylamine have been used. ETA is generally preferred because of the lower molar concentration required to achieve target pH levels at operating temperatures. ETA also has a lower relative volatility than morpholine, so it is more effective in maintaining alkaline conditions in two-phase regions. Some plants use a mixture of amines to achieve a more desirable distribution of amines throughout different portions of the steam cycle. In other plants, ammonia produced by hydrazine decomposition functions as a second amine sufficient to protect condensate and low temperature sections of the steam cycle.

ETA is recommended for the pH Adjustment Agent at the Levy Advanced Reactor Units based on current industry practice using amines and because ETA is the most widely used amine. Design of the proposed AP1000 units includes condensate polishing, and ETA is also compatible with polishing resins. Detailed computer modeling of amine distribution and of pH at various locations in the system network is beyond the scope of this evaluation. Such modeling would be necessary to establish a justification, if any, for use of a second organic amine. It is expected that ammonia from hydrazine will be sufficient based on typical industry practice.

7.3 Potable Water Biocide

The Safe Drinking Water Act requires disinfection of pathogenic organisms to limit waterborne disease. Physical removal and/or inactivation of 99.9% of Giardia lamblia (3-log inactivation) and 99.99% of viruses (4-log inactivation) is required to meet drinking water standards for surface waters. Two-log inactivation of Cryptosporidium may also be required.

Chemical inactivation is traditionally done by chlorination based on a long history of effective drinking water treatment. Chlorination is effective against a wide variety of microorganisms and provides a residual that continues to maintain effectiveness downstream of the disinfection process. Chlorine has also proven to be an economical disinfectant. Consequently, chlorination is by far the most widely used method for potable water disinfection. Because of these advantages, chlorination is recommended for treatment of potable water at Levy.

There are other alternative oxidants such as potassium permanganate, chlorine dioxide, and ozone, but they are more costly and much less common than chlorine.

Chlorination can be accomplished using either chlorine gas or liquid sodium hypochlorite solution as the source of chlorine. Chlorine gas is effective, but storage can be hazardous and there is a potential for affecting control room habitability. Sodium hypochlorite is an alternative and is manufactured by reacting chlorine gas with sodium hydroxide in a water solution. An excess of sodium hydroxide is used to stabilize the solution and retard decomposition. Sodium hypochlorite is also referred to as bleach.

Sodium hypochlorite is the recommended chemical for potable water treatment at Levy. Sodium hypochlorite is chemically equivalent to chlorine gas, but is more convenient to handle and is less hazardous to store and feed. Because of safety concerns, sodium hypochlorite has largely supplanted chlorine gas in industrial and small municipal potable water applications. It should be noted that the AP1000 Design Control Document also recommends using sodium hypochlorite.

Chlorination of surface waters can react with organics in the water to form halogenated organics such as trihalomethanes (THM) and haloacetic acids (HAA5). These and other disinfection byproducts (DBP) have been shown to be carcinogenic and mutagenic and cause chronic, long-term health risks. As a result, application of chlorination is limited to a maximum residual of 4 ppm as chlorine to minimize DBP formation. Levy will supply potable water from new wells which have less potential for DBP formation, but an upper limit of 4 ppm as chlorine will be used for conservatism and to limit adverse impact on taste and odor. The minimum required dose is a function of contact time, temperature, and pH. The minimum at Levy will be at least 0.5 ppm per the DCD.

7.4 Cooling Water Treatment Chemicals

Seawater will be used for makeup to the Circulating Water System cooling tower at Levy and is supplied from the Gulf of Mexico via the Cross Florida Barge Canal. This makeup will be supplemented from time to time with storm runoff collected in storm retention ponds and pumped to the makeup basin. Stormwater flow can range from 0% to a maximum 6% of the total make-up flow (with one unit operating).

The composition of stormwater in coastal regions typically contains dissolved constituents in proportions similar to seawater, but much more dilute, plus dissolved gasses from the atmosphere. Gasses dissolved from the atmosphere are not significant for cooling tower applications because the cooling water will scrub the atmosphere as it passes over the tower. As a result, recovered storm runoff is equivalent to dilute seawater for purposes of CWS makeup. The storm retention ponds provide sedimentation and flow equalization needed for control of cooling water chemistry.

The design basis for the Circulating Water System is 1.5 cycles of concentration. This results in the circulating water having a pH of 8.2 and approximately 40,000 ppm total

dissolved solids (TDS). The projected composition is within industry standards such as SPX Cooling Technologies preferred limits for salt water.

Computer analysis of circulating water chemistry at 1.5 cycles of concentration, the resulting pH of 8.2 without adjustment, and a temperature of 122 degrees F (Calculation LNG-CWS-GEC-002) indicates the absence of any scaling potential. Calcium carbonate, calcium sulfate, silica, magnesium hydroxide, and magnesium silicate compounds were determined to be below 60% of their solubility limits.

These conditions will only require chemical treatment with a biocide. Sodium hypochlorite is the recommended biocide. Although the comparatively high pH of the circulating water would normally hinder the effectiveness of sodium hypochlorite, bromide present in seawater will counter this effect. Sodium hypochlorite will oxidize the bromide to hypobromous acid, an effective biocide at elevated pH levels. A biodispersant used concurrently with sodium hypochlorite will also enhance its effectiveness by controlling bacteria or algae biofilms. Sodium bisulfite will be needed to dechlorinate cooling tower blowdown prior to discharge to meet discharge requirements.

Scale inhibitors are not necessary as shown by the chemistry analysis indicating no potential for scale formation. Corrosion is best controlled through appropriate material selection in the CWS system rather than chemical addition. This is because the high blowdown rates cause short retentions of chemicals in the circulating system.

Acid feed will generally not be required for normal operation. However, the Cross Florida Barge Canal is currently filled with brackish water at about 5% to 10% the salinity of seawater. Evaluation of the chemistry of this brackish water indicates a calcium carbonate scaling tendency at 1.5 cycles of concentration and a temperature of 122 degrees F. Calcium carbonate scaling can be controlled by adding sulfuric acid to lower the pH. Acid might be required if the Cross Florida Barge Canal is not thoroughly purged prior to startup or after prolonged outages.

These cooling water treatment chemicals are consistent with successful operating experience at Crystal River. The natural-draft cooling tower for Crystal River Units 4 & 5 uses seawater makeup and is operated at 1.2 cycles of concentration. Sodium hypochlorite and sodium bromide is used as the biocide. A surfactant has been fed for control of algal growth, but was discontinued once the growth was dispersed. Sodium bisulfite is used for dechlorination in the canal prior to discharge. Crystal River also has a mechanical draft cooling tower similar to the design planned for Levy, but this tower is a helper tower used intermittently to cool water in the canal and is not used in a circulating cooling system.

Well water will be used as makeup for the Service Water system cooling tower. Well samples show this water is a moderately hard, moderate alkalinity water. Significant

amounts of magnesium and silica are present. The total dissolved solids are approximately 550 mg/l.

Chemical treatment will require scale and corrosion inhibitors. Chemical selection is patterned after the GE Water program employed at Progress Energy Harris Station. Treatment utilizes phosphoric acid and zinc chloride as corrosion inhibitors to protect mild steel metallurgy and a proprietary halogen-resistant azole (HRA) as a corrosion inhibitor to protect copper metallurgy. A proprietary blended HEDP dispersant is used to inhibit scaling and to assist in preventing zinc and phosphate deposits. No specific pH adjustment chemical is added, but the use of phosphoric acid for mild steel corrosion control also results in a neutral cooling water pH.

Sodium hypochlorite is used as the biocide. It is typically injected intermittently three times per day for a total daily duration of about 2 hours. A biodispersant is also utilized concurrently with the sodium hypochlorite to enhance its effectiveness.

8. LIMITATIONS

This evaluation is to support Combined License Application (COLA) and shall provide the basis for the detailed design prior to construction. Verification of inputs, assumptions, and limitations shall be performed during the detailed design stage.

AVT chemical selections for the Secondary Water System in this evaluation are based on conservative application of current industry practice and have not been optimized. Optimization should be performed during detailed design and should be continued during plant operation as part of a chemistry control program to minimize corrosion and transport of corrosion products.

9. CONCLUSIONS

9.1 Hydrazine will be used as the oxygen scavenger in the secondary water system.

9.2 Ethanolamine will be used for pH adjustment in the secondary water system.

9.3 Sodium hypochlorite will be used as the biocide for potable water disinfection.

9.4 Orthophosphate and zinc will be used as the mild steel corrosion inhibitor in the SWS system. Chemical addition will be continuous as needed to maintain target levels.

9.5 A halogen-resistant azole will be used as the yellow metal corrosion inhibitor in the SWS system. Chemical addition will be continuous as needed to maintain target levels.

9.6 A blended HEDP dispersant (GE Water Depositrol BL5323 or equivalent) will be used as the deposit control agent in the SWS system. Chemical addition will be continuous as needed to maintain target levels.

9.7 Sodium hypochlorite will be used as the biocide in the CWS and SWS systems. Chemical addition will be intermittent for a duration of 2 hours per day or less. A biodispersant (GE Water Spectrus BD1500 or equivalent) will also be injected as to enhance biocide efficacy.

9.8 Sodium bisulfite will be used to dechlorinate CWS and SWS system blowdown.

9.9 Sulfuric acid may be used when needed to adjust pH in the CWS system. It is expected that sulfuric acid addition will be limited to startup or to periods following prolonged outages when the Cross Florida Barge Canal contains brackish water with scale-forming tendencies.

