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BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 050958-EI

IN RE: Petition for Approval of New Environmental Program for Cost Recovery through Environmental Cost Recovery Clause

REBUTTAL TESTIMONY

OF

JOHN V. SMOLENSKI

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED REBUTTAL TESTIMONY

OF

JOHN V. SMOLENSKI

Q. Please state your name, address, occupation and employer.

A. My name is John V. Smolenski. My business address is 702 North Franklin Street, Tampa, Florida 33602. I am employed by Tampa Electric Company ("Tampa Electric" or the "company") as Senior Consultant II - Advanced Technology, in the Engineering and Construction Services Department.

Q. Are you the same John Smolenski who submitted Prepared Direct Testimony in this proceeding?

A. Yes, I am.

Q. What is the purpose of your rebuttal testimony in this proceeding?

A. The purpose of my testimony is to address some serious deficiencies and incorrect conclusions reached in the prepared direct testimony of Office of Public Council

("OPC") witness John B. Stamberg. Additionally, OPC witness Thomas A. Hewson, Jr. relies upon a number of Mr. Stamberg's statements and conclusions in Mr. Hewson's testimony. To the extent Mr. Hewson incorporates the statements and conclusions I address in my rebuttal to Mr. Stamberg, that rebuttal is intended to rebut Mr. Hewson's testimony as well.

Q. Have you prepared any exhibits to support your testimony?

A. Yes. Exhibit ____ (JVS-2) consists of five documents which provide the necessary support for specific sections of my rebuttal testimony.

I. Definitions and Key Concerns

Q. Mr. Smolenski, recognizing that your testimony, of necessity, is somewhat technical in nature, could you provide the Commission with a brief set of definitions of the technical terms you will be using, as well as a brief summary of the key concerns you have about the testimony of OPC's witness Stamberg and, to the extent Mr. Hewson relies on Mr. Stamberg's findings and conclusions, Mr. Hewson's testimony?

A. Yes. There are three technical terms that are important to understand. They are:

De-integration - Throughout my testimony I use the term de-integration, which refers to times when one or more of the Big Bend coal units' scrubbers are not operating. The Consent Decree currently allows a certain number of de-integration or unscrubbed days for Big Bend Units 1 through 3. Beginning in 2010 (for Big Bend Unit 3) and 2013 (for Big Bend Units 1 and 2), Tampa Electric will not be permitted to operate the units in a de-integrated mode. If the scrubber goes down, so must any unit it serves. It is important to note that the units served by these scrubbers at Big Bend Station are large, very efficient base load coal-fired units that generate the most economical electric power on Tampa Electric's system. For this reason, it is crucial to keep these units operating at all times for the benefit of ratepayers. If one or more of these units has to shut down because of a scrubber outage, the company must make up the lost generation either from more expensive generation on its own system or at higher purchased power costs relative to the cost of running the Big Bend units. This makes the scrubber the weak link in the chain of operations and puts all the more emphasis on the

integrity of scrubber operations, both for system reliability and to maximize the use of the most economical base load coal-fired units.

Flue Gas Desulfurization ("FGD") - This describes the function of a scrubber; it removes SO_2 from the gases emitted from a boiler.

Induced draft ("ID") fan - This is a large fan that draws flue gas through the boiler and delivers it to the FGD system.

I would also like to summarize my key concerns regarding the deficiencies in Mr. Stamberg's testimony.

First, Mr. Stamberg apparently does not recognize or simply ignores the significant differences in the allowable operating parameters for Big Bend Units 1 through 3 before certain deadlines imposed by the Consent Decree and the allowable operating parameters for those base load coal-fired units after the Consent Decree deadlines. Before the 2010 deadline (for Big Bend Unit 3) and the 2013 deadline (for Big Bend Units 1 and 2), Tampa Electric is afforded an allowance of the number of days per year during which it may continue to run these

highly efficient, lower cost base load coal-fired generators even through the scrubber serving these units may be non-operational due to a forced outage or a maintenance outage. After the Consent Decree deadlines pass, Tampa Electric will have no choice but to shut each of these generating units down when the scrubber serving the unit is not operating. This is a huge operational change that requires significant and creative preventive measures to ensure that customers continue to enjoy the low cost generation from Big Bend Units 1 through 3.

Stated differently, during the period of time Tampa Electric is allowed to operate these units in an unscrubbed mode, a problem with a generating unit is the company's primary concern as far as keeping the power flowing from that unit. If the scrubber serving that unit goes down, the operation of the unit and another unit served by the scrubber are not affected, as long as Tampa Electric has the ability to utilize unscrubbed operation days. After the deadlines in 2010 and 2013, it is an entirely different and new situation. Without the protections provided by the Big Bend FGD System Reliability Program, the failure of one scrubber serving two units could shut down both generating units. Mr. Stamberg simply fails to recognize that the 2010 and 2013

deadlines in the Consent Decree significantly compound the risks of having to shut down base load coal-fired generation at Big Bend Station, absent the incremental protections the Big Bend FGD System Reliability Program will provide.

Consistent with his failure to recognize the compound risks I have described, Mr. Stamberg erroneously assumes that the incidence of unit shut downs prior to the 2010 and 2013 Consent Decree deadlines equates to the expected incidence of unit shut downs after the deadlines have passed, even without the protections provided by the Big Bend FGD System Reliability Program. This is an "apples and oranges" comparison that completely ignores the fact that those events that would not have required unit outages before the deadlines will definitely require units to be shut down after the deadlines pass, absent the protections this program will provide.

Secondly, Mr. Stamberg never challenges the findings and conclusions set forth in the Tampa Electric Big Bend FGD System Reliability Study. That study demonstrates that the 13 projects comprising the program have benefit cost ratios of from 1.2 to 21, with projected net savings to customers of approximately $34 million, utilizing

conservative assumptions. Mr. Stamberg apparently dismisses those significant savings to customers as being unimportant. By not even addressing, much less rebutting the results of that study, Mr. Stamberg essentially concedes that Tampa Electric's customers will achieve those savings as Tampa Electric implements the Big Bend FGD System Reliability Program. Mr. Stamberg apparently feels that significant customer savings on the order of $34 million take a backseat to his primary goal of having the Commission disallow Tampa Electric's recovery of the bulk of the costs of the program that will bring about those savings. This is unfair and wrong.

Thirdly, certain fundamental errors in Mr. Stamberg's analysis demonstrate the shallowness of his analysis. These include his mistaking the time of day reported for the commencement of an outage (expressed in military time, e.g., 15:30 hours) for the duration of an outage (expressed in total hours, e.g., 15½ hours) - a significant error that renders meaningless his conclusions about Tampa Electric's historical and projected outages. Another example of this type of basic, underlying error is his erroneous conclusions that the long term projects which are the subject of Tampa Electric's petition should have been listed in a previous

interim plan under the Consent Decree that addressed an entirely different earlier phase of the Consent Decree, when Big Bend Units 1 through 3 may be operated in an unscrubbed mode for a certain number of days per year. These are fundamental errors that undermine Mr. Stamberg's conclusions in their entirely.

Mr. Stamberg's cursory and erroneous assessment of Tampa Electric's Big Bend FGD System Reliability Program fails to rebut the need for the program in order for Tampa Electric to comply with the deadlines in the Consent Decree and at the same time, to continue meeting its obligation to serve the needs of its customers. The Commission was correct when it previously unanimously voted to approve every component of the Big Bend FGD System Reliability Program for cost recovery through the methods sought in the company's petition. Neither Mr. Stamberg, nor Mr. Hewson in adopting certain of Mr. Stamberg's conclusions, has presented any reason to revisit the wisdom of that approval.

II. Big Bend Units 1 through 4 Electric Isolation Project

Q. On pages 3 and 4 of his testimony, Mr. Stamberg addresses the estimated cost of the Big Bend Units 1 through 4

Electric Isolation Project. How do you respond to his assessment?

A. Mr. Stamberg has reported the correct estimate for the cost of the project as $6,600,000; however, he seems to insinuate the estimate is unreasonable. Tampa Electric has applied engineering judgment and submitted its best estimate for the Big Bend Units 1 through 4 Electric Isolation Project given the degree of understanding of the engineering complexity of the project's full scope at the time of filing. But it is important to realize the $6,600,000 is just that - an estimate. The company recognizes the submission of an initial project cost estimate for ECRC consideration in no way guarantees the recovery of that exact cost.

Historically, Tampa Electric has demonstrated sound project management during the development and installation of its environmental projects and ultimately has submitted for ECRC recovery only those project costs that are reasonably and prudently incurred. Of necessity, projects must have a cost estimate at the time of submission for ECRC approval. At the time of project completion, some projects have been on budget, others have been slightly over or under their projected costs

but ratepayers are not harmed since only actual project costs that are reasonably and prudently incurred are ultimately recovered through the ECRC true-up mechanism.

Q. On pages 4 and 5 of his testimony, Mr. Stamberg states that the loads served by the Electric Isolation Project's new transformer are almost all purely boiler loads and, therefore, inappropriate for ECRC recovery. Do you concur?

A. No. The loads on circuit breakers B3003A and B3003B are FGD loads that are currently served from Big Bend Unit 4, which will be moved to Big Bend Unit 3 to support the Big Bend FGD System Reliability Program. These circuit breakers provide primary power to a 480 volt substation that is located near the scrubber for these units. This 480 volt substation serves loads which are FGD-related. These loads are characterized as "motor loads" and "lighting and other non-motor loads" in the table contained in Tampa Electric's response to Interrogatory No. 38 of OPC's 2nd Set of Interrogatories, to facilitate expressing all loads in KVA, and the table clearly indicates these are FGD-related loads. The individual loads are further identified in the referenced diagrams also listed in the table.

The loads on circuit breakers B3004A and B3004B are a mix of FGD, Selective Catalytic Reduction ("SCR") and boiler related loads. Big Bend Unit 3 is currently a pressurized furnace that does not have ID fans. Therefore, ID fans 3A and 3B are not existing loads as indicated in Mr. Stamberg's testimony on page 5. These fans will be added in year 2008 for two reasons: 1) to move gases through FGD towers A and B once the existing tower A and B booster fans are retired and these towers are dedicated to Big Bend Unit 3, and 2) to move gases through the Big Bend Unit 3 SCR system and the associated interconnecting ducts. Thus, circuit breakers B3004A and B3004B serve a mix of FGD scrubber, SCR and boiler loads.

The nature of the 3A and 3B ID fan loads is indicated in the above referenced table in response to Interrogatory No. 38, which indicates that circuit breakers B3004A and B3004B will serve both FGD and boiler processes. The A and B tower booster fans are rated at 2,000 hp each, which is equivalent to 1,875 KVA. Therefore, 1,875 KVA of the 9,500 KVA required by each ID fan is attributable to the FGD. Also, the boiler gases are currently moved through the boiler, air pre-heater, precipitator and interconnecting ductwork with two 4,500 hp forced draft ("FD") fans. After the installation of the ID fans, the

load on the FD fans will be reduced to 2,500 hp. This reduction in FD fan horsepower represents the transfer of 2,000 hp of existing boiler-related load to the ID fans, which is equivalent to 1,875 KVA.

Q. On page 5 of his testimony, Mr. Stamberg states that only 0.4 percent and 0.6 percent of the capacity of the new transformer serves FGD and SCR loads, respectively. Do you concur?

A. No. A further breakdown of the loads on the new station service transformer 3B is provided in Document No. 1 of my exhibit, which shows that 21.9 percent of the load on the transformer is attributable to the FGD, 59.8 percent to the SCR, and 18.3 percent to the boiler. Thus, a total of 81.7 percent of the load on the transformer is for new pollution control loads, not 0.4 percent and 0.6 percent as indicated in Mr. Stamberg's testimony.

In addition to the 4,491 KVA of FGD reliability load transferred to the new 13.8 kV station service transformer 3B, 8,448 KVA of connected load will be transferred to the existing 4.16 kV station service transformer 3A. The FGD loads transferred to the existing transformer are summarized in Document No. 1 of

my exhibit. Therefore, the FGD reliability project will add a total of 12,939 KVA of electrical load to the Big Bend Unit 3 electrical system.

The goal of the Big Bend FGD System Reliability Program is to ensure that all of the auxiliary loads, including pollution control equipment, required to operate Big Bend Unit 3 will be powered from the Big Bend Unit 3 generator. Conversely, all the auxiliary loads, including pollution control equipment, required to operate Big Bend Unit 4 will remain on the Big Bend Unit 4 generator. This functional separation of the Big Bend Units 3 and 4 electrical systems is essential to unit reliability and system security. If the Big Bend Units 3 and 4 electrical systems are not functionally separated, then the failure of a single electrical system component could shut down both units simultaneously. The concurrent loss of two large coal-fired units is a serious threat to system reliability. Moreover, as I previously noted, the required shut down of one or both of two large, base load coal-fired units due to the failure of the scrubber serving them has significant consequences from a cost perspective. The lost generation during the shut down must be replaced with more expensive generation from relatively less efficient

units on Tampa Electric's system or with more expensive purchased power from another source. These justifications are not addressed at all in OPC's pre-filed testimony by Mr. Stamberg or any of the other witnesses appearing on behalf of OPC.

Q. On page 5 of Mr. Stamberg's testimony, he states that approximately 19,000 KVA will be freed up for other large electricity loads as a result of the Electric Isolation Project insinuating that this project is unnecessary. Do you concur?

A. No. Since the ID fans 3A and 3B do not presently exist, they are new load; therefore, they will not be transferred from existing transformers elsewhere on-site. Thus, the FGD Electric Isolation Project will not free up 19,000 KVA for other large electricity loads from existing transformers elsewhere on-site.

Q. On page 6 of Mr. Stamberg's testimony he states that there were no recorded forced outages or derates over the past five years because of failure of transformer(s) servicing ID Fans 3A and 3B. Do you concur?

A. I agree with Mr. Stamberg, but only because as I

previously stated ID fans 3A and 3B do not presently exist nor did they exist over the past five years. That obviously accounts for the fact that there have been no FGD related forced outages or derates reported in the past five years due to of the failure of transformer(s) servicing ID fans 3A and 3B. You can't have a forced outage associated with equipment that does not exist.

Q. Mr. Stamberg's testimony on page 6 states that the Electrical Isolation Project is neither reasonable nor prudent given the systems' proven high availability. Do you concur?

