Project: 1050003-018-AC

Farzie Shelton, chE; REM

Associate GM Technical Support

Paul
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October 1, 2012

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DIVISION OF AIR
RESOURCE MANAGEMENT

Division of Air Resource Management
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399

Attention: Mr. Jeffery N Koerner, P.E. Program Administrator, Office of Permitting and Compliance

RE: Charles Larsen Memorial Power Plant
Unit 8 Repair and Maintenance Project

Dear Jeff:

Lakeland Electric is planning a repair and maintenance project for Unit 8 at the Charles Larsen Memorial Power Plant. This correspondence is being submitted to provide information to the Department concerning this project and our conclusion that it meets the regulatory guidance for routine maintenance, repair and replacement. As a result, this maintenance project is not a modification as defined in the Department's rules and not subject to any regulatory action. The basis for this conclusion is the attached letter from our environmental engineer that provides a reason for the maintenance, a description of the maintenance project, the historical information for similar activities, and a regulatory evaluation of this maintenance project. The letter was developed from an evaluation of specific engineering information developed by Lakeland Electric on the maintenance project.

Lakeland Electric can discuss with the Department the information in the letter and address any questions. You can contact me or our environmental consultant Mr. Kennard Kosky at (352) 336-5600 related to this information. If we do not hear from you by October 20th, 2012 we assume your agreement with our analysis of this project.

Sincerely,

cc: Ken Kosky PE

City of Lakeland • Department of Electric Utilities

501 East Lemon Street • Lakeland, Fl 33801-5050 • 863. 834.6603 • Fax 863. 834.8187 •Cell 863.430.8297

farzie.shelton@lakelandelectric.com

October 1, 2012 123-87648

Ms. Farzie Shelton, Associate General Manager Technical Support
Lakeland Electric
501 E. Lemon Street
Lakeland, Florida 33801

RE: LARSEN UNIT 8 – REPAIR AND MAINTENANCE PROJECT

Dear Farzie:

Golder Associates Inc. (Golder) has evaluated information related to a routine maintenance, repair, and replacement (RMRR) project planned for Unit 8 at the Larsen Power Plant. The project involves maintenance and repairs to the gas turbine, heat recovery steam generator (HRSG), and controls. The maintenance and repairs include replacement, repairs, and maintenance of equipment that are routinely repaired or replaced or that became obsolete. This correspondence is a Professional Engineer's Certification that provides a scope, reason, description, and estimated costs for the maintenance and repairs, and a regulatory evaluation of the RMRR project.

Scope, Reason, Description, and Estimated Costs for Maintenance, Repairs, and Replacements: The attached table (Table 1) provides the scope, reason, description, and estimated costs for the maintenance repairs and replacement. The Unit 8 maintenance and repair project involves seven items as shown in Table 1. The primary items involve hot gas path components where hot exhaust temperatures cause normal wear and tear on metal and equipment. These items are 1A, 2, 3, 4, and 5, where metal and equipment is exposed to high temperatures where heat can stress and cause metal fatigue requiring repair and replacement. Item 1B involves inspection of the high pressure components of the gas turbine compressor and repair and replacement as necessary. Item 6 involves the replacement of the existing 20-year-old computer control system, which has become obsolete. The new control system will operate the unit in the same manner as the existing system. There will be no increase in performance or emissions as a result of the maintenance and repair project.

Previous Repairs and Replacement Activities: Lakeland Electric has performed similar repair and replacement of gas turbine components. For example, the gas turbine associated with Unit 8 is a General Electric (GE) Frame 7EA that has a recommended maintenance cycle. Several maintenance cycles for the gas turbine have occurred over the past 20 years. This maintenance is conducted according to the recommended GE maintenance schedules.

Regulation Evaluation: The Florida Department of Environmental Protection (FDEP) definition of "modification" in Rule 62-210.200 (205), Florida Administrative Code (F.A.C.), excludes RMRR as a physical change or a change in the method of operation. Although RMRR is not defined in the FDEP rules, there is the U.S. Environmental Protection Agency (EPA) guidance from the Detroit Edison ruling that set out five general categories for evaluating RMRR for a project. While EPA has attempted to establish rules for RMRR (68 Federal Register 61248-61280, October 27, 2003), there are no current rules due to subsequent legal cases. RMRR is currently evaluated on a case-by-case basis.