10. REFERENCES

1. Final Safety Analysis Report (FSAR), Levy Nuclear Power Plant, Progress Energy
2. AP1000 Design Control Document, Revision 16: Chapters 9 and 10, Westinghouse
3. "PWR Secondary Water Chemistry Guidelines – Revision 6," Technical Report 1008224, EPRI, Palo Alto, CA, 2004
4. "Steam Generator Reference Book, Revision 1," TR-103824, EPRI, Palo Alto, CA, 1994
5. "PWR Advanced Amine Application Guidelines Revision 2," TR-102952-R2, EPRI, Palo Alto, CA, 1997
6. "National Primary Drinking Water Standards," EPA, 40 CFR Part 141
7. RFI #250, "Levy Site, Canal water analysis, Crystal River 4 & 5 Cooling tower water treatment"
8. RFI #255, "Levy Site, Canal water analysis"
9. RFI #303, "Water Analysis Data for Crystal River Intake Canal"
10. RFI #306, Levy Site, Confirmation for use of Prior Crystal River Water data"
11. Calculation LNG-CWS-GEC-002 Rev 0, Circulating Water Chemical Analysis
12. "Preferred Cooling Tower Water Condition Limits for Salt Water", SPX Cooling Technologies, Balcke/Hamon Dry Cooling/Marley, December, 2005
13. Calculation LNG-DRS-M3C-001 Rev 0, Excess Storm Water Pump and Pipe Size Calculation
14. Calculation LNG-CWS-GEC-004 Rev 0, Calculation for Blowdown System
15. GE Betz, personal communication

ATTACHMENTS

Attachment 1
Response to RFI 250
(5 pages)

JVT - REQUEST FOR INFORMATION

RFI # 250 CWO # 10 COLA : PEF WBS# 10.3

RFI TITLE: *(be concise)* Levy Site, Canal water analysis, Crystal River 4 & 5 Cooling tower water treatment

Date of Request: 9/11/07 **Date information is needed?** 9/28/07

To: Paul Snead, Progress Energy (Name and Organization)

From: Ed Toll, WorleyParsons (Name and Organization)

Item Requested (Please provide detailed description, title, dates, etc., if known):

Makeup water for the circulating water cooling tower will be supplied from the Gulf of Mexico through the barge canal at the Levy site. Please provide water analysis data per the attached list for the makeup water. This data will be used to evaluate the cycles of concentration for operation and required chemical treatment.

The chemicals used to treat the Crystal River 4 & 5 cooling tower basin water is also requested. If our analysis of the basin water concentrations indicates that these chemicals are suitable we would list the same chemicals in the Levy FSAR.

How would you like this information sent to you (e-mail, hard copy, CD, etc.)?

E Mail completed RFI

Provide any additional information here:

PROGRESS ENERGY – RFI RESPONSE

Responding Person: ***Date of Response:***

Source of Information:

Response (what was sent):

Transmittal method (how it was sent:)

FOR PGN FILE MANAGEMENT USE

Readily available QA document? *(yes or no)* *Hard copy filed?* *(yes or no)*

Sent to PGN Server Path:

RFI-

Water Analysis Parameters

Parameter	Units
Calcium	mg/l
Magnesium	mg/l
Sodium	mg/l
Potassium	mg/l
Barium	mg/l
Strontium	mg/l
Manganese	mg/l
Boron	mg/l
M,P Alkalinity	mg/l CaCO3
Chloride	mg/l
Flouride	mg/l
Sulfate	mg/l
Nitrate	mg/l
Nitrite	mg/l
Phosphate	mg/l
Orthophosphate	mg/l
Silica, reactive	mg/l
Silica, total	mg/l
SDI (Silt Density Index)	
Total Hardness	mg/l CaCO3
Aluminum, total	mg/l
Antimony (filtered and non-filtered)	mg/l
Arsenic (filtered and non-filtered)	mg/l
Beryllium (filtered and non-filtered)	mg/l
Cadmium (filtered and non-filtered)	mg/l
Chromium (filtered and non-filtered)	mg/l
Copper (filtered and non-filtered)	mg/l
Iron (filtered and non-filtered)	mg/l
Lead (filtered and non-filtered)	mg/l
Mercury (filtered and non-filtered)	mg/l
Nickel (filtered and non-filtered)	mg/l
Selenium (filtered and non-filtered)	mg/l
Silver (filtered and non-filtered)	mg/l
Thallium (filtered and non-filtered)	mg/l
Zinc (filtered and non-filtered)	mg/l

Water Analysis Parameters (continued)

Parameter	Units
TOC	mg/l
BOD-5day	mg/l
Total Dissolved Solids	mg/l
Total Suspended Solids	mg/l
Total Colloidal Solids	mg/l
Turbidity	NTU
Chlorine	mg/l
Conductivity	microS/cm
Sample Temperature	Deg F
pH	Standard Units
Ammonia	mg/l
Cyanide (total)	mg/l
Cyanide (amenable)	mg/l
Polychlorinated Biphenyls (PCB)	mg/l
Pesticides	mg/l
Total Toxic Organics	mg/l
Sulfide (total)	mg/l
Sulfide (dissolved)	mg/l
Oil & Grease (petroleum)	mg/l

"Toll, Edward B. (Reading)" <Edward.Toll@WorleyParsons.com>
01/24/2008 02:26 PM

To <JERI.C.PENROSE@sargentlundy.com>
cc
bcc
Subject Water data

Attached are items you requested. RFI 250 was split into two RFIs with 250 applying to CR 4&5 treatment and 255 covering water analysis. This information is attached as messages

E. B. Toll
WorleyParsons Group Inc

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Calc LNG-CWS-GEC-002.DOC RFI 306.doc

----- Message from "Snead, Paul" <paul.snead@pgnmail.com> on Fri, 14 Sep 2007 08:31:48 -0600 -----

To: "Toll, Edward B. (Reading)" <Edward.Toll@WorleyParsons.com> <ANAND.K.SINGH@sargentlundy.com>, "Archer, John C. (Reading)" <John.Archer@WorleyParsons.com>, <Lorin.Young@CH2M.com>,
cc: <Mike.Keating@CH2M.com>, <Raymond.Bogardus@CH2M.com>, <William.Marsh@CH2M.com>, "Kitchen, Robert" <robert.kitchen@pgnmail.com>, <Jessica.McElroy@CH2M.com>

Subject: FW: RFI-250 Water Analysis Data for Barge Canal

Ed,
My preliminary investigation into your RFI notes the following:

Regarding the water analysis parameters listed in RFI #250, CH2M is only analyzing the for the following:

copper (non-filtered)
iron (non-filtered)
nickel (non-filtered)
zinc (non-filtered)
nitrate
nitrite
total phosphorous

Other parameters they are analyzing, but are not in the RFI #250 are as follows:

chlorophyll *a*
total suspended solids
total dissolved solids
ammonia
total Kjeldahl nitrogen

Sampling of the above parameters is expected to occur between 9/20 and 9/25.

That leaves many water analysis parameters on your list that are not being analyzed for.

Regarding the CR 4&5 treatment chemicals:

It appears that only chlorination (with de-chlorination prior to discharge) and a surfactant agent are used in the CR 4&5 cooling tower basin.
We are not sure if there would be any additional need for treatment chemicals for mechanical draft towers (vs. natural draft towers like CR 4&5).

Ed: Please advise if this is sufficient for your purposes, or if we need more to collect more data.
CH2M: Please advise if there are any plans that I am unaware of to obtain the data included in Ed's attached RFI.

Thanks,

Paul Snead
Lead Environmental Specialist
Nuclear Plant Development & License Renewal
Progress Energy
paul.snead@pgnmail.com
(919) 546-2836

-----Original Message-----
From: Toll, Edward B. (Reading) [mailto:Edward.Toll@WorleyParsons.com]
Sent: Tuesday, September 11, 2007 1:07 PM
To: Snead, Paul; Jessica.McElroy@CH2M.com; ANAND.K.SINGH@sargentlundy.com
Cc: Archer, John C. (Reading)
Subject: RFI-250

Attached is a RFI requesting information for the Levy Plant. If you have any questions please give me a call. This information is required for the conceptual design of the Circulating Water system

*** WORLEYPARSONS GROUP NOTICE ***
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RFI 250.doc

----- Message from <Bryan.Burkingstock@CH2M.com> on Wed, 12 Dec 2007 08:51:35 -0600 -----

Attachment 2
Response to RFI 255
(24 pages)

JVT - REQUEST FOR INFORMATION

RFI # 255 CWO # 10 COLA : PEF WBS# 10.3

RFI TITLE: *(be concise)* Levy Site, Canal water analysis

Date of Request: 9/24/07 **Date information is needed?** 10/8/07

To: Mike Keating, CH2MHill (Name and Organization)

From: Ed Toll, WorleyParsons (Name and Organization)

Item Requested (Please provide detailed description, title, dates, etc., if known):

Makeup water for the circulating water cooling tower will be supplied from the Gulf of Mexico through the barge canal at the Levy site. Please provide water analysis data per the attached list for the makeup water. This data will be used to evaluate the cycles of concentration for operation and required chemical treatment.

How would you like this information sent to you (e-mail, hard copy, CD, etc.)?

E Mail completed RFI

Provide any additional information here:

PROGRESS ENERGY – RFI RESPONSE

Responding Person: Bryan Burkingstock **Date of Response:** 12/12/07

Source of Information:

Data Summary Tables, Levy Nuclear Plant Water Quality Sampling: March, June, and September 2007 (3 files, 1 Table each)

Data Summary Tables, Levy Nuclear Plant Aquatic Sampling: October and November 2007 (1 file, 3 Tables)

Field data from logbook for the March, June, September, and December 2007 water quality sampling events.

Response (what was sent):

E-mail a PDF file (Total of 24 pages) that includes RFI 255, site maps of each sampling location, and water quality data for each sampling event.

(Note: Water quality data for the Aquatic Study represent two of four sampling events. However, these data represent a short list of nutrients and metals intended to support biological and mixing zone evaluations, not cooling tower modeling. Additional samples which include a longer list of parameters for use in cooling tower modeling were collected during the week of December 10th. The validated water quality results will be available no later than December 31st.)