A. No. Mr. Stamberg's testimony attempts to recast the true intent of the Electric Isolation Project as merely a new transformer project. The intent of the project is to segregate electric power supply systems such that a single power supply system failure does not cause two, efficient, base load coal-fired units to shut down but affects just a single unit. The new transformer is just a consequence of isolating the units. Given this intent, operating history of the electric power supply system shows that there have been 12 de-integration events, totaling 25 days of de-integration, on Big Bend Units 1 through 3 over the past five years which could have been

prevented had the Electric Isolation Project been in place. This is reflected in Document No. 2 of my exhibit. It should also be noted that many of these events required the de-integration of two coal-fired units simultaneously. This is a situation that puts a strain not only on the cost of replacement purchased power but even its availability in that quantity in the state. For example, an event on September 5, 2002 would have required shutting down all four base load coal-fired units due to the total loss of the FGD system electric power if it occurred after the Consent Decree deadlines and without the Electric Isolation Project (three units were de-integrated and Big Bend Unit 4 was in outage that day). Obviously replacing over 1,800 MW of base load coal-fired capacity in September, a high demand month, could not be achieved at any cost. Though these considerations were not factored into Tampa Electric's benefit analysis due to the very difficult nature of assigning monetary value to blackouts or brownouts, they should not be overlooked when assessing the importance of segregating the electric supply system to ensure adequate unit reliability.

Q. Mr. Stamberg's testimony on pages 5 and 7 characterizes the variable frequency ID fan drive systems as a "high

capital cost and a deluxe ID fan feature that allows improved ID fan speed control that can reduce on-site electrical use." Do you concur?

A. Not in the sense that it is not the most cost-effective selection or that it was selected merely to provide lower operating electrical consumption. The ID fan variable speed drive systems were selected based on a comprehensive study of fan drive alternatives which clearly showed that variable speed centrifugal fans were the lowest cost alternative as shown in Document No. 3 (Big Bend Unit 3 SCR Project Evaluation of Fan Alternatives, S&L Report No. SL-008417), of my exhibit. Variable speed drives were first utilized on Tampa Electric's generating system for the original Big Bend Unit 4 FD and ID fans, which were commissioned in 1985. Since that time, variable speed drives for large boiler fans have become a de facto standard in the industry.

III. Group A - Big Bend Units 3 through 4 (Split Inlet and Split Outlet Duct)

Q. On page 8 of Mr. Stamberg's testimony, he states that he does not believe that the Group A projects will significantly improve the reliability of the

environmental equipment. Do you concur?

A. No. I believe that Mr. Stamberg is making two profound errors in the underlying assumptions he uses for his reliability analysis. First, he ignores the significant change in maintenance philosophy required by the changes in the allowable operating parameters for Big Bend Units 1 through 3 that will occur in 2010 and 2013 as a direct result of the Consent Decree. During the period that the Consent Decree allows unscrubbed operations, a far less pro-active maintenance philosophy can be applied to the FGD systems in general. The existence of the de-integration days that allow for continued generating unit operations while the FGD system is off line for repairs, could allow this less pro-active approach without penalty. However, once the de-integration days are no longer available due to the Consent Decree - in 2010 for Big Bend Unit 3 and in 2013 for Big Bend Units 1 and 2 - that philosophy must be abandoned in favor of a more pro-active preventive maintenance approach. Given the inherent economic advantage of operating the large and efficient base load coal-fired units at Big Bend Station, Tampa Electric would be imprudent not to take steps to prevent forced outages of these units or even expanded maintenance outages during the peak generating seasons.

A forced outage of this type would force the company to rely on units in its fleet that are more expensive to operate or to rely on purchased power, or a combination of the two.

Second, Mr. Stamberg obviously assumes that past performance can be directly extrapolated to future performance. It is unreasonable to assume that the maintenance needs of the FGD systems will not increase with the passage of time or that the outage rates will not increase over time. As any car owner will tell you as their car gets older it breaks down more often and requires more maintenance, time and money.

Q. On pages 7 through 11 of Mr. Stamberg's testimony, he states that the FGD system for Big Bend Units 3 and 4 has experienced only 9.88 hours of de-integration due to common ductwork problems over two de-integration events, that the common ductwork problems may not cause a forced outage in the absence of allowable FGD system bypass days and that the project is not cost-effective. Do you concur with his analysis?

A. No. First, it appears that Mr. Stamberg has simply misread the quarterly reports and interpreted the time

column as duration time of the de-integration event instead of the time of day (in military time) that the event started. This accounts for the statement in his testimony that the de-integration event in the first quarter of 2006 was 8.55 hours long when it actually began at 8:55 a.m. on February 21, 2006 and lasted until March 1, 2006 or approximately 200 hours.

Mr. Stamberg's conclusion that only two de-integration events were needed for ductwork maintenance because only two events were attributed to ductwork maintenance in the quarterly reports is incorrect. Ductwork repair and maintenance were performed during more than just the de-integration events attributed to ductwork maintenance. A comprehensive review of all work orders associated with the common inlet and outlet ductwork and common stacks Nos. 2 and 3, which are also affected by the split ductwork projects; show that maintenance was performed in these areas during 11 de-integration events and an additional nine maintenance outages where both Big Bend Units 3 and 4 were offline. This is reflected in Document No. 4 of my exhibit. This means that Mr. Stamberg's assertion in his testimony that only 9.88 hours over five years could be attributed to any type of outage as an upper limit is also incorrect. Tampa

Electric's review yields approximately 1,800 hours of de-integration time and an additional 1,992 hours of outage time over five years for an annual average of 360 hours or 15 days and 398 hours or 16.6 days, respectively. This represents a total of over 31 days per year on average when maintenance or repair was performed on common inlet ductwork, common outlet ductwork or common stacks where both units were required to be unscrubbed.

His error in accounting of ductwork maintenance and repair time also means that Mr. Stamberg's cost-benefit analysis, which was based upon the erroneous outage time of 9.88 hours over five years, is completely in error. Furthermore, it calls into question Mr. Stamberg's conclusion that FGD system reliability cannot be significantly improved by these split ductwork projects. Tampa Electric's cost-benefit analysis is both highly conservative and reflective of the fact that a portion, but not all, of the maintenance might be able to be performed during scheduled generating unit outages or other FGD system outages. It is rare that both units paired to a single, essential FGD system, are scheduled to be off line for maintenance simultaneously. This fact requires the split duct projects to allow for future ductwork maintenance during a single unit outage.

Q. On page 11 of Mr. Stamberg's testimony he states that many other utilities have combined units into a common scrubber. Is Tampa Electric's Big Bend Units 3 and 4 FGD system ductwork the same as these other utilities' units?

A. Tampa Electric is not familiar with all of the other utility companies' scrubber units that share a common FGD system, but for the ones the company does have some knowledge of, they are not the same. To the best of Tampa Electric's knowledge, other units such as Owensboro Municipal Utilities, Elmer Smith Station and Western Kentucky Energy's Coleman Station have bypass ducts back to the units' original stack and can send their flue gas to those stacks when their FGD system is off line in order to access the common ductwork. Additionally, Elmer Smith Station has more than one tower and can therefore access portions of the common ductwork while still scrubbing significant amounts of flue gas.

Unlike Tampa Electric, other utilities may not be required to scrub 100 percent of their flue gas at all times. Other utilities with common FGD systems may be facing the very same questions of multiple unit reliability and forced outages due to their common ductwork. Still other utilities may not have a problem

with accepting multiple unit outages to accommodate the common ductwork because the lost generating capacity may be just a small fraction of their total capacity. Finally, most of the units Tampa Electric is aware of only have a fraction of the length of common ductwork that exists on the Big Bend Units 3 and 4 FGD system. These other units are very similar to the Big Bend Units 1 and 2 FGD system for which Tampa Electric is not seeking to split the ductwork. I believe the common ductwork on Tampa Electric's Big Bend Units 3 and 4 FGD system represents a rather unique configuration in the industry.

Q. On page 11 of Mr. Stamberg's testimony, he states that Tampa Electric reported in its quarterly compliance reports to the United States Environmental Protection Agency ("EPA") that the common inlet duct replacements occurred during the 2nd quarter of 2003, 4th quarter of 2004 and the 2nd quarter of 2006. He further alludes that these are Group A projects as contained in Tampa Electric's petition for approval of its Big Bend FGD System Reliability Program. Do you concur?

A. No. These projects are not Group A projects. The common inlet ductwork projects referred to by Mr. Stamberg were

merely replacement projects where corrosion had damaged ductwork over time and was replaced. The Group A projects are ductwork projects that split up, divide or segregate the common ductwork by generating unit.

Q. On page 12 of Mr. Stamberg's testimony he states that Tampa Electric reported, through its quarterly compliance reports to EPA, that the Big Bend Units 3 and 4 Split Inlet Duct project was started during the 3rd quarter of 2006 with an estimated project cost of $4.8 million, far in excess of the petition estimate of $0.116 million. Is this correct?

A. The Consent Decree 3rd quarter compliance report to the EPA states that the Big Bend Units 3 and 4 Split Inlet Duct project was started in the 3rd quarter and the project cost is estimated at $4.8 million. However, the quarterly report is in error. The Split Inlet Duct project was not started; it was the Split Outlet Duct project that was started and has an estimated cost of $4.8 million which is consistent with the petition. The Split Inlet Duct project has not commenced and the estimated cost remains at $0.116 million. A correction in the name of the project will be made in the next quarterly report.

IV. Group C Big Bend Gypsum Projects

Q. On page 13 of Mr. Stamberg's testimony, he states that there has never been a forced outage or derate reported that was caused by gypsum processing. Do you concur with that statement?

A. No I do not. The vacuum filter was the cause of de-integrating Big Bend Units 1 and 2 on December 20 and 21, 2003 as referenced in Document No. 5 of my exhibit, Work Order 17893897.

Q. On page 13 of Mr.Stamberg's testimony, he states that no gypsum dewatering projects were listed in the Tampa Electric FGD Optimization Study submitted to EPA and, therefore implies, they are not appropriate now. Why were these gypsum projects not listed?

A. The FGD Optimization Study was not intended to present long range projects necessary to accommodate the Consent Decree requirement that eliminates the use of de-integration days. The study was intended to cover immediate projects necessary to minimize the use of existing de-integration days.

Mr. Stamberg references pages 7 and 8 of Mr. Hewson's testimony where Mr. Hewson is asked whether the 13 FGD capital improvement projects were included in the plan required under Section 31 of the Consent Decree. At the top of the next page Mr. Hewson states that only two of the 13 projects were included. This statement is also in error, as discussed in detail in the rebuttal testimony of Tampa Electric's witness Ms. Laura R. Crouch.

Q. On page 15 of Mr. Stamberg's testimony and page 14 of Mr. Hewson's testimony, they each assert that the gypsum fines filter project is not required by the Consent Decree and is motivated by the desire to produce saleable gypsum to avoid landfill disposal costs. Mr. Hewson further testifies that the FGD systems were designed to produce gypsum by-product for disposal. Are these the primary motivations for this project and were the FGD systems designed to produce gypsum for disposal?

A. No they are not. Tampa Electric takes great pride in its corporate culture of striving to make commercial saleable by-products rather than streams of waste that must be disposed of from its power generation operations. Tampa Electric has been an industry leader in finding markets for its by-products that have benefited the company and

its customers. Tampa Electric does not own nor operate any landfills as do other electric utilities, and therefore disposal operations is an expensive option and less than environmentally optimum. Tampa Electric is not currently landfilling any of its FGD gypsum nor did it ever intend to do so. Tampa Electric is presently selling all of its FGD gypsum; so, a desire to produce more saleable gypsum is not a motivation.

Tampa Electric's primary motivation for the Gypsum Fines Filter project is to provide increased reliability to the FGD systems once the de-integration is no longer allowed by the Consent Decree. The company's intent is simply achieve a design configuration that will mitigate the decreased reliability brought about by the higher moisture content gypsum that would otherwise be produced without a fines filter as part of the dewatering process.

Q. On page 15 of Mr. Stamberg's testimony, he states that the fines filter project is not necessary to meet the requirements of the Consent Decree. Do you concur?

A. No. It is Tampa Electric's belief that the Consent Decree withdrawal of the de-integration days and subsequent requirement to shut the generating unit down

if the FGD system is unavailable makes it necessary to improve the reliability of the FGD systems at Big Bend Station. While the absence of a fines filter has not resulted in many de-integration days being used, this has been the result of a series of interim stop-gap operating measures. This is best understood with a brief description of that operating history.

When Big Bend Units 1 and 2 FGD system went in-service December 1999, fines were purged to Dredge Disposal Area-2 ("DA-2") to enable de-watering of the gypsum by vacuum filters. In 2002, DA-2 was no longer available for use due to environmental concerns. The fines were then purged to an on-site recycle water pond. The settling basin and recycle pond received over 60,000 tons of fine gypsum in 2002 and was approaching capacity. With the settling pond at capacity, one of the two existing gypsum vacuum filters was converted to a fines filter to remove the fines that in the past had been purged to the recycle pond. As a result, the gypsum dewatering system could not be used as a back up gypsum filter. Without this redundancy, proper maintenance of the vacuum filters cannot be performed resulting in a deterioration of the filter drums. It is not uncommon to have both filter drums down at the same time and, as a result, a 1.5

million gallon emergency pond (the last place that slurry can be stored) is at capacity. Because of these operational issues, the company has been very close to operating on a de-integrated basis several times.

Not purging fines from the FGD system is not an option because they continue to build up in the FGD slurry system causing numerous cascading process problems. The fines build up interferes with filter operations, reducing capacity to the point where the filters cannot keep up with generating unit full load operation as well as interferes with the density control process thereby decreasing crystal size further aggravating the filter dewatering capacity. In short, fines must be removed from the system and the present system is inadequate to perform this function. Tampa Electric firmly believes that the good fortune reflected in this history and the interim design modifications made to one of the gypsum filters cannot and should not be counted on to avoid increased forced and maintenance outages going into the future.

V. Big Bend Units 3 and 4 FGD Booster Fan Capacity Expansion

Q. On page 16 of his testimony Mr. Stamberg's states, with

reference to the Big Bend Units 3 and 4 booster fan capacity project, "This new project is needed only if the Units 3 and 4 existing combined duct is split into two ducts" again implying the project is unnecessary. Is this statement correct?

A. No it is not. The SCR project on Big Bend Unit 3 will convert the draft system on that unit from its present pressurized design to a balanced draft design to accommodate the needs of the SCR system. This change will result in a minimum of 15 percent increase in the flue gas flow rate for that unit. The present FGD booster fans cannot accommodate this increase in flue gas flow. Therefore, one or more of the FGD booster fans must undergo a capacity expansion regardless of whether or not the inlet and outlet ductwork is split. Tampa Electric has determined that a capacity expansion of a single FGD booster fan is the most cost-effective approach. This project is almost identical to the Commission-approved ECRC project to make modifications to the "D" tower of the FGD system as part of the integration of the Big Bend Unit 3 flue gas into the FGD system in 1995.