Attached as Table 2 is a five factor evaluation for the repairs and replacements planned for Larsen Unit 8 based on the nature, extent, purpose, frequency and cost of the project. The information on the project and the evaluation clearly indicates that the planned project for Unit 8 is "routine maintenance, repair, and replacement" and would not be a modification under FDEP rules. The nature of the repairs and replacement parts are extremely limited compared to the total amount of boiler heat transfer surface and

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the repairs and replacements are similar to other activities that have been routinely performed on Unit 8. The unit is not being replaced and the planned project can be accomplished in a small period of time (16 weeks) during a planned period of low electrical demand (February to June 2013). The purpose of the project is to make like-kind repairs and replacements so that Unit 8 can continue to operate as it has in the recent past. The project is similar to other hot gas path repairs that have occurred frequently over the course of operation. Most importantly, the cost of the project is less than 10 percent of the cost of an entirely new unit. It should be noted that EPA, in its rule to more clearly define RMRR, proposed a 20 percent replacement value as the exclusion criteria for New Source Review. The planned budget for the Unit 8 maintenance and repair project is less than one-half of that previously promulgated criterion. Taking together the information and evaluation, it is concluded that the Unit 8 maintenance project meets the requirements of RMRR.

If you have any questions concerning this information, please feel free to call me at (352) 336-5600.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Principal Engineer
Registration Number: 14996
Golder Associates Inc. Board of Professional Engineers Certificate of Authorization #00001670

SEAL

cc: Doug Doerr, Lakeland Electric

Enclosures

KFK/tz

Table 1. Larsen Plant, Unit No. 8 - Repair and Maintenance Project

Item	Project Title	Scope of Work	Reason	Description	Estimated Costs
1A	Unit 8 Gas Turbine "Hot Gas Path Inspection"	The scope of work is to inspect and repair/replace combustion hardware and hot gas path components.	Borescope inspections to these components have revealed that these components need refurbishment and in some cases replacement for turbine reliability.	The fuel nozzles, combustion liners, and transitions will all be replaced. A combination of new/refurbished parts will replace the parts coming out of the machine. All of the major Hot Gas Path components will be inspected. These components include the 1st, 2nd, and 3rd stage buckets/nozzles/diaphragms/shroud blocks. The 1st stage nozzle is expected to require refurbishment. Also, some of the other components will require refurbishment as well, but extent as to which ones and quantity won't be known until the HGP section is inspected.	Total cost for this Inspection is estimated at $6,000,000.
1B	R17 Blades in Compressor	Reposition and double peen the R17 blades in the compressor section.	Borescope inspections show these blades have moved.	Reposition and double peen the R17 blades in the compressor section.	Total cost for this work is estimated at $350,000.
2	Unit 8 HRSG Economizer Module Replacement - LLP9022	The scope of work is to provide access through the south side wall of the HRSG at the economizer module, remove the existing economizer module assemblies (2), make repairs to the insulating barrier and inner liner in preparation for the new modules, install the new economizer modules (2), tie in drains, inlet and outlet header piping, reinstall the south wall casing, install alignment/vibration bars and supports. Afterward, HRSG will be chemically cleaned.	The existing economizer modules are original equipment that have been in service for ~20 years. By metallurgical analysis, the tubes in these modules have reached the end of their useful life expectancy. Tube failures in the Economizer modules have increased substancially and repairs are decreasingly a viable option as the material to tie into remains fatigued.	There are four Heat Exchanger sections in the U8 HRSG: The Economizer, the Evaporator, the Primary Superheater, and the Secondary Superheater. The Economizer heat exchanger is made up of two separate modules, each with an upper inlet and outlet header. The total effective heating surface of the economizer is 86,160 sq. ft. The Economizer makes up 29% of the total heating surface of the HRSG. Note that the HRSG heat transfer surfaces have been routinly monitored for tube conditions with repairs performed as necessary.	Total cost for this purchase of the material, fabrication, and installation is estimated at $1,000,000.