Transmittal method (how it was sent:)

Email

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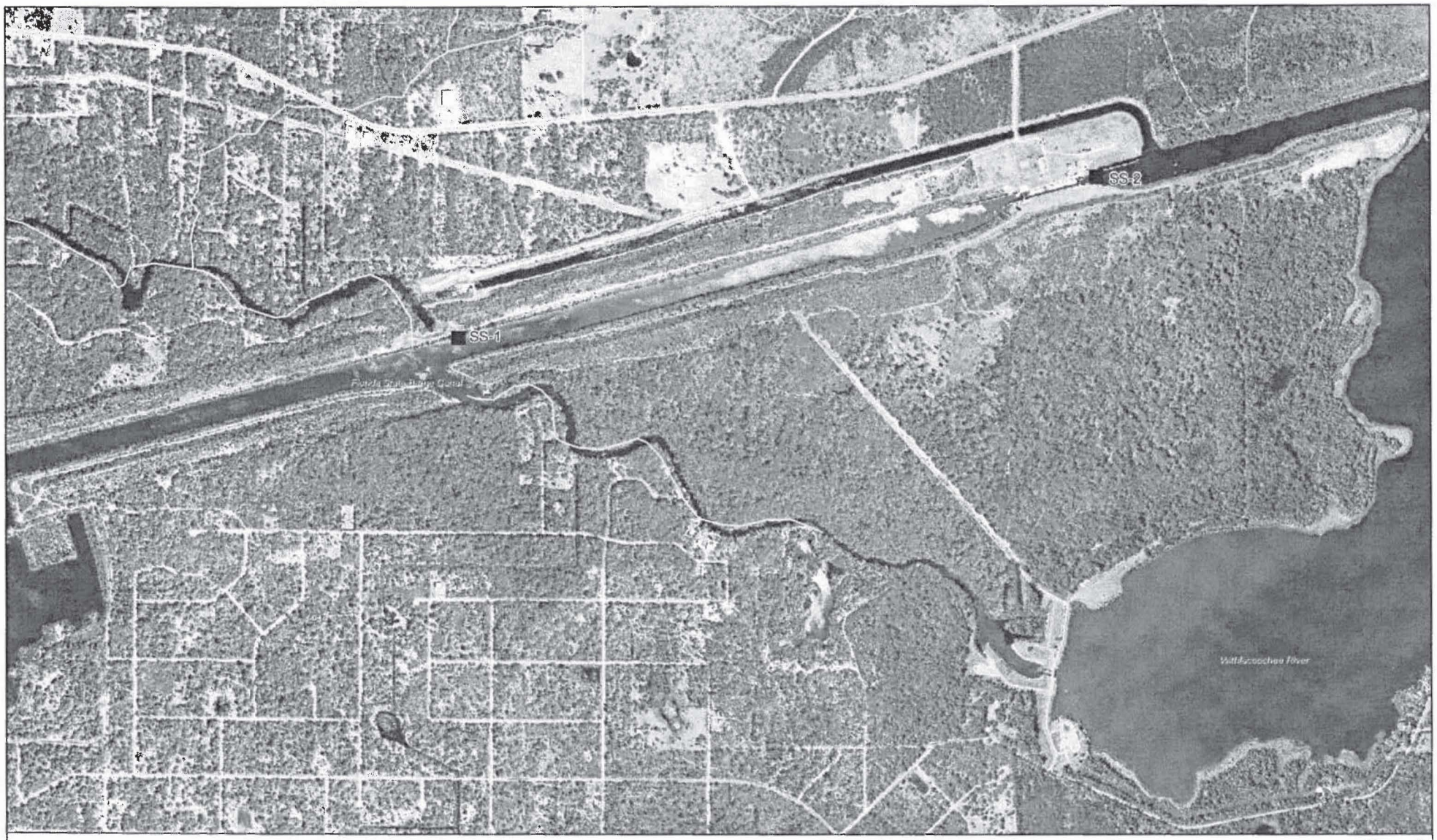
Readily available QA document? (yes or no) _____	*Hard copy filed?* (yes or no) _____
Sent to PGN Server Path: _____	

Water Analysis Parameters

Parameter	Units
Calcium	mg/l
Magnesium	mg/l
Sodium	mg/l
Potassium	mg/l
Barium	mg/l
Strontium	mg/l
Manganese	mg/l
Boron	mg/l
M,P Alkalinity	mg/l CaCO3
Chloride	mg/l
Fluoride	mg/l
Sulfate	mg/l
Nitrate	mg/l
Nitrite	mg/l
Phosphate	mg/l
Orthophosphate	mg/l
Silica, reactive	mg/l
Silica, total	mg/l
SDI (Silt Density Index)	
Total Hardness	mg/l CaCO3
Aluminum, total	mg/l
Antimony (filtered and non-filtered)	mg/l
Arsenic (filtered and non-filtered)	mg/l
Beryllium (filtered and non-filtered)	mg/l
Cadmium (filtered and non-filtered)	mg/l
Chromium (filtered and non-filtered)	mg/l
Copper (filtered and non-filtered)	mg/l
Iron (filtered and non-filtered)	mg/l
Lead (filtered and non-filtered)	mg/l
Mercury (filtered and non-filtered)	mg/l
Nickel (filtered and non-filtered)	mg/l
Selenium (filtered and non-filtered)	mg/l
Silver (filtered and non-filtered)	mg/l
Thallium (filtered and non-filtered)	mg/l
Zinc (filtered and non-filtered)	mg/l

Water Analysis Parameters (continued)

Parameter	Units
TOC	mg/l
BOD-5day	mg/l
Total Dissolved Solids	mg/l
Total Suspended Solids	mg/l
Total Colloidal Solids	mg/l
Turbidity	NTU
Chlorine	mg/l
Conductivity	microS/cm
Sample Temperature	Deg F
pH	Standard Units
Ammonia	mg/l
Cyanide (total)	mg/l
Cyanide (amenable)	mg/l
Polychlorinated Biphenyls (PCB)	mg/l
Pesticides	mg/l
Total Toxic Organics	mg/l
Sulfide (total)	mg/l
Sulfide (dissolved)	mg/l
Oil & Grease (petroleum)	mg/l



Legend

Surface Water Sample Location

RFI 255 - 12/12/2007

N W E S

0 0.5 1 Miles

Figure 3
Surface Water Sample Locations
Levy County, Florida

CH2MHILL

File Path: \\hocmar4\projects\LevyCounty\mxd\SurfaceWaterLocations.mxd, Date: March 6, 2007, User: FKENT2

DO999
Data Summary Table
Levy Nuclear Plant Water Quality Sampling March 2007

Levy Nuclear Plant Water Quality Sampling March 2007	StationID	MW-14DBL	MW13SBL	MW15SBL	MW16DBL	MW100BL	SS-100BL	SS-1BL	SS-2BL
	SampleID	MW-14DBL	MW13SBL	MW15SBL	MW16DBL	MW100BL	SS-100BL	SS-1BL	SS-2BL
	Sample Date	3/7/2007	3/7/2007	3/7/2007	3/7/2007	3/7/2007	3/8/2007	3/8/2007	3/8/2007
Parameter	Unit								
SW10200H									
Chlorophyll-a	mg/m3						3.2	2.9	2.7
E310.1									
Alkalinity (As CaCO3)	mg/L	301	196	274	304	279	110	115	109
SW2320B									
Alkalinity, Bicarbonate (As CaCO3)	mg/L	299	195	270	300	275			
E350.1									
Ammonia (as N)	mg/L	0.21	0.16	0.053 J	0.23	0.05 U	0.15 UJ	0.1 J	0.096 J
E405.1									
BOD - 5 Day	mg/L	4	2.5	2.4	5.6	2.5	2 U	2 U	2 U
A4500D									
Carbon Dioxide, Total	mg/L	272	179	243	271	248			
E300									
Chloride	mg/L	10.6	13.6	18.8	17.5	18.9	6.8	741	6.9
Fluoride	mg/L	0.18	0.18	0.078 J	0.091 J	0.075 J	0.091 J	0.12 J	0.09 J
Sulfate	mg/L	2	4.6	2.7	0.5 U	3.9	31.1	139	30.8
E410.4									
COD	mg/L	22.8 J	27.8 J	32.8 J	55.4 J	32.8 J	20 U	20 U	20 U
E200.7									
Hardness, Total (As CaCO3)	mg/L	306	212	294	303	288	140	366	141
E353.2									
Nitrate + Nitrite (As N)	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.29 J	0.25 U	0.28 J
E365.2									
Phosphorous, Ortho (As P)	mg/L	0.079	0.034	0.049	0.069	0.059	0.01 U	0.1 U	0.1 U
Phosphorous, Total (As P)	mg/L	0.14	0.14	0.12	0.16	0.13	0.029 J	0.029 J	0.024 J
E376.1									
Sulfide	mg/L	0.7 U	0.73 U	0.71 U	0.68 U	0.69 U	0.71 U	0.71 U	0.71 U
E160.1									
TDS	mg/L	336	235	322	312	298	198	1630	184
E351.2									
TKN	mg/L	0.68 J	0.8 J	0.51 J	1.1 J	0.51 J	0.51 J	0.55 J	0.5 U
E415.1									
TOC (NPOC)	mg/L	8.2	10	14.3	17.7	14.2	1.9	2.8	2
E160.2									
TSS	mg/L	7.2	54.4	27.2	7.2	21.6	4 UJ	4 UJ	4 UJ
SW7470A									
Mercury	ug/L	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
SW6010B									
Arsenic	ug/L	3 U	9 J	3 U	3 U	3 U	3 U	3 U	3 U
Boron	ug/L	15.4 J	19.9 J	25.4 J	16.8 J	24.8 J	10.5 J	184	10.7 J
Calcium	ug/L	85400	53200	98800	86400	96900	47200	62800	47500
Chromium	ug/L	2 U	4 J	2 U	2.3 J	2 U	2 U	2 U	2 U
Copper	ug/L	5 U	5 U	5 U	5.3 J	5 U	5 U	5 U	5 U
Iron	ug/L	2380	15300	7270	3920	7150	34.8 J	37.8 J	30.3 J
Lead	ug/L	1.5 U	1.6 J	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Magnesium	ug/L	22700	19100	11400	21200	11200	5460	50900	5490
Manganese	ug/L	38.3	46.5	43.3	61.2	42.6	3.6 J	4 J	3.7 J
Nickel	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	ug/L	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	18700	1000 U
Sodium	ug/L	9220	8400	10700	12200	10500	4010 J	389000	4060 J
Zinc	ug/L	6.5 J	6 J	5 U	10.4 J	5 U	5 U	5 U	10.9 J
SW6010B									
Silica	mg/L	8.3	9.5	6.3	9.6	6.2			

Notes:
Values Bold and Shaded are Hits
U - The analyte was analyzed for , but not detected.
J - estimated value
B-The analyte was detected in the associated method and/or calibration blank.
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated Field Blank, Method and/or calibration blank.