Q. On page 16 of Mr. Stamberg's testimony, he states that

the booster fan capacity expansion project has already been completed and therefore should not be part of the Big Bend FGD System Reliability Program. Do you concur?

A. No. The two quarterly report projects that Mr. Stramberg cites are different projects that have nothing to do with fan capacity expansion. Those projects were to replace the fan wheel of "C" tower booster fan and the fan inlet ducts of the "A" and "B" towers booster fans.

VI. Big Bend Other Upgrade and Maintenance Projects

Q. Do any of the FGD reliability projects that Mr. Stamberg supports for acceptance under the ECRC clause have any similarities to the projects objected to?

A. Yes. Mr. Stamberg concedes on pages 19 and 20 of his testimony that the FGD Controls Additions Project is reasonable and prudent. This project seeks to physically divide the control functions of the FGD control system such that a single control system failure will only reduce the scrubbing capacity by one half or one generating unit instead of loosing the entire FGD system and both coal-fired generating units. The Electric Isolation Project seeks to do exactly the same function

except it addresses the electric power delivery system to the components of the FGD system instead of the control components. Therefore, the reasons and logic for implementing the Electric Isolation Project are exactly the same as that for the Controls Additions Project which he finds acceptable.

Q. Mr. Smolenski, in your opinion are the 13 projects that comprise Tampa Electric's Big Bend FGD System Reliability Program necessary to comply with the Consent Decree and appropriate for cost recovery in the manner Tampa Electric has proposed?

A. Yes. As explained in the testimony of Tampa Electric witnesses Nelson, Crouch and myself they clearly are needed to comply with incremental environmental constraints that become effective in 2010 and 2013 under the Consent Decree. The projects have been designed, engineered and are being constructed in a manner that will comply with the Consent Decree and at the same time do so in the most cost-effective way from the perspective of Tampa Electric's customers. In addition, they meet all of the qualifying criteria for cost recovery in the manner proposed by Tampa Electric, as explained in detail in the direct and rebuttal testimony of Tampa Electric

witness Howard T. Bryant.

Q. Does this conclude your rebuttal testimony?

A. Yes it does.

TAMPA ELECTRIC COMPANY
DOCKET NO. 050958-EI
FILED: 02/20/07

EXHIBIT TO THE REBUTTAL TESTIMONY OF

JOHN V. SMOLENSKI

EXHIBIT NO._____
TAMPA ELECTRIC COMPANY
DOCKET NO. 050958-EI
(JVS-2)
FILED: 02/20/07

INDEX

13.8 kV Transformer 3B Load Allocation

Circuit Breaker	Connected Load (KVA) FGD	SCR	Boiler	Total
B3003A	362	0	0	362
B3003B	379	0	0	379
B3004A	1,875	5,750	1,875	9,500
B3004B	1,875	5,750	1,875	9,500
B3005A	0	544	0	544
B3005B	0	237	0	237
Total	**4,491**	**12,281**	**3,750**	**20,522**
Percentage	**21.9**	**59.8**	**18.3**	**100.0**

4.16 kV Transformer 3A FGD Reliability Loads

Description	HP	KVA
FGD Tower A:		
A1 Forced Oxidation Compressor	900	844
A2 Forced Oxidation Compressor	900	844
A1 Absorber Recycle Pump	500	469
A2 Absorber Recycle Pump	500	469
A3 Absorber Recycle Pump	500	469
A1 Quencher Recycle Pump	300	281
A2 Quencher Recycle Pump	300	281
Total FGD Tower A		**3,657**
FGD Tower B:		
B1 Forced Oxidation Compressor	900	844
B2 Forced Oxidation Compressor	900	844
B1 Absorber Recycle Pump	500	469
B2 Absorber Recycle Pump	500	469
B3 Absorber Recycle Pump	500	469
B1 Quencher Recycle Pump	300	281
B2 Quencher Recycle Pump	300	281
Total FGD Tower B		**3,657**
Limestone Preparation:		
Vacuum filter	250	234
Limestone ball mill C	960	900
Total Limestone Preparation		**1,134**
Total Load Transferred		**8,448**

Summary of Electrical Work Orders Associated with De-Integration Days

Work Order	Date	Units	Outage Duration (Days)
Big Bend Units 1 & 2			
1578554	09/22/01 - 09/23/01	2	2
1681834	09/05/02 - 09/06/02	2	2
1738802	06/08/03 - 06/10/03	2	4
1762580	09/12/03 - 09/12/03	1	1
1779989	12/04/03 - 12/04/03	2	2
1872409	03/03/05 - 03/06/05	1	3
1872373	03/05/05 - 03/06/05	1	1
1939710	02/21/06 - 02/21/06	1	1
1952142	03/04/06 - 03/04-06	2	2
Total			**18**
Big Bend Units 3 & 4			
1681834	09/05/02 - 09/06/02	2	2
1690024	11/16/02 - 11/16/02	2	2
1748826	06/21/03 - 06/21/03	1	1
1957468	05/15/06 - 05/15/06	2	2
Total			**7**

TECO TAMPA ELECTRIC

Work Order

Number: 1578554
Task: 1

Equipment Description:	Date Opened:
Unit 1&2 Booster Fan	Sep 23, 2001 03:06 AM

Equipment Name and Failed Component:	Status: Closed Approver: Approved: Priority: Urgent Condition: Outage Outage Code: None specified
Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #1 & 2 FLUE GAS DESULFURIZATION SYSTEM / NO. 1 UNIT PROCESS GAS FLOW / BOOSTER FAN 1-FGI-FN-1 - UU29 / MOTOR - UU30 /	Reason: FGD Deintegration

Work Order Problem Description:
Booster fan tripped when power was lost from #4 unit tripped.

Estimates:	Total Job Hours	Total Man Hours		
Planned By:			Teco Labor	$.00
Planned Date:	Teco Labor:		Teco Material	$.00
Approved By:			Teco Other Material	$.00
			Contract Labor	$.00
			Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 512 82 --202	Electrical Maintenance		
ACTIVITY Number:	Requester:		
15447	Matte, James A.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1578554-1

TECO TAMPA ELECTRIC

Work Order

Number: 1681834
Task: 1

Equipment Description: #3 unit FGD system	Date Opened: Oct 16, 2002 11:27 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / ***Warning! This equipment location has reported Medgate incident(s). See task in Workman for specifics!***	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason: FGD Deintegration

Work Order Problem Description:
Loss power to #3 unit scrubber

Estimates: Planned By: Planned Date: Approved By:	Total Job Hours Total Man Hours Teco Labor:	Teco Labor	$.00
		Teco Material	$.00
		Teco Other Material	$.00
		Contract Labor	$.00
		Contract Material	$.00
		Contract Eqpt Rental	$.00
		Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:		

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number: 919 512 84 --150	Area: Plant Operations FGD Operations (Tyson)	Skills Requirement Quantity Hours
ACTIVITY Number: 15406	Requester: Milligan, Vickie L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1681834-1

TECO TAMPA ELECTRIC

Work Order

Number: 1738802
Task: 1

Equipment Description: #4- 13.8V FD FAN ACB B403	Date Opened: Jun 6, 2003 06:34 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION / 13.8 KV SWITCHGEAR / FACILITIES BUILDING 13.8 KV SWITCHGEAR /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason: FGD Deintegration

Work Order Problem Description:
SMOKE COMING FROM BRKR AND TAKING OUT THE WEST 13.8V BUS

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date:	Teco Labor:		
Approved By:			

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
PLEASE TROUBLE SHOOT AND MAKE THE NECESSARY REPAIRS.

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 513 44 --200	Electrical Maintenance		
ACTIVITY Number:	Requester:		
15437	Griffis, Oscar E.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1738802-1

TECO TAMPA ELECTRIC

Work Order

Number: 1738802
Task: 2

Equipment Description:	Date Opened:
#4- 13.8V FD FAN ACB B403	Jun 9, 2003 12:59 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION / 13.8 KV SWITCHGEAR / FACILITIES BUILDING 13.8 KV SWITCHGEAR /	Status: Closed Approver: Approved: Priority: Emergency Condition: Outage Outage Code: None specified
	Reason: FGD Deintegration

Work Order Problem Description:
SMOKE COMING FROM BRKR AND TAKING OUT THE WEST 13.8V BUS

Estimates:			Teco Labor	$.00
Planned By:		Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:	Teco Labor:		Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
DE-INTEGRATING UNIT #1 & #2, DUE TO ELECTRICAL SWITCHING TO REPAIR THE WEST 13.8kV BUS.

PAR Number:	Area: Plant Operations	Skills Requirement	Quantity Hours
919 513 44 --152	FGD Operations (Tyson)		
ACTIVITY Number:	Requester:		
15437	Lewis III, Benjamin		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1738802-2

TECO TAMPA ELECTRIC

Work Order

Number: 1738802
Task: 3

Equipment Description:	Date Opened:
#4- 13.8V FD FAN ACB B403	Jun 9, 2003 08:11 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION / 13.8 KV SWITCHGEAR / FACILITIES BUILDING 13.8 KV SWITCHGEAR /	Status: Closed Approver: Approved: Priority: Emergency Condition: Reduced Load Outage Code: Reason:

Work Order Problem Description:
SMOKE COMING FROM BRKR AND TAKING OUT THE WEST 13.8V BUS

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 06/09/03 08:11:30	Teco Labor:		
Approved By:	Contractor Labor:	6.0	4,032.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$121,000.00
Contract Material	$50,000.00
Contract Eqpt Rental	$.00
Estimates Total:	$171,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(Switchgear Unlimited) Inspect, Repair, Test, and Report on damage to 13.8kV West Bus in the facilities building. Repair cubicle damage, test and repair breakers, and test FD fan isolation transformer and feeder cables.

PAR Number:	Area: Contractor Services Electrical SWITCH GEAR UNLIMITED	Skills Requirement	Quantity Hours
917 513 44 --210			
ACTIVITY Number: 15437	Requester: Mussetter, Troy		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1738802-3

TECO TAMPA ELECTRIC

Work Order

Number: 1738802
Task: 4

Equipment Description:	Date Opened:
#4- 13.8V FD FAN ACB B403	Jun 10, 2003 06:16 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION / 13.8 KV SWITCHGEAR / FACILITIES BUILDING 13.8 KV SWITCHGEAR /	Status: Closed Approver: Approved: Priority: Emergency Condition: Reduced Load Outage Code: Reason:

Work Order Problem Description:
SMOKE COMING FROM BRKR AND TAKING OUT THE WEST 13.8V BUS

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 06/13/03 06:06:31	Teco Labor:		
Approved By:	Contractor Labor:	.0	50.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$150.00
Teco Other Material	$250.00
Contract Labor	$1,875.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,275.00

Description of Work to be Performed for this Task:
(EME) Repair the electrical connection in the primary termination compartment on FD Fan Isolation Transformer X1-A1 (tracking and failed stress cones). Coordinate conductor testing with Switchgear Unlimited (Dave Cox). Failures caused by water gettinginto the termination compartment. Repair and seal the compartment and roof cable penetrations.

PAR Number:	Area: Contractor Services Electrical ELECTRIC MACHINERY ENTERPRISES	Skills Requirement	Quantity Hours
917 513 44 --210			
ACTIVITY Number: 15437	Requester: Mussetter, Troy		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1738802-4

TECO TAMPA ELECTRIC

Work Order

Number: 1738802
Task: 7

Equipment Description:	Date Opened:
#4- 13.8V FD FAN ACB B403	Jun 24, 2003 06:11 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION / 13.8 KV SWITCHGEAR / FACILITIES BUILDING 13.8 KV SWITCHGEAR /	Status: Closed Approver: Approved: Priority: High Condition: Non Outage Outage Code: Reason:

Work Order Problem Description:
SMOKE COMING FROM BRKR AND TAKING OUT THE WEST 13.8V BUS

Estimates:	Total Job Hours	Total Man Hours		
Planned By:			Teco Labor	$.00
Planned Date: 06/24/03 18:11:35	Teco Labor:		Teco Material	$.00
Approved By:			Teco Other Material	$1,850.00
			Contract Labor	$.00
			Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$1,850.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(Switchgear Unlimited) Rebuild the spare 13.8kV, 2000 amp breaker.

PAR Number:	Area: Engineering Electrical SWITCH GEAR UNLIMITED	Skills Requirement	Quantity Hours
917 513 44 --090			
ACTIVITY Number: 15437	Requester: Mussetter, Troy		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1738802-7

TECO TAMPA ELECTRIC

Work Order

Number: 1762580
Task: 1

Equipment Description: Waste & Limestone substations	Date Opened: Sep 12, 2003 12:09 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #1 Thru #4 FGD COMMON SYSTEMS /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code:
	Reason: FGD Deintegration

Work Order Problem Description:
Lost power to Limestone,Waste handling & WWt Please assist in restoring power

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 512 85 --200	Electrical Maintenance		
ACTIVITY Number:	Requester:		
15028	Shockley, Leslie R.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1762580-1

TECO TAMPA ELECTRIC

Work Order

Number: 1779989
Task: 1

Equipment Description:	Date Opened:
1&2 Tower Intergation	Dec 4, 2003 05:05 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #1 & 2 FLUE GAS DESULFURIZATION SYSTEM / ABSORBER 1-FGA-TWR-1 / INSTRUMENTATION & CONTROLS /	Status: Closed Approver: Approved: Priority: Urgent Condition: Non Outage Outage Code:
	Reason: FGD Deintegration

Work Order Problem Description:
Tagging the 13.8kv breaker cubicle B409W

Estimates:					
Planned By: Guthrie, Mary K.		Total Job Hours	Total Man Hours	Teco Labor	$200.00
Planned Date: 12/15/03 11:24:57	Teco Labor:	4.0	8.0	Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$200.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
Tagging the 13.8kv breaker cubicle B409W, t/s and make needed repairs

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 512 82 --200	Electrical Maintenance	E - Electrician	2 4.0
ACTIVITY Number:	Requester:		
15457	Matte, James A.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1779989-1

TECO TAMPA ELECTRIC

Work Order

Number: 1872409
Task: 1

Equipment Description:	Date Opened:
#4 RESERVE TRANSFORMER	Mar 4, 2005 04:35 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / TRANSFORMERS / RESERVE STATION SERVICE TRANSFORMER /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code:
	Reason: FGD Deintegration

Work Order Problem Description:
LOST 13.8KW WEST BUS

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
CHECK YOUR TAGS	Tag #:			Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 513 49 --190	Electrical Maintenance		
ACTIVITY Number:	Requester:		
15457	Hobbs, Harold B.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1872409-1

TECO TAMPA ELECTRIC

Work Order

Number: 1872373
Task: 1

Equipment Description:	Date Opened:
13.8 KV ACB B495W	Mar 3, 2005 04:02 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION / POWER VACUUM SWITCHGEAR /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason:

Work Order Problem Description:
The breaker blew up.