Table 1. Larsen Plant, Unit No. 8 - Repair and Maintenance Project

Item	Project Title	Scope of Work	Reason	Description	Estimated Costs
3	Unit 8 Gas Turbine Exhaust Plenum and Expansion Joint Replacement	The scope of work is to remove the existing turbine exhaust plenum and expansion joint and install the new exhaust plenum and expansion joint.	The existing exhaust plenum and expansion joint are original equipment that have been in service for ~20 years. This duct and insulation have reached the end of their useful life expectancy. Heat to the outside is over 900 degrees and repairs are not a viable option as the material remains fatigued.	The hot gases from the turbine diffuser exit into the plenum duct, which makes a 90 degree turn into the HRSG duct system. The plenum duct is insulated and has metal shielding to keep the heat in. The existing plenum will be removed and replaced with a new plenum.	Total cost for this purchase of the material, fabrication, and installation is estimated at $300,000.
4	Unit 8 Gas Turbine Exhaust Diffuser Replacement	The scope of work is to remove the existing turbine exhaust diffuser and install the new exhaust diffuser.	The existing exhaust diffuser is original equipment that has been in service for ~20 years. This diffuser has reached the end of its useful life expectancy. The diffuser has many cracks all the way around it and many repairs have been performed to the point that repairing the diffuser is no longer a viable option.	The hot gases from the turbine exit into the exhaust diffuser, which diffuses the hot gases into the plenum. The existing diffuser will be removed and replaced with a new diffuser.	Total cost for this purchase of the material, fabrication, and installation is estimated at $350,000.
5	Unit 8 HRSG Inlet Damper and Expansion Joint Replacement	The scope of work is to cut out and remove the existing HRSG Inlet Damper and expansion joint and install the new HRSG Inlet Damper and expansion joint.	The existing HRSG Inlet Damper is the original equipment that has been in service for ~20 years. This damper has reached the end of its useful life expectancy. The louvers and insulation have fallen down, heat to the outside is over 900 degrees, and repairs are not a viable option as the material remains fatigued.	The HRSG Inlet Damper is constructed of motor operated louvers that close off the hot gases from entering the HRSG and diverts the gases out the bypass stack. The existing HRSG Inlet Damper assembly will be removed and replaced with a new HRSG Inlet Damper assembly, including a new expansion joint.	Total cost for this purchase of the material, fabrication, and installation is estimated at $200,000.

Table 1. Larsen Plant, Unit No. 8 - Repair and Maintenance Project

Item	Project Title	Scope of Work	Reason	Description	Estimated Costs
6	Unit 8 CT, ST, and BOP Control System Upgrade	The scope of work entails removal and replacement of existing GE Mark-IV control system and Foxboro I/A control system.	The control systems are obsolete and repair parts are in short supply. Increasingly, age-related failures occur negatively affecting Unit reliability.	Obsolete control systems will be replaced with new state-of-art systems. Spare parts will be readily available. There will be no change in the algorthms for the NOx control system. Tuning will be performed as necessary to match the existing system with the original control system.	Total cost for purchase, installation, and checkout is estimated at $1,200,000.

Table 2. Lakeland Electric
RMRR Five-Factor Test for Larsen Unit 8
Unit 8 Gas Turbine and HRSG Maintenance Project
September 26, 2012

Criteria Based on EPA May 23, 2000 Guidance	Unit 8 – Gas and HRSG Turbine Maintenance
Nature	
1. Whether major components of the facility are being modified or replaced.	1. The components being repaired and replaced are the major components of the unit where maintenance is normally required.
2. Whether the unit is of considerable size, function, or importance to the operation of the facility.	2. Unit 8 is one of the several generating units at Lakeland Electric's three power plant sites (Larsen, McIntosh, and Winston). The maintenance activities being conducted are scheduled during a normal outage.
3. Whether the source itself has characterized the change as non-routine.	3. All the proposed activities are characterized as routine maintenance, repair, and replacement due to normal wear of component parts of the gas turbine and HRSG. For example, the majority of the repairs are for component parts in the hot gas path [gas turbine (turbine section), expansion joint, inlet damper, and economizer].
4. Whether the change could be performed during full functioning of the facility or while it was in full working order.	4. The repair and replacement of component parts will be performed during an outage of about 16 weeks (Feb-June 2013) with other generating units available to provide electric power during a lower demand period. Scheduled outages for maintenance are routine for electric utilities.
5. Whether the materials, equipment and resources necessary to carry out the planned activity are already on site.	5. The replacement parts will be manufactured offsite and be purchased for onsite installation.