DO999
Data Summary Table
Levy Nuclear Plant Water Quality Sampling June 2007

Levy Nuclear Plant Water Quality Sampling June 2007	StationID	MW13SQ2	MW14DQ2	MW15SQ2	MW16DQ2	SS-1Q2	SS-2Q2
	SampleID	MW13SQ2	MW14DQ2	MW15SQ2	MW16DQ2	SS-1Q2	SS-2Q2
	Sample Date	6/15/2007	6/15/2007	6/14/2007	6/14/2007	6/14/2007	6/14/2007
Parameter	Unit						
A4500D							
Carbon dioxide free	mg/l	209	268	317	274		
E160.1							
Chlorophyll-a	mg/m³					4.5	7.5
Total dissolved solids (residue, filterable)	mg/l	221	320	357	335	2530	123
E160.2							
Total Suspended Solids	mg/l	19.2	10.4	124	12	4 U	4.8
E200.7							
Hardness (as caco3)	mg/l	194	320	593	310	602	104
E300							
Chloride (as Cl)	mg/l	15.2	10.6	18.8	16.7	1270	7.6
Fluoride	mg/l	0.17	0.18	0.11 J	0.18		
Sulfate (as SO4)	mg/l	1.5 U	1.3 J	0.9 J	1.5 U	177	15.3
E310.1							
Alkalinity, total (as CaCO3)	mg/l	172	283	280	265	89	79
E350.1							
Nitrogen, ammonia (as N)	mg/l	0.18	0.12 J	0.15 U	0.24 J	0.15 U	0.15 U
E351.2							
nitrogen, kjeldahl, total	mg/l	0.83 J	0.84 J	0.54 J	0.83 J	1.5 U	0.69 J
E353.2							
Nitrogen, nitrate-nitrite	mg/l	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
E365.2							
Phosphorus, Total (as P)	mg/l	0.17	0.15	0.49	0.26	0.058 J	0.047 J
Phosphorus, total orthophosphate (as p)	mg/l	0.094	0.077	0.3	0.21	0.042	0.03 U
E376.1							
Sulfide	mg/l	2.1 U	2.1 U	2.1 U	2.2 U	2.1 U	2.2 U
E405.1							
biologic oxygen demand, five day	mg/l	4.4	8	4.5	5.6	2.3	2.4
E410.4							
cod - chemical oxygen demand	mg/l	51.4 J	44 J	56.4 J	51.4 J	60 U	60 U
E415.1							
Total organic carbon	mg/l	11.3	9.6	17.1	17.3	2.2	1.7
SW2320B							
Alkalinity, bicarbonate (as caco3)	mg/l	172	282	280	265		
SW6010B							
Arsenic	ug/L	13.8	3 U	3 U	3 U	3 U	3 U
Boron	ug/L	22.4 J	18.6 J	34.8 J	19 J	330	13.3 J
Calcium	ug/L	50400	89000	169000	88600	59900	32900
Chromium, total	ug/L	4 J	2 U	19.7	3.5 J	2 U	2 U
Copper	ug/L	5 U	5 U	5 U	5 U	5 U	5 U
Iron	ug/L	18700	1990	9290	4800		
Lead	ug/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Magnesium	ug/L	16500	23900	41500	21600	88800	5330
Manganese	ug/L	52.1	40.1	76.8	65.8	12.8 J	5.9 J
Nickel	ug/L	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	ug/L	1000 U	1000 U	1000 U	1000 U	35100	1000 U
silica	mg/l	8.8	8.3	10.4	9.7		
Sodium	ug/L	8900	9920	10900	11500	686000	4690 J
Zinc	ug/L	10.4 J	15.4 J	6.6 J	14.3 J	7.2 J	5.1 J
SW7470A							
Mercury	ug/L	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U

Notes:
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DO999
Data Summary Table
Water Quality Sept 2007

Water Quality Sept 2007	StationID	MW13SQ3	MW14DQ3	MW15SQ3	MW16DQ3	SS-1Q3	SS-2Q3
	SampleID	MW13SQ3	MW14DQ3	MW15SQ3	MW16DQ3	SS-1Q3	SS-2Q3
	Sample Date	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007	9/13/2007
Parameter	**Unit**						
A4500D							
Carbon dioxide free	mg/L	**179**	**310**	**300**	**297**		
E160.1							
Total dissolved solids (residue, filterable)	mg/L	**279**	**407**	**445**	**424**	**3530**	**267**
E160.2							
Total Suspended Solids	mg/L	**18.4**	**11.6**	4 U	4 U	**4.8**	4 U
E200.7							
Hardness (as CaCo3)	mg/L	**168**	**303**	**324**	**278**	**710**	**126**
E300							
Chloride (as Cl)	mg/L	**19.4**	**12.3**	**20.6**	**18.5**	**1790**	**7**
Fluoride	mg/L	**0.21**	**0.56**	**0.18**	**0.2**		
Phosphorus, total orthophosphate (as p)	mg/L	1.5 UJ	1.5 UJ	1.5 UJ	1.5 UJ		
Sulfate (as SO4)	mg/L	1.5 U	**4.5**	**1.7**	**0.52 J**	**288**	**47.4**
E310.1							
Alkalinity, total (as CaCO3)	mg/L	**134**	**306**	**266**	**282**	**89.5**	**64.4**
E350.1							
Nitrogen, ammonia (as N)	mg/L	**0.19 J**	**0.16 J**	0.3 U	**0.23 J**	0.3 U	0.3 U
E351.2							
Nitrogen, kjeldahl, total	mg/L	**1 J**	**1.3 J**	**0.82 J**	**1.6**	**1 J**	**0.74 J**
E353.2							
Nitrogen, nitrate-nitrite	mg/L	0.75 U	0.75 U	0.75 U	0.75 U	**0.3 J**	0.75 U
E365.2							
Phosphorus, Total (as P)	mg/L	**0.13**	**0.1**	**0.22**	**0.36**	**0.037 J**	0.06 U
Phosphorus, total orthophosphate (as p)	mg/L					0.03 U	0.03 U
E376.1							
Sulfide	mg/L	2 U	2 U	2 U	**0.67 J**	2 U	2 U
E405.1							
Biologic oxygen demand, five day	mg/L	**5.6 J**	**9.8 J**	**4.3 J**	**12.4 J**	**3.5 J**	2 U
E410.4							
COD - chemical oxygen demand	mg/L	**27 J**	**20.3 J**	**44.8**	**53.7**	**56**	**33.7 J**
E415.1							
Total organic carbon	mg/L	**11.1**	**10.7**	**16.9**	**18.7**	**4.1**	**3**
SM10200H							
Chlorophyll-a	mg/m³					**20.8**	**4**
SM2320B							
Alkalinity, bicarbonate (as caco3)	mg/L	**134**	**306**	**266**	**282**		
SW6010B							
Arsenic	ug/L	**12.2**	3 U	3 U	3 U	3 U	3 U
Boron	ug/L	**22.2 J**	**19.6 J**	**31.9 J**	**20 J**	**453**	**15.8 J**
Calcium	ug/L	**45800**	**85200**	**110000**	**80200**	**83800**	**40900**
Chromium, total	ug/L	**2.9 J**	2 U	**5.6 J**	**3 J**	2 U	2 U
Copper	ug/L	5 U	5 U	5 U	5 U	5 U	5 U
Iron	ug/L	**15400**	**1450**	**7350**	**3810**		
Lead	ug/L	**2.4 J**	1.5 U	**3.7**	1.5 U	1.5 U	1.5 U
Magnesium	ug/L	**13000**	**21800**	**12300**	**18900**	**121000**	**5720**
Manganese	ug/L	**51**	**35.2**	**50.5**	**59.1**	**9.7 J**	**3.6 J**
Nickel	ug/L	5 U	5 U	5 U	5 U	5 U	5 U
Potassium	ug/L	1000 U	1000 U	1000 U	1000 U	**49200**	1000 U
silica	mg/L	**8.1**	**8.4**	**7.6**	**10.1**		
Sodium	ug/L	**7950**	**10700**	**10500**	**17300**	**979000**	**4480 J**
Zinc	ug/L	**11.9 J**	**11 J**	**11 J**	**9.1 J**	**11.1 J**	**7.1 J**
SW7470A							
Mercury	ug/L	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U

Notes:
Values Bold and Shaded are Hits
U - The analyte was analyzed for , but not detected.
J - estimated value
B-The analyte was detected in the associated method and/or calibration blank.
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated Field Blank, Method and/or calibration blank.

LNP Site

"Rite in the Rain"®
ALL-WEATHER
ENVIRONMENTAL
No. 550

PEF COLA

3/6/07 -

Log Book #1

Location: Levy County Date: 3-8-07
Project / Client: PEF CUA
E. Musi / J. Frank / ROM

Objective - Collect Surface water samples, ship samples to Empirical Lab, Obtain new transducers to continue Slug tests

Weather - Sunny 50's (morning)
Sunny 70's (predicted)

0700 - H&S tailgate - watch hands close gate etc.

0800 - Leave site to collect Surface water samples

0830 - Arrive at Site for SS-2
- Sample Location is at INGLIS LOCK REC AREA
20751 SE 70th AVE, INGLIS FL
OFFICE OF GREENWAYS & TRAILS / DEP
- Calibrate YSI 650 MDS
- CALL MIKE BROSE TO VERIFY LOCATION

900 - Collect Sample ID: SS-2BL
Duplicate ID: SS-100BL
- Grab sample Parameters taken:

TEMP	Cond	DO	pH	ORP	Turb	Sal / PPT
18.41	0.166	5.15	7.94	114.9	151.5	0.09

- Photographs taken of area.
- Location marked on Aerial.

Location: Levy County Date: 3-8-07
Project / Client: PEF CUA
J. FRANK / E. MUSI

1000 - Leave to find location on SS-1
- Computer battery dead, unable to see original figure.

1130 - Arrive at possible location. CALL MIKE BROSE TO VERIFY - SEE IF BACK PRIOR TO COMPUTER TO SEE FIGURE

1300 - MIKE BROSE VERIFIES LOCATION

1330 - COLLECT SAMPLE ID: SS-1BL
(BOTTLEWARE SAYS 11:30 for some)
- LOCATION AT BARGE CANAL PARALLEL TO BYPASS DAM. SEE AERIAL & PHOTOS
- GRAB SAMPLE PARAMETERS

TEMP	Cond	DO	pH	ORP	TURB	SAL
21.88	1.949	4.16	7.51	113.9	21.4	1.06

1445 - LEAVE TO SHIP SAMPLES

1545 - SHIP SAMPLES FROM QUICK PACK & SHIP in Homosassa, FL

1640 - RETURN TO SITE TO CONTINUE SLUG TESTS
- TWO TRANSDUCERS SENT TO REPLACE
- The one from yesterday
- SET UP ON MW-SS for SLUG IN
- Water Level = 3.91' BTOC
- TROLL SN - 20931
- Test started too slowly ... deleted - will restart

Location Levy County, FL Date 06/14/07
Project / Client PEF COLA

1120 Calibrate turbidity meter #01115
std 1.0 1.03 → 1.00
10.0 9.60 → 10.00
1115 Begin purging @ MW15S 3 well volumes = 129G