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
Please repair.

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 513 49 --190	Electrical Maintenance		
ACTIVITY Number:	Requester:		
15437	Weesner, Eugene E.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1872373-1

TECO TAMPA ELECTRIC

Work Order

Number: 1939710
Task: 1

Equipment Description:	Date Opened:
B Absorber Tower	Feb 21, 2006 02:56 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / B. BOOSTER FAN, FGD - IA27 / MOTOR, B. BOOSTER FAN - GF91 /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason: FGD Deintegration

Work Order Problem Description:
4160v Feeder breaker trip.

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:				

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 512 84 --190	Electrical Maintenance		
ACTIVITY Number:	**Requester:**		
14743	Wilder, Joseph E.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1939710-1

TECO TAMPA ELECTRIC

Work Order

Number: 1939710
Task: 2

Equipment Description:	Date Opened:
B Absorber Tower	Feb 21, 2006 03:21 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / B. BOOSTER FAN, FGD - IA27 / MOTOR, B. BOOSTER FAN - GP91 /	Status: Closed Approver: Approved: Priority: Urgent Condition: Reduced Load Outage Code: Reason:

Work Order Problem Description:
4160v Feeder breaker trip.

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
CHECK YOUR TAGS	Tag #:			Contract Eqpt Rental	$.00
				Estimates Total:	$.00

Description of Work to be Performed for this Task:
(Switchgear Unlimited) - repair breaker as directed by Tampa Electric representative.

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
917 512 84 --210	Electrical SWITCH GEAR UNLIMITED		
ACTIVITY Number:	Requester:		
14743	Youngblood, Kent		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1939710-2

TECO TAMPA ELECTRIC

Work Order

Number: 1952142
Task: 1

Equipment Description:	Date Opened:
1&2 FGD Tower Loss of Power	Apr 26, 2006 02:49 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #1 & 2 FLUE GAS DESULFURIZATION SYSTEM /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code:
	Reason: FGD Deintegration

Work Order Problem Description:
Loss electrical power (4160V) to the 1&2 FGD Tower.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Electrical Maintenance	Skills Requirement	Quantity Hours
917 512 82 --190	Electrical Maintenance		
ACTIVITY Number:	Requester:		
14009	Jaggie, Lawrence E.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1952142-1

TECO TAMPA ELECTRIC

Work Order

Number: 1690024
Task: 1

Equipment Description: ACB AT SWITCHYARD	Date Opened: Nov 16, 2002 04:36 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF ELECTRIC PLANT / UNIT ELECTRICAL EQUIPMENT / SWITCHGEAR & DISTRIBUTION /	Status: Closed Approver: Approved: Priority: Emergency Condition: Reduced Load Outage Code:
	Reason: FGD Deintegration

Work Order Problem Description:
BREAKER TRIPPED LOST #4 UNIT

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Plant Operations	Skills Requirement	Quantity Hours
919 513 44 --150	FGD Operations (Tyson)		
ACTIVITY Number:	Requester:		
15437	Markland, Larry W.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1690024-1

TECO TAMPA ELECTRIC

Work Order

Number: 1748826
Task: 1

Equipment Description: D BOOSTER FAN	Date Opened: Jul 18, 2003 10:20 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / ***Warning! This equipment location has reported Medgate incident(s). See task in Workman for specifics!***	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason: FGD Deintegration

Work Order Problem Description:
13.8 K TRIP

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date:	Teco Labor:		
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number: 917 512 84 --200	Area: Electrical Maintenance Electrical Maintenance	Skills Requirement	Quantity Hours
ACTIVITY Number: 15406	Requester: Montague, David M.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1748826-1

TECO TAMPA ELECTRIC

Work Order

Number: 1957468
Task: 1

Equipment Description: #3 FGD 13.8 West Reserve Bus	Date Opened: May 22, 2006 10:22 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT /	Status: Open Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason: FGD Deintegration

Work Order Problem Description:
Loss FGD 13.8Kv West reserve Bus

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date:	Teco Labor:		
Approved By:			

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Plant Operations	Skills Requirement	Quantity Hours
919 512 84 --150	FGD Operations (Tyson)		
ACTIVITY Number:	Requester:		
14743	Tyson, Thomas E.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1957468-1

TECO TAMPA ELECTRIC

Work Order

Number: 1957468
Task: 1

Equipment Description: #3 FGD 13.8 West Reserve Bus	Date Opened: May 22, 2006 10:22 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT /	Status: Open Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason: FGD Deintegration

Work Order Problem Description:
Loss FGD 13.8Kv West reserve Bus

Estimates: Planned By: Planned Date: Approved By:	Total Job Hours Total Man Hours Teco Labor:	Teco Labor Teco Material Teco Other Material Contract Labor Contract Material Contract Eqpt Rental Estimates Total:	$.00 $.00 $.00 $.00 $.00 $.00 $.00
CHECK YOUR TAGS	Tag #:		

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number: 919 512 84 --150	Area: Plant Operations FGD Operations (Tyson)	Skills Requirement Quantity Hours
ACTIVITY Number: 14743	Requester: Tyson, Thomas E.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1957468-1

TAMPA ELECTRIC COMPANY

BIG BEND UNIT 3
BIG BEND SCR PROJECT

Evaluation of Fan Alternatives

55 E. Monroe Street
Chicago, IL 60603

April 05, 2005
Project No. 11764-003

S&L Report No. SL-008417, Rev. 1

Big Bend Unit 3

Evaluation of Fan Alternatives

Rev No.	*Date*	*Revisions*	*By*
0	*01-28-05*	*Issue for Comment*	*J. Donajkowski*
1	*04-05-05*	*Comment Incorporation*	*J. Donajkowski*

Prepared by: _____ Date: 4/05/05
Jason Donajkowski

Reviewed by: _____ Date: 4/05/05
Kevin Hopkins

Approved by: _____ Date: 4/5/05
Daniel Anderson

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EXECUTIVE SUMMARY

Tampa Electric Company (TEC) entered into an agreement with the United States Environmental Protection Agency to reduce various pollutants from its power generating units. As part of this agreement, TEC will add selective catalytic reduction (SCR) systems to the four coal fired units that makeup the Big Bend Power Station. Big Bend Unit 3 is currently a pressurized furnace design. Adding the SCR would increase the pressure loss through the backend equipment by 6 to 10 in-wg. A previous study determined that it was not feasible for this additional pressure to be accounted for by increasing the furnace pressure. Instead, new fans would need to be added to accommodate the SCR

Various forced draft (FD) and induced draft (ID) fan alternatives have been considered to meet the required draft modifications to support SCR installation at Big Bend Unit 3. Both centrifugal (radial) and axial fans were considered, as well as a number of control options for centrifugal fans. For the FD fans, use of the existing fan in current condition, or with modifications was also considered. The alternatives considered in this evaluation are:

FD fan alternatives:

- Existing centrifugal fans operated at the lower motor speed (885 rpm) with:
  - existing variable inlet vanes
  - new fluid drives
  - new variable frequency drives
- New centrifugal fans (properly sized for new system curve) with:
  - variable inlet vanes
  - fluid drives
  - variable frequency drives
- New rotating element only
- New motor only
- Axial fans with variable pitch blades

ID fan alternatives:

- Centrifugal fans with control by:
  - variable inlet vanes
  - fluid drives
  - variable frequency drives
- Axial fans with variable pitch blades

The alternatives listed above were evaluated based on capital costs, installation costs, operating and maintenance costs, and auxiliary power consumption. The following alternatives are recommended based on the lowest cost option over a 20-year operating period:

ID Fans: New Centrifugal Fan with VFD

FD Fans: Retrofit existing Fan with new rotating element
or
Add VFD to existing fan

Further evaluation into the feasibility of retrofitting the existing fan with a new rotating element should be performed in order to determine the best FD fan alternative.

Note that variation in ductwork costs between the alternatives was not included in the economic analysis, although some discussion of equipment arrangement is included in this report.

1.0 BACKGROUND AND OBJECTIVE

1.1 Background

Big Bend Unit 3 is a pressurized Riley Wet Bottom Turbo Furnace nominally rated for 450 MW with 2 x 50% FD fans. The existing fans are Westinghouse Electric size 4084 airfoil fans with a maximum developed head of 49 in-wg (at 0.0688 lb/ft^3 density) and a rated power of 3000 hp. The motors are two-speed. The high speed is 1185 rpm and the low speed is 885 rpm. A series of four FGD booster fans, shared with Unit 4, are located after the electrostatic precipitator (ESP). Each booster fan discharges to an FGD tower.

The addition of an SCR is expected to add 6-10 in-wg of pressure drop to the system. A previous evaluation determined that adding this pressure to the FD fans would result in unacceptable operation of the furnace. Therefore, new ID fans will be added to accommodate the SCR installation and the boiler combustion air / flue gas system conversion to balanced draft operation.

Fan technology for power plants has not changed significantly in the last several decades. There are two primary fan designs: centrifugal (radial) and axial. In order to optimize the fan operating point to the unit load, various technologies have been developed to modify the fan performance. The technologies have various degrees of efficiency penalties that roughly correspond to the additional capital cost

Older plants have typically been configured with centrifugal fans often with some sort of speed control. Some of the newer plants and some SCR retrofit projects have opted for axial fans. The selection of the optimum fan and control technology has typically been based on the overall life cycle cost and the owner's experience with the technology.

1.2 Objective

The purpose of this study is to evaluate alternative fan arrangements required for draft modifications to support SCR operation. The study will evaluate centrifugal and axial fans as well as several forms of fan performance modulation.

A portion of the 2003 Comprehensive Study provided a comparison of the alternatives to overcome the pressure drop associated with an SCR including upgrading FD fans, adding booster fans, and converting to balanced draft. The decision has been made to perform draft modifications for Unit 3. This report (SL-008417) has been written based on balanced draft operation.

Transient analysis to determine the conditions during system upsets is beyond the scope of this report, but it has been recommended that TEC pursue such an analysis in the future.

2.0 INPUTS

The following data were used as inputs to the evaluation:

2.1 Hourly plant operating data (gross unit load in MWhr) from January 1st 2002 through June 13th 2004 is obtained from Reference 9.2.

2.2 Boiler duty in Btu/hr and generation in kW is obtained from the heat balances listed in Reference 9.3.

2.3 Typical axial fan curves and predicted performance are based on the vendor submittal for Unit 4 in Reference 9.5.

2.4 The fan curves for the existing FD fans are from Reference 9.6.

2.5 Operating data with air heater air side inlet pressure is from Reference 9.2.

2.6 The fuel ultimate analysis is obtained from Reference 9.4.

2.7 Pressure in the furnace at full load is 15.60 in-wg based on Reference 9.7. (The furnace can operate up to the alarm pressure of 19 in-wg).

2.8 The economizer temperature, primary air flow, and quantity of wet O_2 at the economizer outlet are based on Reference 9.7.

2.9 Information on hydraulic coupling performance is obtained from Reference 9.10.

3.0 ASSUMPTIONS

3.1 Full Load

Full load is assumed to be at 450 MW with a corresponding heat input of 3.574×10^9 Btu/hr based on the '100% VWO, 5% Overpressure' heat balance in Reference 9.3. Note that the calculations performed in this evaluation are for comparative purposes only. The results are not meant to be absolute design values, but only provide a means to evaluate the various fan alternatives. Using a different heat input value would impact all alternatives similarly and would not impact the conclusions of this evaluation.

3.2 Furnace Pressure Drop

Pressure drop through the furnace to the ID fan outlet is assumed to be similar to that of Unit 4. The pressure drop data from the Unit 4 calculation in Reference 9.1 is used as input in the calculations for this study in order to develop a system curve. Any discrepancy in the pressure drop data from Reference 9.1 and the actual Unit 3 pressure drop should not significantly impact the conclusions of this study, since they are based on comparisons of various alternatives (not absolute values) that are all based on the same pressure drop input.

The actual pressure drop will be determined through system testing prior to procurement of new equipment.

3.3 Centrifugal Fan Inlet Vane Performance Curves

The arrangement of variable inlet vane performance curves as they relate to fan brake horsepower and pressure for a centrifugal fan is based on the sample curves in Attachment 10.5.

3.4 Furnace Pressure for Balanced Draft Operation

The furnace pressure for balanced draft operation is assumed to be -0.5 in-wg.

3.5 Additional Fan Sizing Calculation Assumptions

The following assumptions are used in the fan sizing spreadsheets in Attachment 10.1, but do not have a significant impact on the conclusions of this evaluation. The conclusions of this evaluation are based on a comparison of different fan alternatives and these assumptions will remain constant across all alternatives, minimizing their effect on the resulting conclusion

Table 1. Additional Calculation Assumptions

Parameter	Value	Basis
Plant grade elevation	9'	Based on drawings
Water vapor in air	0.025 lb/lb dry air	Corresponds to 86°F and 90% humidity
Total Air heater leakage	25% Note 1	
Air heater leakage of primary air to flue gas	5% Note 2	
Air heater leakage of primary air to secondary air	5% Note 2	
Precipitator infiltration	3%	
Precipitator removal efficiency	95%	
Flyash leaving the economizer (as % of total ash)	20%	Typical for wet bottom, PC-fired boilers

Notes: 1) Air in-leakage estimates account for higher than normal degradation of air heater seals, expansion joints, and duct work.
2) Big Bend Unit 3 does not have a trisector air preheater but this assumption was included to provide for conservative fan sizing.

3.6 Equipment Costs

Equipment costs are based on information from the vendor submittals in Attachment 10.9.

3.7 Installation Costs

Installation costs included in Attachment 10.8 are used in the economic evaluation of alternatives. The installation costs were developed using information from previous fan estimates and fan replacement studies, however, the values remain conceptual in nature.

3.8 Economic Evaluation Assumptions

Table 2. Economic Evaluation Assumptions

Parameter	Value	Basis
Maintenance Man-hour Cost	$50/hr	Used previously by TEC
Auxiliary Power Cost	$50/MWhr	Used previously by TEC
Discount Rate	9.09%	Reference 9.11
Annual escalation of Maintenance Costs	3%	Consistent with catalyst study (SL-008318)
Equipment Life	20 yrs	

4.0 CRITERIA

4.1 The best alternatives for FD and ID fans will be selected based on economic evaluation considering the following factors: equipment costs, installation costs, auxiliary power costs, and maintenance costs. The arrangements with the lowest life-time cost will be selected.