Table 2. Lakeland Electric
RMRR Five-Factor Test for Larsen Unit 8
Unit 8 Gas Turbine and HRSG Maintenance Project
September 26, 2012

Criteria Based on EPA May 23, 2000 Guidance	Unit 8 – Gas and HRSG Turbine Maintenance
Extent	
1. Whether an entire emissions unit will be replaced.	1. Only those component parts requiring repair and replacement are affected.
2. Whether the change will take significant time to perform.	2. The maintenance will occur within a relatively short amount of time and will be scheduled. The repairs and replacement will take approximately 16 weeks.
3. Whether the collection of activities, taken as a whole, constitutes a non-routine effort, notwithstanding that individual elements could be routine.	3. The amount of repairs as a whole deals with component parts requiring repair and replacement. Standard maintenance cycles for gas turbines and HRSGs typically require inspection and replacement of the items being repaired. For example, standard maintenance cycle for the GE Frame 7EA is based on hours of operation, fuel used and/or number of starts. Unit 8 has been in operation for approximately 20 years with similar maintenance activities performed, such as a hot gas path repair in 2007.
4. Whether the change requires the addition of parts to existing equipment.	4. The replacement components/parts will be like-kind component parts that are connected to the existing equipment in the same manner as they are connected now. No additional parts will be added.
Purpose	
1. Whether the purpose of the effort is to extend the useful life of the units; similarly, whether the source proposes to replace a unit at the end of its useful life.	1. Unit 8 has been operating approximately 20 years and has at least another 10 years of useful life. The repairs and replacements of components are routine in nature and do not extend the useful life of the unit.
2. Whether the modification will keep the unit operating in its present condition, or whether it will allow enhanced operation (e.g., will it permit increased capacity, operating rate, utilization, or fuel adaptability).	2. Unit 8 will operate in a similar manner as in the past; no increase in electric generating capacity, operating rate, or utilization will occur. Unit 8 will utilize the same fuels (primarily natural gas) with no change in air emissions as a result of the repairs.

Table 2. Lakeland Electric
RMRR Five-Factor Test for Larsen Unit 8
Unit 8 Gas Turbine and HRSG Maintenance Project
September 26, 2012

Criteria Based on EPA May 23, 2000 Guidance		Unit 8 – Gas and HRSG Turbine Maintenance
Frequency 1. Whether the change is performed frequently in a typical unit's life.		1. The repairs and replacements are similar to those that have occurred in the past. Repairs and replacements to Unit 8's gas turbine have occurred in the past. Most recently, inspection in the spring of 2007 resulted in work to the second stage nozzle. The repairs and replacements being performed are the most effective and cost-effective.
Cost 1. Whether the change will be costly, both in absolute terms and relative to the cost of replacing the unit. 2. Whether a significant amount of the cost of the change is included in the source's capital expenses, or whether the change can be paid for out of the operating budget (i.e., whether the costs are reasonably reflective of the costs originally projected during the source's or unit's design phase as necessary to maintain the day-to-day operation of the source).		1. Cost is estimated at $9.4 million for the entire project: The cost of a similar new combined cycle unit is estimated at $96 million. The entire project is 9.8 percent of the total replacement cost of a comparable new unit. 2. The costs of the repairs and replacements are part the planned budget for Unit 8 and common for the repairs and maintenance being implemented and the age of the unit.

Responsible Official Certification

1. Responsible Official Name :

   Tony Candales, Assistant General Manager of Production

2. Responsible Official Mailing Address...
   Organization/Firm: **Lakeland Electric**
   Street Address: **501 E. Lemon St.**
   City: **Lakeland** State: **FL** Zip Code: **33801-5079**

3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(863) 834-6559** ext. Fax: **(863) 834-6373**

4. Responsible Official E-mail Address: **TONYCANDALES@LAKELANDELECTRIC.COM**

5. Responsible Official Statement:

   I, the undersigned, am a responsible official of the Title V source addressed in this submittal. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this submission are true, accurate and complete. The air pollutant emissions units and air pollution control equipment described in this submittal will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this submittal to which the Title V source is subject. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in any compliance plan(s) previously submitted.

   Re: Charles Larsen Memorial Power Plant - Permit 1050003-017-AV

   Subject: Unit 8 Repair and Maintenance Project

   Signature

   October 2, 2012
   Date