1145 Collect sample MW15SQ2 and duplicate MW15SQ2FD Final reading @ 15G

pH	cond	T°	DO	orp	turb	sal.
6.66	0.615	22.68	0.74	-19.4	6.50	0.30

1236 Begin purging @ MW16D. 3 well volumes = 56.6G
1245 Place troll back down MW15S
1315 Collect sample MW16DQ2
Final reading @ 55G

pH	cond	T°	DO	orp	turb	Sal
6.78	0.540	21.84	0.52	-95.2	0.25	0.29

1340 Drive out to Hwy 40E to collect surface water samples.

Location Levy County, FL Date 06/14/07
Project / Client PEF COLA

1430 Collect sample SS-1Q2
Grab sample parameters

pH	cond	T°	DO	orp	turb	Sal
7.80	4.489	29.15	6.07	229.4	1.10	2.37

1450 Head over towards 2nd surface water sampling location

1530 Collect sample SS-2Q2 and duplicate SS-2Q2FD. Parameters

pH	cond	T°	DO	orp	turb	Sal
8.62	0.225	29.89	8.89	220.7	1.40	0.10

1615 Buy ice and head to FedEx to ship/pack coolers

1800 Coolers handed off to FedEx, EOD

Location: Levy County, FL Date: 9/13/07
Project / Client: PEF COLA

1817 Return to collect Surface water samples

1830 Collect Surface water sample SS-1Q3

Temp	Cond	Sal	DO	pH	ORP	Turb
(*) N/A	6.152	3.07	0.52	7.74	81.6	0.7

1900 Collect Surface water sample SS-2Q3 & SS-2Q3FD Duplicate

Temp	Cond	Sal	DO	pH	ORP	Turb
(*) N/A	0.294	0.13	0.67	8.24	989	0.00

1918 Pack coolers & equipment. Leave site, event complete

(*) See pg. 31 for explanation (AT)

Location: Levy County, FL Date: 120407
Project / Client: PEF COLA

1100 Arrive onsite
Personnel: A. Teal S. Vaughn
Weather: Sunny, cool, High 70°F
Objective: Site wide water levels, begin 4th Q 07 GW Sampling event

1110 Meet w/ Karen Olsen, go over daily H&S: cold weather

1115 Begin calibration
YSI 650 Pine # 07190

	Lot #	Exp
~~pH 4.0~~		
pH 4.0	5819	07/16/08
pH 7.0	2708894	08/2008
pH 10.0	7090	04/30/08
Cond	5889	08/21/08
ORP	6 2391	08/2012

	pH(4.0)	pH(7.0)	pH(10.0)	(1413) Cond	ORP	DO
initial	3.90	7.00	10.02	1.293	222.1	—
Final	4.00	—	10.00	1.413	240.0	9.59 %

LaMotte 2020 turbidimeter

Std:	1 NTU	10 NTU	Pine #
initial	0.73	9.49	01882
final	1.0	10.00	

Location Levy County, FL Date 120407

Project / Client PEF COLA

Site-Wide Water Levels

Well	DTW	Time	TD	Transducer out	transducer in
MW-1S	8.78	1340		NA	NA
MW-2S	9.63	1358			
MW-3S	10.39	1320			
MW-4S	7.90	1350			
MW-5S	7.95	1350			
MW-6D	8.32	1349			
MW-7S	8.92	1453			
MW-8D	8.86	1453			
MW-9S	8.03	1211			
MW-10D	8.21	1213			
MW-11S	7.04	1241			
MW-12D	7.96	1243			
MW-13S	8.08	1435	33.28	1424	1445
MW-14D	8.16	1422	123.89	NA	NA
MW-15S	8.36	1231	33.21	1230	1305
MW-16D	8.33	1228	122.62	NA	NA
PW-1	8.10	1438			
PW-1	8.18	1436			
OW-2	7.82	1420			
OW-3	7.73	1411			
OW-4	7.79	1439			
OW-5	7.99	1411			
OW-6	7.91	1437			
OW-7	7.88	1420			

Location Levy County, FL Date 120407

Project / Client PEF COLA

1147 I have read and understand the manufacturers manual for the calibration for the YSI 650 MDS and the Lamotte 2020. The calibration for YSI # 07190 (PW#) and LaMotte # 01882 (PW#) follows the manufacturers procedures as provided by the operator's manual

1500 WLs complete. Over to SS-1 to collect surface water sample

1545 Collect sample SS-1004

pH	cond	T°	DO	ORP	turb	Sal
7.52	4.589	20.84	8.19	225.4	1.30	2.46

1600 Over to SS-2 to collect surface water sample

1615 Collect sample SS-2004 and dup SS-1004

pH	cond	T	DO	ORP	turb	Sal
8.16	0.400	21.99	9.30	185.3	2.25	0.19

Aquatic Sampling Locations
LNP Site
Progress Energy

Aquatic Study Water Quality Sampling Station Descriptions

Description	Station ID
0.5 mi west of Inglis Lock	**Sta 1**
3.5 mi west of Inglis Lock	**Sta 2**
7.0 mi west of Inglis Lock	**Sta 3**
0.5 mi west of canal mouth	**Sta 4**
3 mi west of canal mouth	**Sta 5**
5 mi west of canal mouth	**Sta 6**
7 mi west of canal mouth	**Sta 7**

Progress Energy - Surface Water Quality Data

Canal Station	Sample Date	Analyte	Result	Units	Final Qualifier	Notes
1	10/16/2007	Ammonia	0.6	mg/L	UJ	
1	11/19/2007	Ammonia	0.15	mg/L	UJ	
1	10/16/2007	Chlorophyll-a, corrected for Pheophytin	18	mg/m3	=	
1	11/19/2007	Chlorophyll-a, corrected for Pheophytin	43	mg/m3	=	
1	10/16/2007	Nitrate Nitrite as N	0.0094	mg/L	J	
1	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	UJ	
1	10/16/2007	Nitrogen, Kjeldahl	0.43	mg/L	J	
1	11/19/2007	Nitrogen, Kjeldahl	0.87	mg/L	J	
1	10/16/2007	Phosphorus	0.074	mg/L	J	
1	11/19/2007	Phosphorus	0.13	mg/L	J	
1	10/16/2007	Total Dissolved Solids	20000	mg/L	=	
1	11/19/2007	Total Dissolved Solids	24000	mg/L	=	
1	10/16/2007	Total Suspended Solids	15	mg/L	=	
1	11/19/2007	Total Suspended Solids	38	mg/L	=	
2	10/16/2007	Ammonia	0.06	mg/L	U	
2	11/19/2007	Ammonia	0.3	mg/L	U	
2	10/16/2007	Chlorophyll-a, corrected for Pheophytin	11	mg/m3	=	
2	11/19/2007	Chlorophyll-a, corrected for Pheophytin	21	mg/m3	=	
2	10/16/2007	Nitrate Nitrite as N	0.0098	mg/L	J	
2	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	U	
2	10/16/2007	Nitrogen, Kjeldahl	0.49	mg/L	=	
2	11/19/2007	Nitrogen, Kjeldahl	0.68	mg/L	=	
2	10/16/2007	Phosphorus	0.077	mg/L	=	
2	11/19/2007	Phosphorus	0.059	mg/L	=	
2	10/16/2007	Total Dissolved Solids	21000	mg/L	=	
2	11/19/2007	Total Dissolved Solids	22000	mg/L	=	
2	10/16/2007	Total Suspended Solids	20	mg/L	=	
2	11/19/2007	Total Suspended Solids	38	mg/L	=	

Progress Energy - Surface Water Quality Data

Canal Station	Sample Date	Analyte	Result	Units	Final Qualifier	Notes
3	10/16/2007	Ammonia	0.3	mg/L	U	
3	10/16/2007	Ammonia	0.3	mg/L	U	Field Duplicate
3	11/19/2007	Ammonia	0.3	mg/L	U	
3	11/19/2007	Ammonia	0.3	mg/L	U	Field Duplicate
3	10/16/2007	Chlorophyll-a, corrected for Pheophytin	5.3	mg/m3	=	
3	10/16/2007	Chlorophyll-a, corrected for Pheophytin	2	mg/m3	U	Field Duplicate
3	11/19/2007	Chlorophyll-a, corrected for Pheophytin	3.2	mg/m3	=	
3	11/19/2007	Chlorophyll-a, corrected for Pheophytin	2	mg/m3	U	Field Duplicate
3	10/16/2007	Copper	0.52	µg/L	=	
3	10/16/2007	Copper	0.51	µg/L	=	Field Duplicate
3	10/18/2007	Copper	0.36	µg/L	=	
3	10/18/2007	Copper	0.37	µg/L	=	Field Duplicate
3	10/16/2007	Iron	333	µg/L	=	
3	10/16/2007	Iron	418	µg/L	=	Field Duplicate
3	10/18/2007	Iron	192	µg/L	=	
3	10/18/2007	Iron	188	µg/L	=	Field Duplicate
3	10/16/2007	Nickel	0.31	µg/L	=	
3	10/16/2007	Nickel	0.29	µg/L	=	Field Duplicate
3	10/18/2007	Nickel	0.27	µg/L	J	
3	10/18/2007	Nickel	0.21	µg/L	=	Field Duplicate
3	10/16/2007	Nitrate Nitrite as N	0.013	mg/L	J	
3	10/16/2007	Nitrate Nitrite as N	0.011	mg/L	J	Field Duplicate
3	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	U	
3	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	U	Field Duplicate
3	10/16/2007	Nitrogen, Kjeldahl	0.27	mg/L	=	
3	10/16/2007	Nitrogen, Kjeldahl	0.29	mg/L	=	Field Duplicate
3	11/19/2007	Nitrogen, Kjeldahl	0.2	mg/L	J	
3	11/19/2007	Nitrogen, Kjeldahl	0.41	mg/L	=	Field Duplicate
3	10/16/2007	Phosphorus	0.06	mg/L	=	
3	10/16/2007	Phosphorus	0.063	mg/L	=	Field Duplicate
3	11/19/2007	Phosphorus	0.037	mg/L	=	
3	11/19/2007	Phosphorus	0.042	mg/L	=	Field Duplicate
3	10/16/2007	Total Dissolved Solids	28000	mg/L	=	
3	10/16/2007	Total Dissolved Solids	27000	mg/L	=	Field Duplicate
3	11/19/2007	Total Dissolved Solids	27000	mg/L	=	
3	11/19/2007	Total Dissolved Solids	25000	mg/L	=	Field Duplicate
3	10/16/2007	Total Suspended Solids	33	mg/L	=	
3	10/16/2007	Total Suspended Solids	28	mg/L	=	Field Duplicate
3	11/19/2007	Total Suspended Solids	39	mg/L	=	
3	11/19/2007	Total Suspended Solids	36	mg/L	=	Field Duplicate
3	10/16/2007	Zinc	0.53	µg/L	=	
3	10/16/2007	Zinc	0.51	µg/L	=	Field Duplicate
3	10/18/2007	Zinc	0.26	µg/L	=	
3	10/18/2007	Zinc	0.34	µg/L	=	Field Duplicate