4.2 Any configurations or technologies that are determined to be not technically viable will be dropped from this evaluation.

5.0 GENERAL DISCUSSION

5.1 Fan Configurations

Both centrifugal and axial fans are considered in this evaluation. Axial fans are typically more expensive and require more maintenance costs. Centrifugal fans with inlet vane control are less costly, but are less efficient as load decreases. This is important since typical new installations account for margin in the fan design point in order to ensure that the unit does not become fan-limited in the future. The point on the fan curve where this higher margin is plotted in known as the test block point. Therefore, operation with inlet vane control at normal load suffers from decreased efficiency. In order to allow for centrifugal fan flow control with better efficiency at lower loads, equipment such as hydraulic couplings and variable frequency drives are used. Such equipment required to increase the centrifugal fan efficiency at lower loads adds to the centrifugal fan installation cost.

In the most common axial arrangement, the fan operates at constant speed and the angle of the blades on the hub is adjusted to vary flow. This enables the axial fan to develop, for each point of operation, a unique aerodynamic configuration that is as efficient as possible. A benefit of axial fans is that they can be specified to maximize the efficiency at the MCR point, whereas centrifugal fan maximum efficiency with inlet vane control is at the fan design point (test block point). More detailed explanations of the flow control options are provided in the sections that follow. A detailed discussion of technical issues related to the two fan types is provided in section 5.5.

The alternatives considered for the ID fans are:

- Centrifugal fans with control by:
  - variable inlet vanes
  - fluid drives
  - variable frequency drives
- Axial fans with variable pitch blades

The alternatives considered for the FD fans are:

- Existing centrifugal fans operated at the lower motor speed (885 rpm) with:
  - existing variable inlet vanes
  - new fluid drives
  - new variable frequency drives
- New centrifugal fans (properly sized for new system curve) with:
  - variable inlet vanes
  - fluid drives
  - variable frequency drives
- New rotating element only
- New motor only
- Axial fans with variable pitch blades

5.2 Fan Control Options

There are three basic methods of controlling the flow through either centrifugal or axial fans. First, the speed of the fan can be changed. Second, variable inlet vanes can be employed to introduce a swirl in the fan inlet to change the angle of attack between the flow and the fan blades. Third, the flow can be throttled to dissipate excess pressure. Throttling of either the fan inlet or outlet to control flow is not typically economically attractive for large fans because of the loss in efficiency and because of fan stability problems. Therefore, throttling is not evaluated in this report. Axial fans have a fourth option, which is to vary the pitch of the fan blades.

5.2.1 Centrifugal Fan Control Options

5.2.1.1 Variable Inlet Vanes

Inlet vanes introduce a swirl to the flow entering a fan. This changes the angle of attack between the flow and the fan blade and changes fan performance characteristics. Inlet vane control has a low initial cost, is a very simple method of control, and is very common for ID fans. The major disadvantage of inlet vanes is poor efficiency at lower loads compared to other fan control methods considered in this evaluation.

With inlet vane control, the fan motor drive will be more expensive than with other methods of control considered in this evaluation, since the motor needs to accelerate the fan rotor to full speed at startup. This results in much larger in-rush current during fan starts. Also, during short circuit condition, the motor contributes fault current to the switchgear bus, which may overduty the switchgear if it is not designed for the ID fan motors. Since the electrical system

design for Big Bend 3 did not originally account for ID fans, significant upgrades to the system may be required. See section 5.9 for further electrical discussion.

5.2.1.2 Hydraulic Coupling

A fluid drive, or hydraulic coupling, is a device that transmits power by kinetic energy in the operating fluid. There is an input member, or impeller, and an output member that turns with the driven load. Since there is no mechanical connection between the two shafts, there is no transmission of shock loads or torsional vibration between the connected shafts.

The device can be installed between the motor and the fan to vary the fan speed. Speed control allows the fan to operate near peak efficiency over the entire load range. However, the hydraulic coupling itself has a maximum mechanical efficiency of approximately 95%, and the efficiency decreases at lower speeds. The combined efficiency of the fan and hydraulic coupling is slightly lower than inlet vane control at full load, but the hydraulic coupling provides a higher efficiency at lower loads.

The motor can be less costly since it can start with the coupling unloaded. The motor still adds short circuit current to the switchgear as explained in the section above.

5.2.1.3 Variable Frequency Drive

A variable-frequency controlled motor can be used to control the fan speed. The speed of the motor is continuously variable throughout the load range. The frequency of the power to the motor is controlled by an electronic system.

Speed control is the optimum method of controlling a centrifugal fan since a variable-speed fan can operate near its best efficiency over the entire load range. Fans with variable speed motors do not require a turning gear because the main motor can operate at the turning gear speed for extended periods.

Modern variable frequency drives (VFDs) are designed using pulse width modulator (PWM) inverters which operate close to 96-97% efficiency over the entire load range. With PWM, induction motors can be used; a synchronous motor is not required, as with older load commutated inverter (LCI) type VFDs. An added feature of PWM drives is that they can operate with a power factor close to 1, versus a typical power factor around 0.9. As a result, they can achieve about 10% more capacity from a given motor horsepower rating.

An additional benefit of VFD control is that there is no feedback in the case of short circuit, so there will be virtually no concern for impact on the switchgear.

5.2.2 Axial Fan Control Options

Axial fans can be controlled by varying the blade pitch or by using variable inlet vanes. Either varying the blade pitch or using variable inlet vanes controls the flow by operating on the same principle as do variable inlet vanes on a centrifugal fan.

5.2.2.1 Variable Pitch Fan Blades

Varying the blade pitch is more efficient than using variable inlet vanes because the flow resistance of the vanes is absent. Variable-pitch blades are the most common method of control for axial fans in ID fan service; variable inlet vanes are used occasionally; and variable speed control is rare. The motor for an axial fan encounters less inertia load than for a centrifugal fan with inlet vane control, and therefore is less costly.

5.2.2.2 Variable Inlet Vanes

This alternative entails fixed-pitch blades and variable inlet vanes. The design is less complicated than the variable-pitch blade design but is also considerably less efficient. Fixed blade axial fans have most of the disadvantages of the variable-pitch blade axial fans without the advantage of high efficiency. This alternative will not be evaluated.

5.2.2.3 Variable Frequency Drive

Variable frequency drives are not typically used with axial fans due to the higher efficiency of variable pitch blades. However, they may be considered on units that operate at low loads for extended periods. This alternative will not be evaluated as part of this study since the unit generally operates at higher loads as shown in Figure 3.

5.3 Maintenance Considerations

The major maintenance areas for centrifugal fans are the blade liners, main shaft bearing, and inlet vane linkages. Repair or replacement of the blade liners requires the most specialized labor. The liners can often be repaired by welding instead of being replaced. Either case requires balancing the fan wheel. The shaft bearings require the same type of maintenance as the bearings for most other large rotating equipment. Maintenance of inlet vane linkage presents no special problems if the linkage is properly designed.

Axial fans require considerably more maintenance than centrifugal fans. The maintenance areas include blade bearings, main shaft bearings, the hydraulic blade positioning system, and blade replacement. The blade bearings are subjected to high loads and require frequent maintenance. Hydraulic blade positions have been a source of problems for some axial fan installations. Some utilities send the hydraulic actuators back to the manufacturer for rebuilding rather than repairing them. Blades on axial fans are designed to be removed and replaced.
Actual maintenance will depend on the design of the fans, operating conditions, and the owner's philosophy on preventive maintenance. For evaluation purposes, the estimated man-hours and present-day replacement-part costs for maintenance are listed below. The costs are based on an 1998 S&L study (Reference 9.9) and the dollar costs have been adjusted upwards by 3% per year (per Assumption 3.8) to bring the costs to a current level. A vendor confirmed that this maintenance schedule is reasonable.

Centrifugal Fan Maintenance

- Each year: check bearings, inlet vanes, or fluid drive (if included): 50 man-hours
- Every 3 years: replace blade liners: 200 man-hours, $2,500 parts
- Every 8 years: rebuild inlet vane assembly: 120 man-hours, $15,500 parts

Axial Fan Maintenance

- Each year: check shaft and blade: 360 man-hours, bearings $14,500 parts
- Every 2 years: inspect hydraulic system: 150 man-hours
- Every 4 years: rebuild rotor $235,000

Note that the axial fan suppliers have made claims that the rebuild period for the most advanced axial fans can be as high as seven years. This evaluation uses a 4 year period, as shown in the list above, which is consistent with S&L's experience.

5.4 Equipment Arrangement

The fan location is critical to the overall system performance. The flow into and out of the fan needs to be uniform. If there is insufficient space for the fans, the ductwork may need to have extra turns or contractions to fit the configuration. The decrease in performance may be seen as an efficiency loss requiring higher auxiliary power demands to achieve the required head and flow. Axial fans in particular require long straight runs into and out of the fan.

5.4.1 ID Fan Arrangement

The preliminary location for the new ID fans would be downstream of the existing electrostatic precipitators and upstream of the FGD booster fan header ducts. The conceptual location would place the fans over the existing waste water sumps. Detail design will need to confirm that rerouting these pipes and installing new sumps is feasible.

Based on the conceptual layout, both centrifugal fans and axial fans could be situated in this location. Refer to Attachment 10.7 for sketches of the arrangement for centrifugal and axial fans. For axial fans, the inlet duct conveys the full volume for both fans rather than splitting into two ducts, and therefore will be more costly to support. However, there is not a significant difference in ducting cost between either fan type. Therefore, duct cost has not been included as a factor in comparison between fan alternatives.

Since the piping and sumps are not critical items, it is expected that replacement sumps and piping could be installed and the interconnections made either with the plant on-line or during a short outage in the future. The new fan foundations could then be built and the fans installed while Big Bend 3 remained in operation. The duct interconnection is not expected to require a substantial time period. Therefore, the fans could be placed in service either during the SCR tie-in outage or during an earlier draft modification outage. If the fans are placed into service before the SCR, all of the duct, boiler, and equipment reinforcing will also have had to been completed.

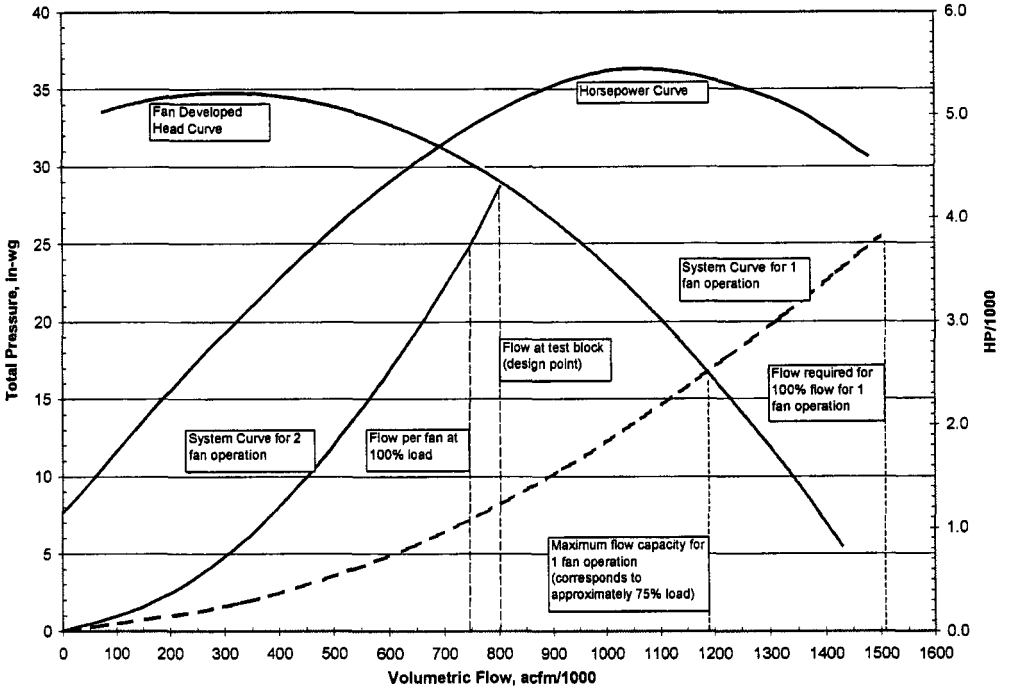
5.4.2 FD Fan Arrangement

If new FD fans are installed, there are two primary options for the location. The simplest approach would be to demolish the existing fans and foundations and install the new equipment in the same location. Due to the extended outage required for the demolition and to install new foundations, this is not considered practical. Instead, new fans would need to be located near the existing fans. The costs associated with demolition and relocation of existing equipment that would interfere with new fans has not been included in this analysis.

5.5 Fan Redundancy

For this evaluation, both the FD and ID fans were based on 2 x 50% operation. This is a typical configuration to allow additional plant flexibility in the event of an equipment malfunction. When one fan is out of service, the remaining fan will be able to meet the demand for approximately 70-80% of full load. This is primarily due to the relationship between the system curve with either one or two fan operation and the fan curve. Some additional capacity may also be due to margins used in determining test block points. During detailed design the final sparing will be optimized. For example, for a relatively small additional cost, 2x60% fans could be selected that would allow a single fan to obtain loads above 70%, but with the possibility of a greater efficiency penalty at normal and low loads. Another option would be 3x50% fans for complete redundancy, but this would likely be cost prohibitive.