Progress Energy - Surface Water Quality Data

Canal Station	Sample Date	Analyte	Result	Units	Final Qualifier	Notes
4	10/16/2007	Ammonia	0.3	mg/L	U	
4	11/19/2007	Ammonia	0.3	mg/L	U	
4	10/16/2007	Chlorophyll-a, corrected for Pheophytin	2	mg/m3	U	
4	11/19/2007	Chlorophyll-a, corrected for Pheophytin	2.1	mg/m3	=	
4	10/16/2007	Copper	0.54	µg/L	=	
4	10/18/2007	Copper	0.44	µg/L	=	
4	10/16/2007	Iron	410	µg/L	=	
4	10/18/2007	Iron	310	µg/L	=	
4	10/16/2007	Nickel	0.32	µg/L	=	
4	10/18/2007	Nickel	0.29	µg/L	=	
4	10/16/2007	Nitrate Nitrite as N	0.013	mg/L	J	
4	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	U	
4	10/16/2007	Nitrogen, Kjeldahl	0.18	mg/L	J	
4	11/19/2007	Nitrogen, Kjeldahl	0.33	mg/L	=	
4	10/16/2007	Phosphorus	0.047	mg/L	=	
4	11/19/2007	Phosphorus	0.03	mg/L	=	
4	10/16/2007	Total Dissolved Solids	27000	mg/L	=	
4	11/19/2007	Total Dissolved Solids	26000	mg/L	=	
4	10/16/2007	Total Suspended Solids	43	mg/L	=	
4	11/19/2007	Total Suspended Solids	37	mg/L	=	
4	10/16/2007	Zinc	0.55	µg/L	=	
4	10/18/2007	Zinc	0.52	µg/L	=	
5	10/16/2007	Ammonia	0.6	mg/L	U	
5	11/19/2007	Ammonia	0.3	mg/L	U	
5	10/16/2007	Chlorophyll-a, corrected for Pheophytin	2	mg/m3	U	
5	11/19/2007	Chlorophyll-a, corrected for Pheophytin	2.1	mg/m3	=	
5	10/16/2007	Copper	0.41	µg/L	=	
5	10/18/2007	Copper	0.46	µg/L	=	
5	10/16/2007	Iron	140	µg/L	=	
5	10/18/2007	Iron	130	µg/L	=	
5	10/16/2007	Nickel	0.24	µg/L	=	
5	10/18/2007	Nickel	0.25	µg/L	=	
5	10/16/2007	Nitrate Nitrite as N	0.05	mg/L	U	
5	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	U	
5	10/16/2007	Nitrogen, Kjeldahl	0.2	mg/L	U	
5	11/19/2007	Nitrogen, Kjeldahl	0.33	mg/L	=	
5	10/16/2007	Phosphorus	0.029	mg/L	=	
5	11/19/2007	Phosphorus	0.019	mg/L	=	
5	10/16/2007	Total Dissolved Solids	28000	mg/L	=	
5	11/19/2007	Total Dissolved Solids	28000	mg/L	=	
5	10/16/2007	Total Suspended Solids	29	mg/L	=	
5	11/19/2007	Total Suspended Solids	33	mg/L	=	
5	10/16/2007	Zinc	0.28	µg/L	=	
5	10/18/2007	Zinc	0.26	µg/L	=	

Progress Energy - Surface Water Quality Data

Canal Station	Sample Date	Analyte	Result	Units	Final Qualifier	Notes
6	10/16/2007	Ammonia	0.6	mg/L	U	
6	11/19/2007	Ammonia	0.3	mg/L	U	
6	10/16/2007	Chlorophyll-a, corrected for Pheophytin	2	mg/m3	U	
6	11/19/2007	Chlorophyll-a, corrected for Pheophytin	2.1	mg/m3	=	
6	10/16/2007	Copper	0.39	µg/L	=	
6	10/18/2007	Copper	0.4	µg/L	=	
6	10/16/2007	Iron	114	µg/L	=	
6	10/18/2007	Iron	88.3	µg/L	=	
6	10/16/2007	Nickel	0.3	µg/L	=	
6	10/18/2007	Nickel	0.25	µg/L	=	
6	10/16/2007	Nitrate Nitrite as N	0.05	mg/L	U	
6	11/19/2007	Nitrate Nitrite as N	0.25	mg/L	U	
6	10/16/2007	Nitrogen, Kjeldahl	0.2	mg/L	U	
6	11/19/2007	Nitrogen, Kjeldahl	0.27	mg/L	=	
6	10/16/2007	Phosphorus	0.03	mg/L	=	
6	11/19/2007	Phosphorus	0.018	mg/L	=	
6	10/16/2007	Total Dissolved Solids	30000	mg/L	=	
6	11/19/2007	Total Dissolved Solids	27000	mg/L	=	
6	10/16/2007	Total Suspended Solids	24	mg/L	=	
6	11/19/2007	Total Suspended Solids	36	mg/L	=	
6	10/16/2007	Zinc	0.29	µg/L	=	
6	10/18/2007	Zinc	0.17	µg/L	=	
7	10/16/2007	Ammonia	0.6	mg/L	U	
7	11/19/2007	Ammonia	0.3	mg/L	U	
7	10/16/2007	Chlorophyll-a, corrected for Pheophytin	2	mg/m3	U	
7	11/19/2007	Chlorophyll-a, corrected for Pheophytin	3.2	mg/m3	J	
7	10/16/2007	Copper	0.34	µg/L	=	
7	10/18/2007	Copper	0.21	µg/L	=	
7	10/16/2007	Iron	98.4	µg/L	=	
7	10/18/2007	Iron	48.4	µg/L	=	
7	10/16/2007	Nickel	0.22	µg/L	=	
7	10/18/2007	Nickel	0.15	µg/L	=	
7	10/16/2007	Nitrate Nitrite as N	0.05	mg/L	U	
7	11/19/2007	Nitrate Nitrite as N	0.015	mg/L	J	
7	10/16/2007	Nitrogen, Kjeldahl	0.2	mg/L	U	
7	11/19/2007	Nitrogen, Kjeldahl	0.2	mg/L	J	
7	10/16/2007	Phosphorus	0.022	mg/L	=	
7	11/19/2007	Phosphorus	0.019	mg/L	=	
7	10/16/2007	Total Dissolved Solids	32000	mg/L	=	
7	11/19/2007	Total Dissolved Solids	33000	mg/L	=	
7	10/16/2007	Total Suspended Solids	31	mg/L	=	
7	11/19/2007	Total Suspended Solids	42	mg/L	=	
7	10/16/2007	Zinc	0.19	µg/L	=	
7	10/18/2007	Zinc	0.11	µg/L	=	

Legend:
Concentration qualifiers
ND- Analyte not detected
U- Analyte not detected
J- Result estimated

Progress Energy
Barge Canal Field Water Quality Profile Data

	Station ID		Sta 1	Sta 1	Sta 1	Sta 1	Sta 1	Sta 2	Sta 2	Sta 2
	Date Sampled		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Time Sampled		1545	1546	1547	1548	1550	1522	1523	1524
	Depth (m)	Units	0.15	1	2	3	4	0.15	1	2
Parameter	Temperature	°C	27.33	27.21	26.09	26.09	25.85	27.12	27.12	25.95
	Dissolved Oxygen (DO)	mg/L	3.95	4.14	2.44	2.25	1.94	4.94	5.41	3.30
	DO Percent Saturation	%	56.1	58.2	33.7	31.5	27.1	65.5	73.8	46.6
	Conductivity	mS/cm	29.88	32.10	36.04	36.66	38.90	15.65	22.78	40.95
	Salinity	ppt	18.43	20.03	22.70	23.15	24.71	9.21	13.72	26.02
	pH	units	7.87	7.81	7.49	7.51	7.52	8.02	8.06	7.78
	Secchi depth	meters	1.23	1.23	1.23	1.23	1.23	1.94	1.94	1.94
	Total Depth	meters	4.72	4.72	4.72	4.72	4.72	3.96	3.96	3.96

	Station ID		Sta 1	Sta 1	Sta 1	Sta 1	Sta 2	Sta 2	Sta 2	Sta 2
	Date Sampled		11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007
	Time Sampled		1531	1532	1533	1533	1425	1426	1426	1426
	Depth (m)	Units	0.15	1	2	3	0.15	1	2	3
Parameter	Temperature	°C	21.21	19.68	18.49	18.43	20.68	20.64	17.92	17.74
	Dissolved Oxygen (DO)	mg/L	5.39	6.67	3.46	2.99	6.37	5.82	5.40	4.52
	DO Percent Saturation	%	68.4	84.2	43.4	37.7	75.1	73.9	68.3	57.1
	Conductivity	mS/cm	32.66	38.10	42.18	43.13	16.10	35.66	46.82	47.30
	Salinity	ppt	20.45	24.25	27.15	27.83	9.45	22.53	30.48	30.83
	pH	units	8.12	8.17	7.84	7.84	8.12	7.95	8.00	8.01
	Secchi depth	meters	0.94	0.94	0.94	0.94	1.40	1.40	1.40	1.40
	Total Depth	meters	3.90	3.90	3.90	3.90	3.23	3.23	3.23	3.23

Progress Energy
Barge Canal Field Water Quality Profile I

	Station ID		Sta 2	Sta 2	Sta 3	Sta 3	Sta 3	Sta 3	Sta 3
	Date Sampled		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Time Sampled		1525	1526	1434	1435	1436	1437	1438
	Depth (m)	Units	3	4	0.15	1	2	3	4
Parameter	Temperature	°C	25.32	25.30	26.59	25.49	25.27	25.25	25.25
	Dissolved Oxygen (DO)	mg/L	2.92	2.81	4.44	3.57	3.10	3.04	3.07
	DO Percent Saturation	%	41.3	40.2	60.7	50.7	44.7	43.9	44.1
	Conductivity	mS/cm	44.27	44.33	28.62	41.65	46.64	46.71	46.71
	Salinity	ppt	28.55	28.61	17.65	26.87	30.28	30.33	30.33
	pH	units	7.79	7.79	7.92	7.88	7.89	7.88	7.88
	Secchi depth	meters	1.94	1.94	1.59	1.59	1.59	1.59	1.59
	Total Depth	meters	3.96	3.96	5.50	5.50	5.50	5.50	5.50

	Station ID		Sta 3	Sta 3	Sta 3	Sta 3	Sta 3	Sta 4	Sta 4
	Date Sampled		11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007
	Time Sampled		1233	1233	1233	1234	1236	1130	1130
	Depth (m)	Units	0.15	1	2	3	4	0.15	1
Parameter	Temperature	°C	20.09	19.69	17.92	17.83	17.81	19.00	18.45
	Dissolved Oxygen (DO)	mg/L	6.26	5.53	4.61	4.51	4.52	4.91	4.75
	DO Percent Saturation	%	74.0	65.6	58.5	57.3	57.4	61.1	59.8
	Conductivity	mS/cm	19.96	22.85	47.62	48.19	48.27	37.84	43.22
	Salinity	ppt	11.94	13.84	31.06	31.48	31.54	24.07	27.89
	pH	units	7.90	7.83	7.88	8.08	8.09	7.98	8.03
	Secchi depth	meters	1.49	1.49	1.49	1.49	1.49	1.68	1.68
	Total Depth	meters	4.57	4.57	4.57	4.57	4.57	5.15	5.15

Progress Energy
Barge Canal Field Water Quality Profile

	Station ID		Sta 3	Sta 4	Sta 4	Sta 4	Sta 4	Sta 4	Sta 4
	Date Sampled		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Time Sampled		1439	1358	1359	1401	1402	1403	1405
	Depth (m)	Units	5	0.15	1	2	3	4	5
Parameter	Temperature	°C	25.25	25.76	25.50	25.32	25.25	25.24	25.24
	Dissolved Oxygen (DO)	mg/L	3.08	4.49	4.22	3.61	3.58	3.50	3.46
	DO Percent Saturation	%	44.4	63.2	60.6	52.2	52.3	51.0	50.3
	Conductivity	mS/cm	46.73	38.51	41.31	46.94	48.35	48.65	48.82
	Salinity	ppt	30.34	24.89	27.11	30.39	31.56	31.82	31.85
	pH	units	7.88	7.97	7.94	7.94	7.95	7.95	7.95
	Secchi depth	meters	1.59	1.02	1.02	1.02	1.02	1.02	1.02
	Total Depth	meters	5.50	5.50	5.50	5.50	5.50	5.50	5.50

	Station ID		Sta 4	Sta 4	Sta 4	Sta 5	Sta 5	Sta 5	Sta 6
	Date Sampled		11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007
	Time Sampled		1131	1132	1133	1038	1039	1040	959
	Depth (m)	Units	2	3	4	0.15	1	2	0.15
Parameter	Temperature	°C	17.64	17.41	17.44	17.13	17.09	17.03	17.37
	Dissolved Oxygen (DO)	mg/L	4.44	4.47	4.19	6.02	5.79	5.79	7.49
	DO Percent Saturation	%	56.0	56.3	51.4	75.9	73.0	73.0	95.4
	Conductivity	mS/cm	46.89	47.64	41.84	49.44	49.47	49.52	50.56
	Salinity	ppt	30.53	31.08	26.90	32.39	32.41	32.45	33.21
	pH	units	8.10	8.10	8.10	8.10	8.11	8.12	7.96
	Secchi depth	meters	1.68	1.68	1.68	2.23	2.23	2.23	2.55
	Total Depth	meters	5.15	5.15	5.15	2.90	2.90	2.90	4.42

Progress Energy
Barge Canal Field Water Quality Profile

	Station ID		Sta 5	Sta 5	Sta 5	Sta 6	Sta 6	Sta 6	Sta 6	Sta 6
	Date Sampled		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Time Sampled		1315	1317	1318	1241	1242	1243	1244	1245
	Depth (m)	Units	0.15	1	2	0.15	1	2	3	4
Parameter	Temperature	°C	25.27	25.19	24.88	25.14	25.11	25.05	25.07	25.10
	Dissolved Oxygen (DO)	mg/L	4.40	4.33	4.10	4.85	4.63	4.52	4.31	4.20
	DO Percent Saturation	%	63.5	62.6	59.4	72.4	67.7	66.2	63.8	62.0
	Conductivity	mS/cm	47.28	47.44	48.78	50.08	50.23	50.55	51.93	52.03
	Salinity	ppt	30.74	30.92	31.83	32.79	32.87	33.15	34.18	34.23
	pH	units	8.00	8.00	8.00	8.03	8.03	8.04	8.04	8.03
	Secchi depth	meters	1.26	1.26	1.26	1.49	1.49	1.49	1.49	1.49
	Total Depth	meters	2.50	2.50	2.50	4.00	4.00	4.00	4.00	4.00

	Station ID		Sta 6	Sta 6	Sta 6	Sta 6	Sta 7	Sta 7	Sta 7	Sta 7
	Date Sampled		11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007
	Time Sampled		1000	1001	1001	1001	855	856	857	858
	Depth (m)	Units	1	2	3	4	0.15	1	2	3
Parameter	Temperature	°C	17.24	17.33	17.31	17.30	17.71	17.71	17.71	17.72
	Dissolved Oxygen (DO)	mg/L	7.18	7.09	7.11	6.99	7.56	7.43	7.42	7.37
	DO Percent Saturation	%	91.2	90.3	90.6	89.1	97.4	95.8	95.7	95.0
	Conductivity	mS/cm	50.57	50.81	50.99	51.05	51.65	51.79	51.80	51.90
	Salinity	ppt	33.22	33.39	33.53	33.57	34.02	34.12	34.13	34.20
	pH	units	8.00	8.03	8.04	8.04	8.08	8.08	8.08	8.08
	Secchi depth	meters	2.55	2.55	2.55	2.55	2.62	2.62	2.62	2.62
	Total Depth	meters	4.42	4.42	4.42	4.42	5.80	5.80	5.80	5.80

Progress Energy
Barge Canal Field Water Quality Profile

	Station ID		Sta 7	Sta 7	Sta 7	Sta 7	Sta 7	Sta 7	Sta 7	Sta 7
	Date Sampled		10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007	10/16/2007
	Time Sampled		1122	1121	1121	1120	1119	1118	1117	1116
	Depth (m)	Units	0.15	1	2	3	4	5	6	7
Parameter	Temperature	°C	25.25	25.23	25.19	25.20	25.25	25.31	25.40	25.50
	Dissolved Oxygen (DO)	mg/L	4.39	4.42	4.41	4.39	4.41	4.43	4.44	4.45
	DO Percent Saturation	%	64.7	65.3	65.1	65.0	65.3	65.8	66.5	66.6
	Conductivity	mS/cm	52.16	52.21	52.46	53.04	53.42	53.75	54.28	54.77
	Salinity	ppt	34.31	34.36	34.57	34.94	35.25	35.49	35.72	36.30
	pH	units	8.03	8.03	8.03	8.03	8.03	8.04	8.04	8.00
	Secchi depth	meters	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
	Total Depth	meters	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50

	Station ID		Sta 7	Sta 7
	Date Sampled		11/19/2007	11/19/2007
	Time Sampled		858	859
	Depth (m)	Units	4	5
Parameter	Temperature	°C	17.74	17.78
	Dissolved Oxygen (DO)	mg/L	7.35	7.30
	DO Percent Saturation	%	94.8	94.3
	Conductivity	mS/cm	51.91	52.08
	Salinity	ppt	34.21	34.34
	pH	units	8.08	8.08
	Secchi depth	meters	2.62	2.62
	Total Depth	meters	5.80	5.80

Attachment 3
Response to RFI 303
(4 pages)

JVT - REQUEST FOR INFORMATION

RFI # 303 CWO # 102 COLA : ~~PEC~~/PEF WBS# 10.3.2

RFI TITLE: *(be concise)* Water Analysis data for Crystal River Intake Canal

Date of Request: Dec 4, 2007 **Date information is needed?** Dec 19, 2007

To: Joe Pavletich, Progress Energy (Name and Organization)

From: Ed Toll, WorleyParsons (Name and Organization)

Item Requested (Please provide detailed description, title, dates, etc., if known):

Chemical Analysis for the water in the Crystal River intake canal covering the water components listed on the attached table. The line for Corrosion target is not applicable

How would you like this information sent to you (e-mail, hard copy, CD, etc.)?

E-mail to edward.b.toll@worleyparsons.com

Provide any additional information here:

Any questions call me at 610-855-3162

PROGRESS ENERGY – RFI RESPONSE

Responding Person: Joe Pavletich **Date of Response:** Dec 07, 2007

Source of Information:

Jamie Hunter, Crystal River site

Response (what was sent):

Analytical results for water samples from the CR intake canal.

Transmittal method (how it was sent:)

email attachments

FOR PGN FILE MANAGEMENT USE

Readily available QA document? *(yes or no)* No *Hard copy filed?* *(yes or no)* No

Sent to PGN Server Path: N:\NGGWeb\NGG\Nuclear Plant Development\NPD - Proprietary Folders\NPD-Admin Support\RFI\RFI 303

RFI #303 Surface Water Analytical Data

Station ID	Sample Date	Analyte	Result	Qualifier	Units	Notes
3	12/10/07	Alkalinity	120		mg/L	
3	12/10/07	Alkalinity	130		mg/L	Field duplicate
3	12/12/07	Alkalinity	130		mg/L	
4	12/10/07	Alkalinity	130		mg/L	
4	12/12/07	Alkalinity	130		mg/L	
4	12/12/07	Alkalinity	130		mg/L	Field duplicate
3	12/10/07	Aluminum	380	J	ug/L	
3	12/10/07	Aluminum	260	UJ	ug/L	Field duplicate
3	12/12/07	Aluminum	600	J	ug/L	
4	12/10/07	Aluminum	350	U	ug/L	
4	12/12/07	Aluminum	500	J	ug/L	
4	12/12/07	Aluminum	420	J	ug/L	Field duplicate
3	12/10/07	Ammonia	0.035	J	mg/L	
3	12/10/07	Ammonia	0.06	J	mg/L	Field duplicate
3	12/12/07	Ammonia	0.06	J	mg/L	
4	12/10/07	Ammonia	0.054	J	mg/L	
4	12/12/07	Ammonia	0.052	J	mg/L	
4	12/12/07	Ammonia	0.053	J	mg/L	Field duplicate
3	12/10/07	Bicarbonate Alkalinity as CaCO3	120		mg/L	
3	12/10/07	Bicarbonate Alkalinity as CaCO3	130		mg/L	Field duplicate
3	12/12/07	Bicarbonate Alkalinity as CaCO3	130		mg/L	
4	12/10/07	Bicarbonate Alkalinity as CaCO3	130		mg/L	
4	12/12/07	Bicarbonate Alkalinity as CaCO3	130		mg/L	
4	12/12/07	Bicarbonate Alkalinity as CaCO3	130		mg/L	Field duplicate
3	12/10/07	Boron	2800		ug/L	
3	12/10/07	Boron	2700		ug/L	Field duplicate
3	12/12/07	Boron	3000		ug/L	
4	12/10/07	Boron	3000		ug/L	
4	12/12/07	Boron	2900		ug/L	
4	12/12/07	Boron	3000		ug/L	Field duplicate
3	12/10/07	Calcium	240000	J	ug/L	
3	12/10/07	Calcium	240000	J	ug/L	Field duplicate
3	12/12/07	Calcium	260000	J	ug/L	
4	12/10/07	Calcium	260000	J	ug/L	
4	12/12/07	Calcium	260000	J	ug/L	
4	12/12/07	Calcium	270000	J	ug/L	Field duplicate
3	12/10/07	Carbonate Alkalinity as CaCO3	1		mg/L	
3	12/10/07	Carbonate Alkalinity as CaCO3	1		mg/L	Field duplicate
3	12/12/07	Carbonate Alkalinity as CaCO3	1		mg/L	
4	12/10/07	Carbonate Alkalinity as CaCO3	1		mg/L	
4	12/12/07	Carbonate Alkalinity as CaCO3	1		mg/L	
4	12/12/07	Carbonate Alkalinity as CaCO3	1		mg/L	Field duplicate
3	12/10/07	Chloride	14000		mg/L	
3	12/10/07	Chloride	14000		mg/L	Field duplicate
3	12/12/07	Chloride	14000		mg/L	
4	12/10/07	Chloride	12000		mg/L	
4	12/12/07	Chloride	14000		mg/L	
4	12/12/07	Chloride	15000		mg/L	Field duplicate
3	12/10/07	Corrosivity toward Steel	0.1		mm/year	
3	12/10/07	Corrosivity toward Steel	0.1		mm/year	Field duplicate