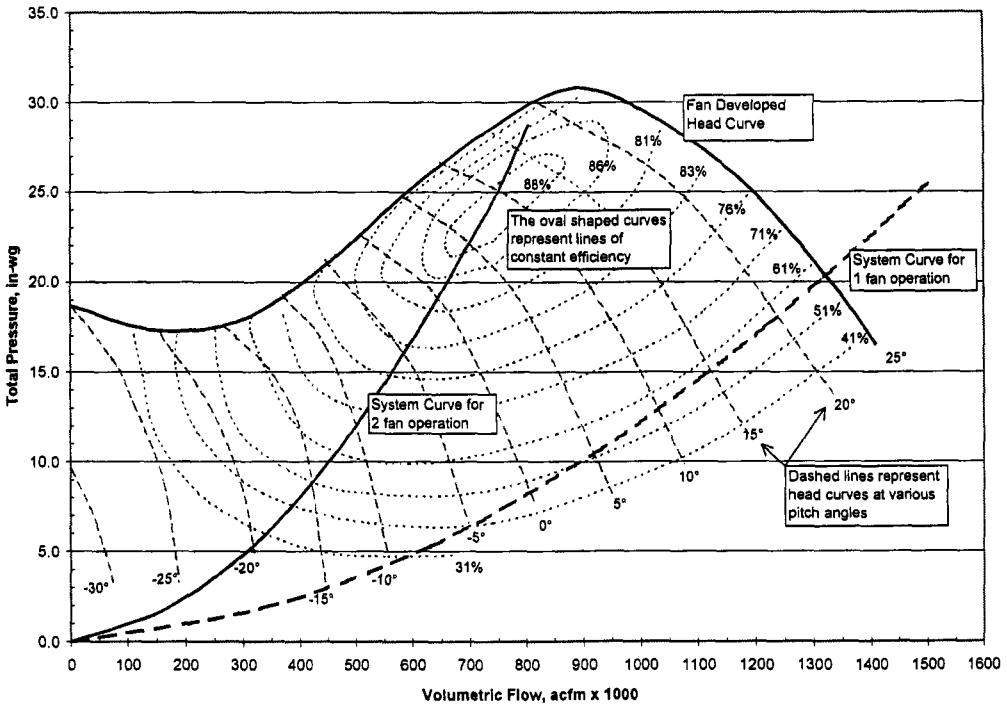
Figure 1. System Curve Per Fan for Centrifugal ID Fans



In the ID centrifugal example shown in Figure 1 above, the system curves for both one and two fan operation are shown. The two fan system curve includes test block margin. Total ID fan flow required at 100% load is about 1,500,000 acfm, so with two fans operating, the requirement is 750,000 acfm per fan. As shown in the figure above, the system curve for one fan operation intersects the fan pressure curve at about 1,200,000 acfm. This indicates that one fan should be able to deliver flow corresponding to approximately 75% load, although at a lower efficiency.

This also applies to axial fans as shown in the Figure 2:

Figure 2. System Curve per Fan for Axial ID Fans



If it is expected that the fans will be required to frequently operate at high loads with only one fan on-line, the ducting immediately downstream of the fan must be designed to handle the additional flow through a single duct. Otherwise, the higher duct velocity will create erosion concerns and potentially cause excessive pressure drop.

NOTE: Sections 5.6 through 5.10 provide discussion of important information for consideration, however the impact of the issues discussed are difficult to quantify and therefore are not included in the economic evaluation of this report.

5.6 Miscellaneous Design Considerations

5.6.1 Erosion

The primary factors that affect erosion from fly ash are:

- fly ash concentration
- ash particle size
- fan tip speed

- fan type
- blade type
- wheel entrance velocity

The primary erosion area for airfoil centrifugal fans and axial fans is the leading edge of the blades. The gas flow in a centrifugal fan must make a 90° turn inside the fan. Since the inertia of the ash particles prevents them from turning as quickly as the gas, the particles and erosion will be concentrated at the junction of the blades and the fan centerplate. As the size of the ash particles increases, this effect will increase; thus centerplate erosion will increase and erosion of the trailing edge of the blade will also increase.

The erosion rate varies approximately with the square of the velocity of impact. Thus, fan tip speed is a significant factor. A direct comparison between the tip speeds of axial and centrifugal fans is not valid. The leading edge of centrifugal fans is toward the inside diameter and has a lower velocity than the periphery of the wheel, whereas the leading edge of an axial fan blade extends to the periphery.

Reduced erosion rates are a significant benefit of variable-speed fans, because erosion rates will vary approximately with the square of fan speed. Variable-speed fans are often capable of meeting full-load system requirements at 90% speed, considering the design margins used. Therefore, at full load, the fan erosion rate of variable-speed fans should be only 80% as great as the erosion rate of constant-speed fans. The difference is even larger at lower loads. At 50% load, the erosion rate of a variable-speed fan should be only 20% of that of a constant speed fan.

Properly protected hollow airfoil blades have a relatively high resistance to erosion. However, erosion of hollow airflow blades can cause a hole in a blade and fill the interior of the blade with fly ash. This can cause vibration problems from rotor imbalance. Single-thickness blades have a slightly lower tolerance to erosion, but they do not have a hollow interior to collect ash. A properly designed hollow airfoil blade is often the optimum selection.

The recommended way to protect centrifugal ID fan blades from erosion is to use protective liners and solid nose pieces. The liner should cover the nose of the blade and the full length of the blade adjacent to the centerplate.

Axial fan blades are more prone to erosion than centrifugal fan blades. EPRI studies indicate that hollow-blade airfoil centrifugal fans can tolerate three times the particle loading that an axial fan can tolerate. However, the axial fan blades are easier to replace. Axial fan blades should be designed to be relatively insensitive to erosion with respect to performance deterioration and structural integrity.

Coating fan blades to improve erosion resistance has met with varying degrees of success. Coatings can affect the physical properties of the base materials of the fan. Cracks in coatings can propagate into the fan members. Tests using proposed coatings and fan structural material should be performed and evaluated before the coatings are actually used.

Of the alternatives considered, the centrifugal fan with speed control (hydraulic coupling or variable frequency drive) is the least prone to erosion.

5.6.2 Materials of Construction

The major criteria when selecting the material for ID fans are cost, fracture fatigue resistance, structural strength, erosion resistance, and weldability. Fan housings for both centrifugal and axial fans are usually made of either A36 or A283 carbon steel plates. The areas of the housing subjected to erosion on centrifugal fans, such as scrolls, can be fitted with replaceable liners of the same material. Fan centerplates, centrifugal fan blades, and inlet vanes are made from A283 when stresses are low and from A514, A441, or A588 when stresses are higher. All these are relatively low-cost structural-quality carbon steels, have good weldability, and have proven satisfactory.

The recommended material for centrifugal and axial fan shafts is forged steel, such as A688, AISI 1035 to 1045, and AISI 4130 to 4145.

The recommended material for axial ID fan hubs is structural quality steel, such as A182, A235, or A441. Hubs have been made from cast iron. Cast iron cannot be easily repaired by welding. If a small failure occurs, the fan may be out of service until a new casting is obtained. Cast iron is not recommended.

The most common materials for axial fan blades used for ID services are steel and aluminum. Steel has better erosion resistance, but aluminum blades are considerably lighter, which reduces the load on the blade thrust bearing and the hub. Aluminum blades result in a lower-weight fan at a lower initial cost. The erosion resistance of aluminum blades is improved by using replaceable shields made of stainless steel on the leading edge. The thickness of the shields is restricted to minimize weight. The shield will wear and have to be replaced; however, it can be replaced without necessitating replacement of the entire blade. Although the leading edge of the blade is the primary wear area, the unshielded areas of the aluminum blades will also eventually wear and have to be replaced. Aluminum blades with a stainless steel shield are less erosion resistant than steel blades. This will result in more frequent maintenance and lower unit availability.

5.6.3 Plant Availability

The best source of availability data is the Generating Availability Data System of the North American Reliability Council (GADS-NERC). However, the data are not detailed enough to permit a quantitative comparison of different fan types. The GADS-NERC data do reveal the overall impact of ID fans on coal-fired units.

The most common problem areas with centrifugal ID fans were blades, bearings, and foundations, which account for over 50% of all problems. The most common direct causes of these problems were erosion and vibration. Bearing problems can be caused by either a design problem or improper maintenance and operation. The major cause of foundation problems is improper design.

Over 50% of the problems with axial ID fans were blades, shaft bearings, and blade thrust bearings. As do centrifugal fans, axial fans have problems with blades caused by erosion and main shaft bearings. Axial fans have less massive rotors and shorter bearing spans than centrifugal fans. Therefore, the bearing loads are less, which should increase availability.

However, axial fans have much higher loads on the thrust bearings. The survey shows that 24% of the axial fans had main shaft bearing problems, while only 19% of the centrifugal fans had problems.

The major difference between axial and centrifugal fans that can affect availability is the control mechanism. The biggest problem area with axial fans is related to the variable-pitch blades: 33% of the problems were due to either the hydraulic supply unit, blade thrust bearings, regulating arm, or blade adjusting mechanism. The control mechanism for centrifugal fans, whether it is inlet vanes, inlet dampers, or fluid drives, is much less complicated than the blade adjusting mechanism for axial fans. The survey shows that 17% of the centrifugal fans had problems with either inlet vanes, inlet dampers, or variable-speed drives. Axial fans had nearly twice as many problems with blade positioning systems as centrifugal fans did.

Previous surveys and studies showed that some stations have had availability problems with axial flow fans. However, these problems had a strong correlation with maintenance practices. The stations that follow the manufacturer's recommendations and rebuilt the axial fan rotors every four years had high availability and those that did not had experienced problems. Units that followed the recommended maintenance had fan availability similar to that for centrifugal fans.

5.7 Fan Noise

5.7.1 Induced Draft Fan Noise

ID fans can contribute significantly to the noise levels inside and beyond the property line of electric power generating stations. The noise levels next to unsilenced ID fans are typically high enough to cause employee noise exposure problems. In an Edison Electric Institute (EEI) study, ID fans were ranked among the three major sources of power plant environmental noise. A study for the Electric Power Research Institute (EPRI) showed that more than 30% of the documented cost of power station noise control during the past 20 years has been for reduction of ID fan noise.

ID fan noise consists of discrete tones as well as a broadband component. The tones, which can be called the rotational component, result from the impulse generated each time a blade passes a fixed point on the rotational path. The predominant tone of this rotational component is at the blade passing frequency. The harmonics of this tone are typically audible. Broadband noise, the vortex component, is the result of the formation of turbulent eddies. The level and frequency of this broadband noise are affected by the fan's blade type.

5.7.2 Factors Affecting Fan Noise

The following discussion summarizes differences among the ID fan alternative schemes with respect to noise. While some of the factors discussed below result in significantly higher or lower noise levels, other parameters have little effect on fan noise.

The fan sound power level (PWL) is related to overall fan performance. Increased fan capacity (CFM), total pressure (FTP), and size, for example, result in a higher sound power level. PWL is also dependent on the type of fan selected. Centrifugal fans typically produce somewhat

lower overall A-weighted PWLs than axial fans. The frequency distribution of noise produced by these fans is also different. While centrifugal fan noise energy is concentrated at frequencies of 250 Hz and below, axial fan noise typically peaks at frequencies of 500 Hz and higher. Because human hearing is most acute in the range around 1000 Hz, axial fan noise is particularly annoying.

Alternatives involving variable inlet vanes with constant or two-speed motors can result in a 5 to 6 dB increase in overall fan noise. For fans operating with inlet vanes the noise level peaks at a vane position of approximately 70% open.

As noted above, axial fans can be expected to produce noise frequencies that are more bothersome to people than any of the centrifugal fan alternatives. Axial fans with fixed blades and variable inlet vanes typically produce higher noise levels than fans with adjustable blades.

5.7.3 Noise Control Alternatives

Implementation of fan noise control during design includes the selection and specification of the correct size fans, arrangement of ductwork to result in minimum turbulence, and site arrangement to result in adequate distance between the fans, ductwork, and chimney and the nearest property line. Since this is an existing site, equipment arrangement is not likely to able to be modified to attenuate noise issues. As noted above, the selection of variable-speed motors or fluid drives versus constant-speed motors can result in reduced noise levels. While standard thermal insulation and lagging provide some attenuation of fan noise, additional silencing may be required. The incremental cost of implementing thermal/acoustical instead of thermal insulation is small during initial design and construction. Backfit installation of thermal/acoustical insulation, however, involves the added cost of removing existing insulation.

Based on calculated noise levels from fan casing and ductwork, thermal insulation and lagging can be expected to provide adequate control of centrifugal fan casing and ductwork noise. Axial fan casings and ductwork may require treatment with thermal/acoustical insulation and lagging to limit employee noise exposure.

The need for control of fan discharge (chimney top-radiated) noise should also be reviewed. This need is based not only on fan noise levels but also on the proximity and sensitivity of potential receivers. A detailed evaluation of fan discharge noise is beyond the scope of this study.

Laboratory tests, as well as several years of experience in operating power stations, show that tuned dissipative silencers can effectively control ID fan blade tone and broadband discharge noise. These silencers typically require considerable space and additional structural support and result in increased system pressure drop. Although retrofit treatment may be more expensive than the cost of initial installation, either approach typically involves costs of several hundred thousand dollars. On this basis, retrofit treatment should be considered. This approach, involving a provision for straight sections of duct that could be removed and replaced with silencers, could significantly reduce the cost of such backfit treatment.

A consideration of any of these fan noise control treatments involves a review of the potential effect they might have on plant operation and maintenance as well as on plant design.

Provisions should be made for the removal of insulation and lagging during maintenance, just as an allowance for the required clearance and support for initial installation should be included. While discharge silencers can be designed for pressure drops of 0.5-inch H_20, alternate schemes involving higher pressure drops and smaller silencers may be more appropriate.

Of the alternates being considered, centrifugal fans with hydraulic couplings or variable frequency drives are expected to produce the lowest noise levels.

5.8 Fan Operation

5.8.1 Stall Prevention

What is commonly referred to as stall in fan operation is an aerodynamic stall that occurs when the angle of attack between the air or gas flow and the fan blades exceeds a certain value. During a stall, the air flow separates from the convex side of the fan blade, and a dead area with no flow is created. Stall is undesirable for two reasons. First, it disrupts the draft system, because the flow through the fan cannot be controlled to meet the system requirements. Second, it can cause serious pressure pulsations and vibration of the blades and entire fan.

The first step in stall prevention is fan selection. The interaction of the fan and system characteristics should be examined for a wide range of conditions, including the following:

- changes in system resistance due to a dirty air heater, plugged catalyst, etc.
- low system resistance due to overestimated pressure losses and large design margins
- system resistance and fan performance with high and low gas temperatures
- starting and stopping a second fan with the first fan operating

A system curve that has a tolerance that accounts for the variation described above should be plotted on the fan curves. A fan with a stall line farther away from the system curve is obviously preferred.

When one fan is operating and a second fan is started, the second fan will immediately have a pressure equal to the first fan. However, flow through the second fan will not occur instantaneously. The flow will initially be zero. If the pressure across the first fan is greater than the zero-flow stall pressure of the second fan, the second fan will start out in a stall. The pressure on the first fan will have to be reduced to start the second fan.

The shape of the characteristic curve of an axial fan is very important because of potential stall problems. Fan curves should be examined and evaluated during bid evaluations using these criteria. However, fan vendors generally do not guarantee their curves and rarely have test data to support their predicted stall line.

5.8.2 Stall Prevention in Centrifugal Fans

Rotating stall is a phenomenon that has been observed in centrifugal fans with airfoil blades. It is an aerodynamic stall that occurs when the angle of attack between the gas and the blade exceeds a certain value. It is comparable to the stall of axial fans, but it is not as common. The

stall point of a centrifugal fan is dependent upon several fan design parameters, such as cutoff design, clearance, etc.