RFI #303 Surface Water Analytical Data

Station ID	Sample Date	Analyte	Result	Qualifier	Units	Notes
3	12/12/07	Corrosivity toward Steel	0.1		mm/year	
4	12/10/07	Corrosivity toward Steel	0.1		mm/year	
4	12/12/07	Corrosivity toward Steel	0.1		mm/year	
4	12/12/07	Corrosivity toward Steel	0.1		mm/year	Field duplicate
3	12/10/07	Cyanide, Total	0.01		mg/L	
3	12/10/07	Cyanide, Total	0.01		mg/L	Field duplicate
3	12/12/07	Cyanide, Total	0.01		mg/L	
4	12/10/07	Cyanide, Total	0.01		mg/L	
4	12/12/07	Cyanide, Total	0.01		mg/L	
4	12/12/07	Cyanide, Total	0.01		mg/L	Field duplicate
3	12/10/07	Fluoride	0.51	J	mg/L	
3	12/10/07	Fluoride	0.49	J	mg/L	Field duplicate
3	12/12/07	Fluoride	0.49	J	mg/L	
4	12/10/07	Fluoride	0.48	J	mg/L	
4	12/12/07	Fluoride	0.5	J	mg/L	
4	12/12/07	Fluoride	0.49	J	mg/L	Field duplicate
3	12/10/07	Hydrogen sulfide	0.1		mg/L	
3	12/10/07	Hydrogen sulfide	0.1		mg/L	Field duplicate
3	12/12/07	Hydrogen sulfide	0.1		mg/L	
4	12/10/07	Hydrogen sulfide	0.1		mg/L	
4	12/12/07	Hydrogen sulfide	0.1		mg/L	
4	12/12/07	Hydrogen sulfide	0.1		mg/L	Field duplicate
3	12/10/07	Iron	300		ug/L	
3	12/10/07	Iron	240		ug/L	Field duplicate
3	12/12/07	Iron	500		ug/L	
4	12/10/07	Iron	290		ug/L	
4	12/12/07	Iron	440		ug/L	
4	12/12/07	Iron	390		ug/L	Field duplicate
3	12/10/07	Magnesium	850000		ug/L	
3	12/10/07	Magnesium	830000		ug/L	Field duplicate
3	12/12/07	Magnesium	870000		ug/L	
4	12/10/07	Magnesium	880000		ug/L	
4	12/12/07	Magnesium	860000		ug/L	
4	12/12/07	Magnesium	870000		ug/L	Field duplicate
3	12/10/07	Nitrate as N	0.047		mg/L	
3	12/10/07	Nitrate as N	0.059		mg/L	Field duplicate
3	12/12/07	Nitrate as N	0.051		mg/L	
4	12/10/07	Nitrate as N	0.046		mg/L	
4	12/12/07	Nitrate as N	0.057		mg/L	
4	12/12/07	Nitrate as N	0.049		mg/L	Field duplicate
3	12/10/07	Nitrate Nitrite as N	0.047		mg/L	
3	12/10/07	Nitrate Nitrite as N	0.059		mg/L	Field duplicate
3	12/12/07	Nitrate Nitrite as N	0.055		mg/L	
4	12/10/07	Nitrate Nitrite as N	0.046		mg/L	
4	12/12/07	Nitrate Nitrite as N	0.06		mg/L	
4	12/12/07	Nitrate Nitrite as N	0.052		mg/L	Field duplicate
3	12/10/07	Nitrite as N	0.05		mg/L	
3	12/10/07	Nitrite as N	0.05		mg/L	Field duplicate
3	12/12/07	Nitrite as N	0.004	J	mg/L	
4	12/10/07	Nitrite as N	0.05		mg/L	

RFI #303 Surface Water Analytical Data

Station ID	Sample Date	Analyte	Result	Qualifier	Units	Notes
4	12/12/07	Nitrite as N	0.0029	J	mg/L	
4	12/12/07	Nitrite as N	0.0032	J	mg/L	Field duplicate
3	12/10/07	Orthophosphate	0.026	J	mg/L	
3	12/10/07	Orthophosphate	0.025	J	mg/L	Field duplicate
3	12/12/07	Orthophosphate	0.033	J	mg/L	
4	12/10/07	Orthophosphate	0.02	J	mg/L	
4	12/12/07	Orthophosphate	0.03	J	mg/L	
4	12/12/07	Orthophosphate	0.03	J	mg/L	Field duplicate
3	12/10/07	Phosphorus	0.066		mg/L	
3	12/10/07	Phosphorus	0.052		mg/L	Field duplicate
3	12/12/07	Phosphorus	0.064		mg/L	
4	12/10/07	Phosphorus	0.052		mg/L	
4	12/12/07	Phosphorus	0.045		mg/L	
4	12/12/07	Phosphorus	0.046		mg/L	Field duplicate
3	12/10/07	Potassium	350000		ug/L	
3	12/10/07	Potassium	340000		ug/L	Field duplicate
3	12/12/07	Potassium	350000		ug/L	
4	12/10/07	Potassium	370000		ug/L	
4	12/12/07	Potassium	350000		ug/L	
4	12/12/07	Potassium	360000		ug/L	Field duplicate
3	12/10/07	SiO2, Silica	2700		ug/L	
3	12/10/07	SiO2, Silica	2700		ug/L	Field duplicate
3	12/12/07	SiO2, Silica	2900		ug/L	
4	12/10/07	SiO2, Silica	2800		ug/L	
4	12/12/07	SiO2, Silica	2900		ug/L	
4	12/12/07	SiO2, Silica	2800		ug/L	Field duplicate
3	12/10/07	Sodium	6600000		ug/L	
3	12/10/07	Sodium	6600000		ug/L	Field duplicate
3	12/12/07	Sodium	6700000		ug/L	
4	12/10/07	Sodium	6900000		ug/L	
4	12/12/07	Sodium	6800000		ug/L	
4	12/12/07	Sodium	7000000		ug/L	Field duplicate
3	12/10/07	Sulfate	1500		mg/L	
3	12/10/07	Sulfate	1500		mg/L	Field duplicate
3	12/12/07	Sulfate	1500		mg/L	
4	12/10/07	Sulfate	1600		mg/L	
4	12/12/07	Sulfate	1500		mg/L	
4	12/12/07	Sulfate	1600		mg/L	Field duplicate
3	12/10/07	Total Suspended Solids	29		mg/L	
3	12/10/07	Total Suspended Solids	27		mg/L	Field duplicate
3	12/12/07	Total Suspended Solids	46		mg/L	
4	12/10/07	Total Suspended Solids	28		mg/L	
4	12/12/07	Total Suspended Solids	35		mg/L	
4	12/12/07	Total Suspended Solids	24		mg/L	Field duplicate
3	12/10/07	Zinc	20		ug/L	
3	12/10/07	Zinc	20		ug/L	Field duplicate
3	12/12/07	Zinc	20		ug/L	
4	12/10/07	Zinc	20		ug/L	
4	12/12/07	Zinc	20		ug/L	
4	12/12/07	Zinc	20		ug/L	Field duplicate

Attachment 4
Response to RFI 306
(1 page)

JVT - REQUEST FOR INFORMATION

RFI # 306 CWO # 10 COLA : PEF WBS# 10.3

RFI TITLE: *(be concise)* Levy Site –Confirmation for use of Prior Crystal River Water data

Date of Request: 12/11/07 **Date information is needed?** 12/14/07

To: Joseph Paveltich Progress Energy (Name and Organization)

From: Ed Toll, WorleyParsons - 610-855-3162 (Name and Organization)

Item Requested (Please provide detailed description, title, dates, etc., if known):

WorleyParsons would like to use water analysis data previously obtained for work they performed at Crystal River ,which represents water from the Golf of Mexico, for the water supply for the Levy cooling tower. Progress energy is requested to confirm that WorleyParsons may use the CR data for Levy.

How would you like this information sent to you (e-mail, hard copy, CD, etc.)?

E Mail completed RFI

Provide any additional information here:

PROGRESS ENERGY – RFI RESPONSE

Responding Person: Joe Pavletich **Date of Response:** 12-11-07

Source of Information:

Analytical Report on two (Gulf of Mexico influent/raw) water samples collected for the Crystal River 4+5 Scrubber Project. Data obtained from PGN/CR by Worley Parsons.

CRCA-0-L1-511-0001 AUG 2007

Response (what was sent):

Confirmation that Worley Parsons can use Crystal River Gulf water sampling for their Levy NP cooling tower study. PGN makes no assurance that the data is correct.

Transmittal method (how it was sent:)

email

FOR PGN FILE MANAGEMENT USE

Readily available QA document? *(yes or no)* No *Hard copy filed?* *(yes or no)* No

Sent to PGN Server Path: N:\NGGWeb\NGG\Nuclear Plant Development\NPD - Proprietary Folders\NPD-Admin Support\RFI\RFI 306