The best method of stall prevention in centrifugal fans is the proper matching of the fan and system. The point corresponding to the onset of stall in a centrifugal fan is at a flow rate slightly higher than the flow at the peak pressure. Fans should be selected such that the system resistance curve intersects the fan curve at least 10% to the right of stall line.

5.8.3 Stall Prevention of Axial Fans

Stall is more common for axial fans than for centrifugal fans. A monitoring system can be used to help prevent stall in axial fans. The flow, pressure, and temperature of each fan should be monitored. The alarm computer should compare the actual pressure differential across the fan with the allowable pressure differential for the given flow and temperature. The pressure corresponding to the stall varies with flow (stall curve). The stall curve varies with temperature; thus a temperature correction is necessary. An alarm should sound, indicating imminent stall. A margin should be provided between the alarm point and the stall line to permit time for corrective action to be taken. The selection of the margin should include an evaluation of variations in system resistance and uncertainties in the predicted stall line.

A second alarm should be set at the expected stall line. Automating corrective action to prevent stall is not recommended because an automatic system cannot determine the fault and the fans should not be indiscriminately run back.

5.9 Forced Draft and Induced Draft Fan Compatibility

Mixing axial and centrifugal FD and ID fans has almost no effect on operation of the unit under normal conditions.

The FD fans are controlled to maintain the proper airflow, and the ID fans are controlled to maintain a slightly negative pressure in the furnace. The controls for either type of fan can be designed to obtain the proper response time for either application.

During a draft excursion, the type of fan for each service can make a difference in the results. A high furnace pressure will increase the system resistance of the FD fans and decrease the system resistance of the ID fans. If the FD fans are axial fans and they stall, the flow to the furnace and to the ID fans will decrease. This will cause the ID fans to back up on their curve. Centrifugal ID fans can cause a very high negative pressure under this condition particularly with inlet vane control. Even when the ID fans are tripped, the high inertia of a centrifugal fan keeps the fan pressure high. Axial ID fans may be forced into a stall but will not cause as high a negative pressure as centrifugal ID fans because an axial rotor has far less inertia and coasts down faster.

A draft excursion with a high negative pressure can cause axial ID fans to stall. This will reduce the flow out of the furnace. The furnace pressure will recover and then continue to increase as the FD fans back up on their curves. If the FD fans are centrifugal with inlet vane control, they can produce a high furnace pressure. If the FD fans are axial, they may also be forced into stall.

It has been previously recommended that TEC investigate having a dynamic model of the revised draft system created. This model can determine how the proposed fans will operate during various upset conditions. It will be especially important on Big Bend Unit 3 to perform modeling due to the additional interaction with the FGD booster fans.

5.10 Electrical System

The existing FD fans are rated at 4000 hp and are two speed. During balanced draft operation the projected horsepower requirement is approximately 1000 hp and the fans could be operated on the low speed winding. The overall maximum connected horsepower of the auxiliary system would be reduced by approximately 6000 hp (2 x 3000 hp). If PWM VFDs are added to the FD fan, the present motors could be retained. These drives might be rated at approximately 1500 hp to allow for some margin. These VFDs would be air-cooled and would require some auxiliary 480V power for ventilation and air conditioning.

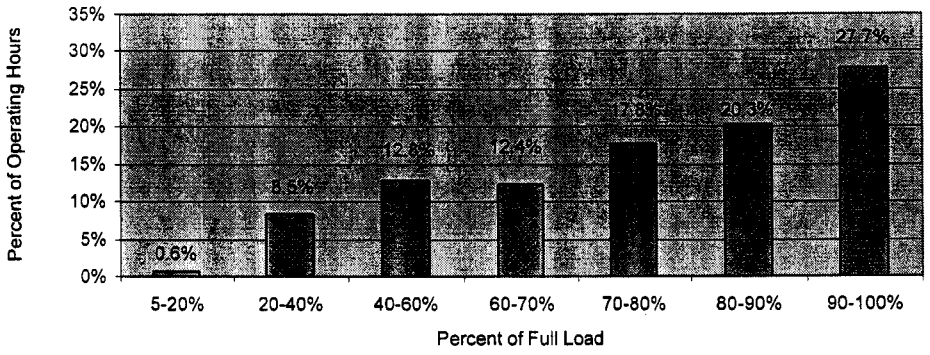
The addition of two 6000 hp ID will require approximately 12,000 kVA. The reduction in FD fan horsepower, as explained above, will be approximately 6000 hp, or 6000 kVA. The present gas recirculation fans, each rated 1500 hp, are no longer used and free up approximately 3000 kVA. The conversion to balanced draft operation will require the present 4160 V auxiliary system to accept an additional 3000 kVA. The SCR loads will add approximately 750 kVA of load during normal unit operation. An investigation is underway to determine if this additional auxiliary power can be absorbed by the present system. If it turns out the existing auxiliary system has enough capacity, the use of VFDs for the new ID fans will be beneficial because the new large 6000 hp fan motors would not contribute fault current to the 4160 V switchgear.

6.0 EVALUATION METHODOLOGY

6.1 Load Profile

The operating data (Input 2.1) was examined in order to determine the percentage of operating time at various load ranges. Only data points indicating plant operation are used in the evaluation by omitting all data points that indicate a gross unit load less than 5% of full load (full load is assumed to be 450 MW, see Assumption 3.1). Seven different load intervals were chosen for this study to allow for evaluation of fan performance across the range of normal operation. The load ranges chosen (as percent of full load) are: 5-20%, 20-40%, 40-60%, 60-70%, 70-80%, 80-90%, and 90-100%. Figure 3, below, shows the percent of operating hours at each of these load ranges:

Figure 3. Big Bend Unit 3 Operating Hour Breakdown from 1/2002 to 6/2004



6.2 Fan Sizing Calculations

The fan sizing calculation details and formulas are provided in Attachments 10.1 and 10.2. The combustion calculations provide a volumetric flow and total pressure rise for each of the seven load intervals. These values are used to create a system curve for the ID fans. The volumetric flow is also used in conjunction with operating data to develop a system curve for the FD fan.

6.2.1 Fuel

Safe-LT is used as the fuel for the fan sizing calculation. The fuel composition input (Input 2.6) is converted to an as-fired basis for use in this calculation. To accomplish this, the fuel components given in dry basis percentages are converted using the following equation:

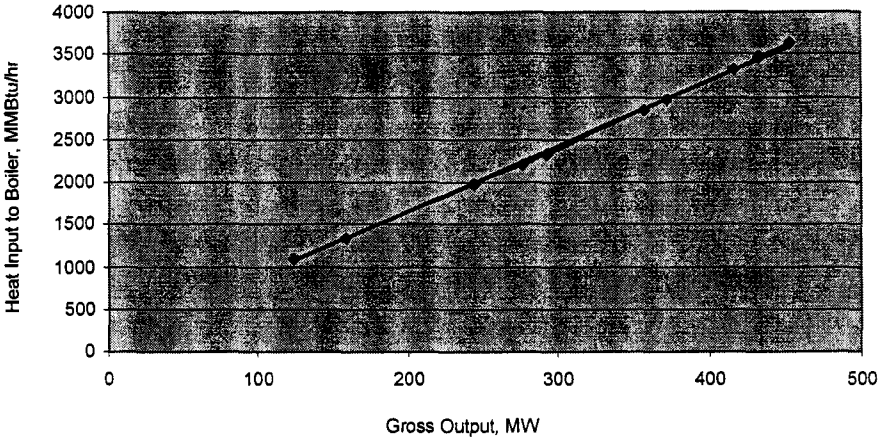
Dry basis percentage x (1- moisture percentage/100) = as-fired percentage

The percentage of oxygen is then adjusted until all the components add up to 100%. This is acceptable because oxygen determination in coal ultimate analysis is done by difference. Only very small adjustments to fuel oxygen were required. This fuel composition is then used for the calculations as shown in Attachment 10.1.

6.2.2 Heat Input to Boiler

The heat input corresponding to the average gross output (MW) for each load range is obtained by using a trend line based on the heat balance data (Input 2.2). Figure 4 shows the trend line based on this data. Note that the calculations performed in this evaluation are for comparative purposes only. The results are not meant to be absolute design values, but only provide a means to evaluate the various fan alternatives. Using different heat input values would impact all alternatives similarly and would not impact the conclusions of this evaluation.

Figure 4. Unit 3 Boiler Duty vs. Generation Based on Heat Balance Data



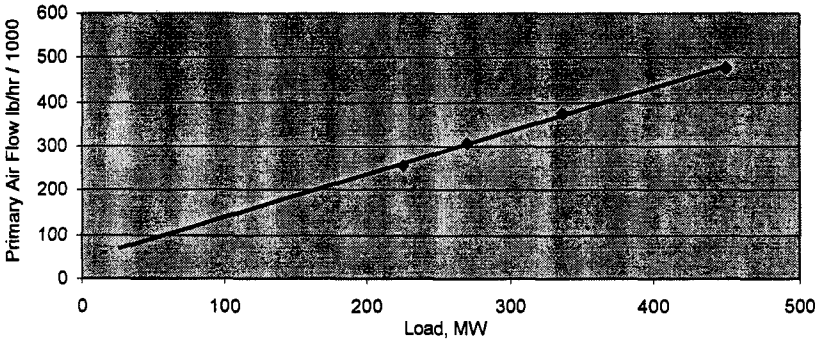
6.2.3 Economizer Bypass Temperature Effects

The effects of economizer bypass result in a relatively small change in fan inlet temperature during the short periods of time at low loads, and do not affect the results of this study.

6.2.4 Primary Air Flow

Primary Air input is from the trend line shown below in Figure 5. The trend line is based on data points from Ref 9.7. This is used in computation of FD fan flow.

Figure 5. Primary Air Flow



6.3 ID Fan System Curve

The calculated volumetric flow and total pressure rise for each of the seven load intervals from the fan sizing calculation is used to create a system curve for the ID fans. Since the maximum load point is 95% (average load for the 90-100% load interval), an additional point is calculated at 100% full load so that the system curve extends to represent 100% full load. The system curve is then extrapolated to include a 15% margin on pressure above the 100% full load point to determine the test block point. This is the typical margin used by S&L for new fans. This margin can be decreased if more specific fan design parameters are established in the future. This system curve can be seen on the sample axial ID fan curve in Figure 12.

6.4 ID Fan Curves

6.4.1 Centrifugal Fan Curve

The ID centrifugal fan is evaluated with an assumed peak efficiency of 87%. The efficiency with different control options is discussed in sections 6.7.

6.4.2 Axial Fan Curves

The axial fan curve from Input 2.3 is reduced using fan affinity (similarity) laws to an appropriate fit for the system curve. These affinity laws for adjusting by fan speed are shown below, based on Reference 9.8:

$$\frac{Q_A}{Q_B} = \frac{n_A}{n_B}$$

$$\frac{p_A}{p_B} = \left(\frac{n_A}{n_B}\right)^2$$

where: Q = volumetric flow rate, acfm
n = fan speed, rpm
p = pressure, in-wg

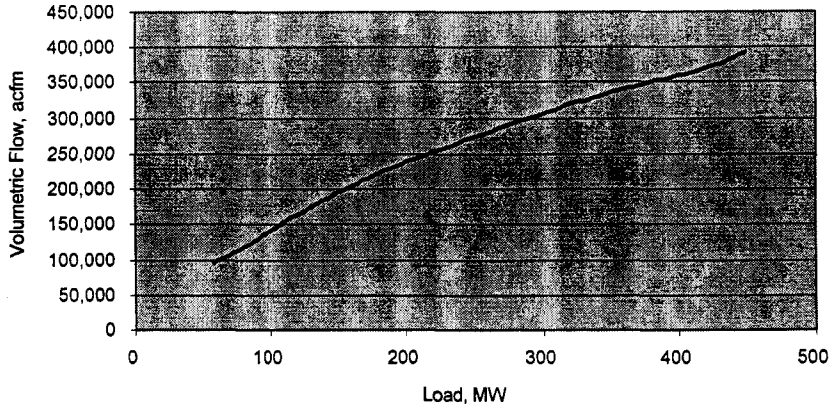
The resulting ID axial fan curve is shown in section Figure 12.

6.5 FD Fan System Curve

Plant operating data (Input 2.5) is used in estimating the current system curve for the FD fan. The operating data used is gross load (MW) and air heater air side inlet pressure (in-wg). The air heater air side inlet pressure is approximately equal to what the FD fan outlet pressure would be. The volumetric flow is calculated from the gross load using a trend line equation

developed from a plot of the gross load and the resulting volumetric flow from the fan sizing calculations discussed in section 6.2. This trend line is shown in Figure 6:

Figure 6. Big Bend Unit 3 FD flow vs Load, based on calculations



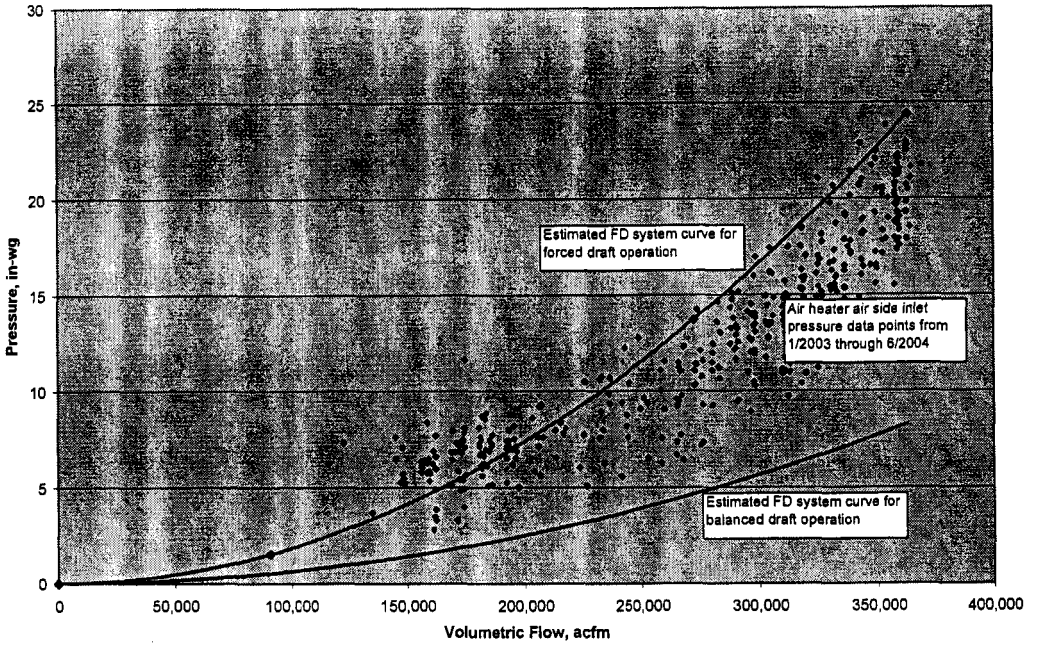
The calculated volumetric flow and air heater air side inlet pressure are plotted as shown in the figure below. A high point on the data plot is chosen as the maximum point for an assumed system curve and the remainder of the curve is plotted using the following relation from Reference 9.8.

$$p_2 = p_1 \cdot \left(\frac{Q_2}{Q_1}\right)^2$$

where: p = pressure, in-wg
Q = volumetric flow, cfm

By choosing a higher starting point for developing this curve, the plotted line is on the higher side of the data points, which establishes a more conservative curve than if it were in the middle of the data points. From this estimated FD fan system curve for existing forced draft operation, a new system curve for balanced draft operation is then derived. To accomplish this, the difference in the operating pressure of the furnace during full load forced draft operation (15.6 in-wg per Input 2.7) and balanced draft operation (-0.5 in-wg per Assumption 3.4) is calculated (16.1 in-wg). This difference in pressure is then subtracted from the maximum point on the system curve in order to determine the maximum point for a new, lower system curve. The remainder of the curve is established using the equation as described above. The development of these curves is illustrated in Figure 7 below:

Figure 7. Big Bend Unit 3 Estimated FD Fan System Curve based on Operating Data



The new FD Fan system curve developed above is also extrapolated further to represent flow at 100% load, as well as to a test block point for fan sizing. [A 15% margin on pressure is added to establish the test block point. This is a typical margin for new fans, since actual data can be collected for most of the draft system, a lower margin may be used during the detailed design.]

6.6 New FD Fan Curves

The new FD centrifugal fan is evaluated with an assumed peak efficiency of 87%. The efficiency with different control options is discussed in sections 6.7. Reuse of the existing centrifugal fan is discussed in section 6.8

To evaluate an axial FD fan, the same efficiencies developed for the axial ID fan discussed in sections 6.4.2 and 6.7.2 are used.

6.7 Fan Control Options

6.7.1 Centrifugal Fan Control

6.7.1.1 Inlet Vanes

Attachment 10.5 shows how the pressure and horsepower curves typically change with varying degrees of inlet vane adjustment. A sample curve was developed using these proportions in order to determine a typical relationship of efficiency decrease as the flow is reduced. The

sample fan curve and trend line for typical inlet vane performance are shown below in Figures 8 and 9.

Figure 8. Sample Fan Curves for Centrifugal with Inlet Vane Control

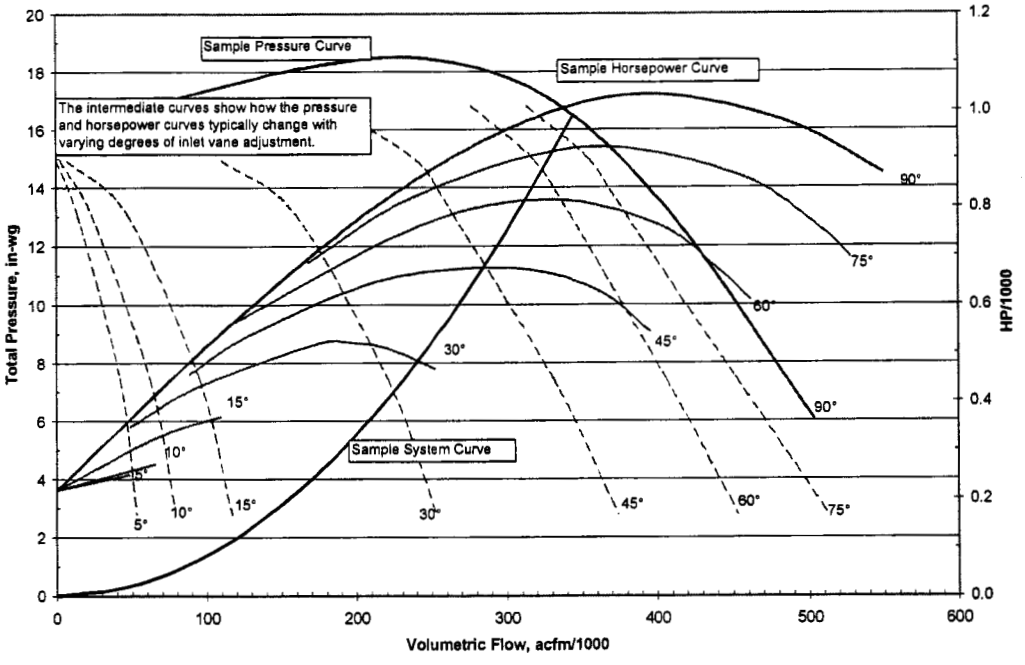
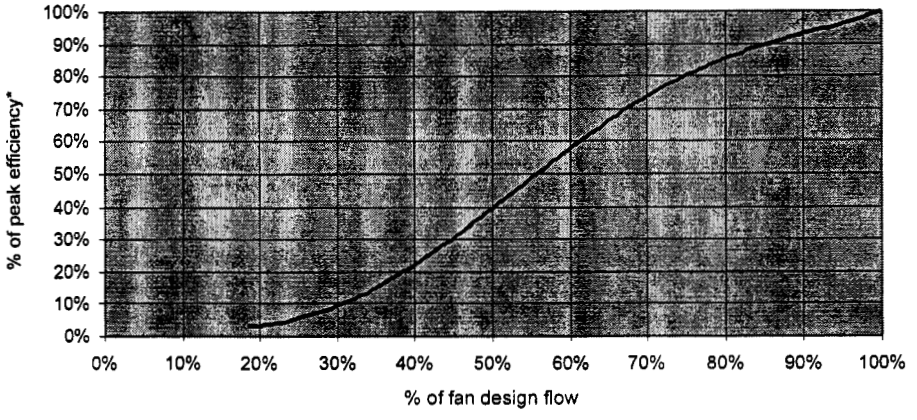


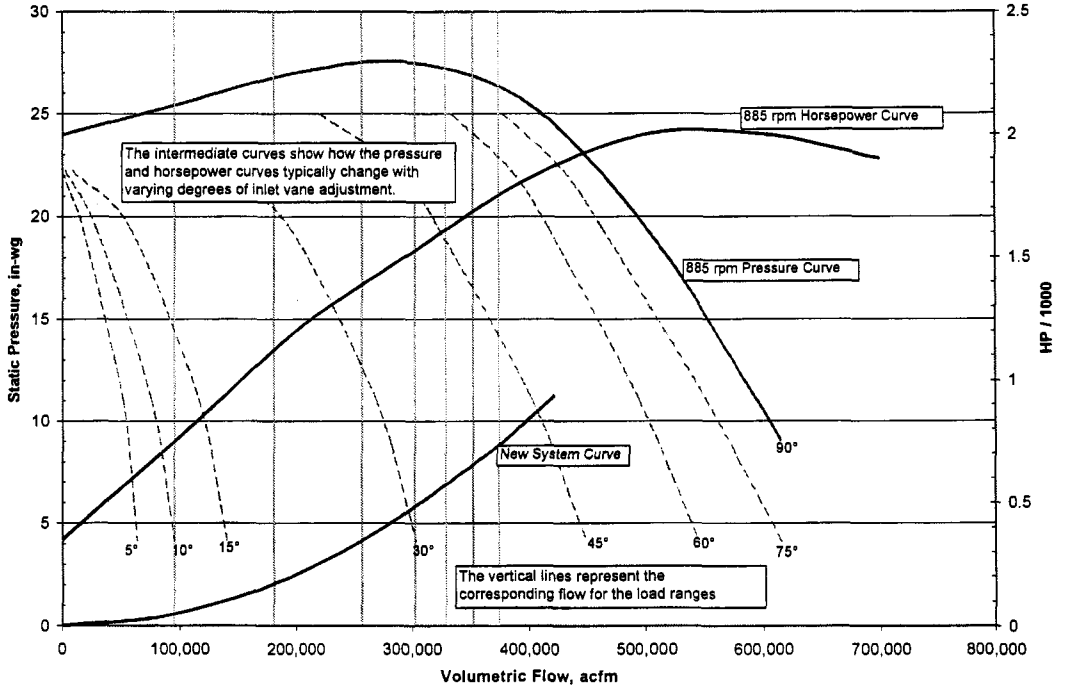
Figure 9. Trend Line of Typical Inlet Vane Performance



* Peak efficiency occurs at the fan design point, where the inlet vanes are in a neutral position

This trend line is used with an assumed peak efficiency of 87% for predicting the performance of new ID and FD centrifugal fans with inlet vane control. Operation with the existing FD fan will be less efficient, since the fan curve is not optimal for the new system curve. The performance of the existing FD fan is determined using a peak efficiency of 70% based on the position of the new system curve within the pressure curve for the 885 rpm pressure curve. Note that the original vane control horsepower curve cannot be used for this evaluation since it was developed based on the original system curve for forced draft operation.

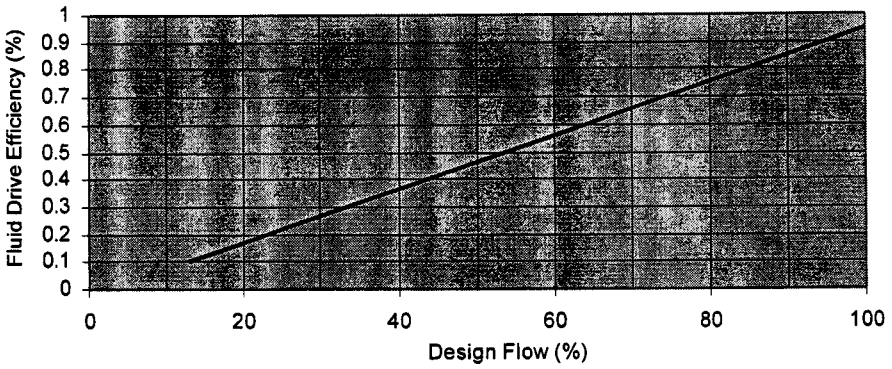
Figure 10. Unit 3 Existing FD Fan, 885 rpm



6.7.1.2 Hydraulic Coupling

To calculate the performance of the fans with hydraulic coupling, Reference 9.10 is used. A trend line based on Reference 9.10 is shown in Figure 11. This trend line is used with the fluid drive fixed loss identified in Reference 9.10 to calculate the fluid drive performance. With a hydraulic coupling, the fan itself is assumed to operate at peak efficiency over the load range, while the efficiency of the hydraulic coupling decreases at lower speeds according to Figure 11:

Figure 11. Fluid Drive Efficiency vs. Design Flow
from MES-13.1 p19



6.7.1.3 Variable Frequency Drive

As in the case with fluid drives, the fan power is assumed to vary by the relationship below. This relationship assumes a flow-squared system resistance curve.

$$W_2 = W_1 \cdot \left(\frac{Q_2}{Q_1}\right)^3$$

where: W = fan power input
Q = flow rate

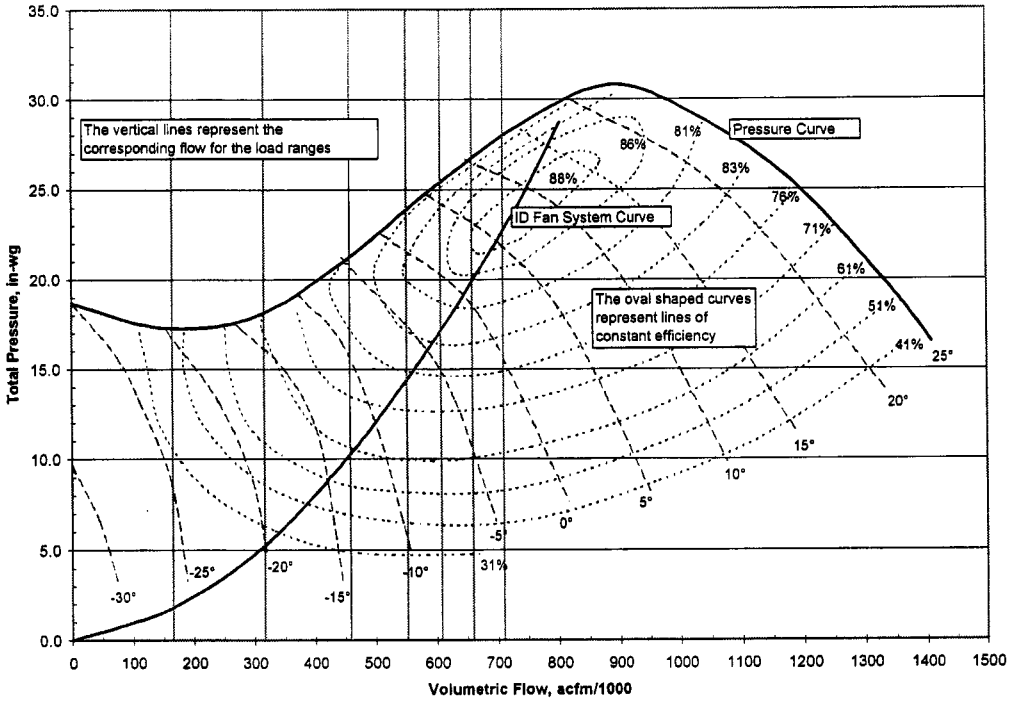
Unlike a fluid drive, whose efficiency decreases with flow, the VFD is assumed to operate at 96% efficiency through the entire load range. This performance is typical for modern VFDs as described in section 5.2.1.3. This efficiency is multiplied by the peak fan efficiency for the application to obtain the total efficiency.

6.7.2 Axial Fan Control

6.7.2.1 Variable Pitch Blades

The axial fan curve from Attachment 10.3 is reduced according to the affinity laws as described in section 6.4.2 to a size that fits the ID system curve. The sample curve shows how the efficiency on an axial curve changes along the system curve for reduced loads. The efficiency at the points of analysis (for the load ranges discussed in section 6.1) is determined based on this graph. These efficiency values are assumed to be typical and are used for both ID and FD fans.

Figure 12. Unit 3 ID Fan - Axial



6.8 Existing FD Fan Evaluation

As shown in Figure 10, the fan curve of the existing FD fans is oversized for the estimated new system curve even when operated at the lower motor speed (885 rpm). Therefore, the inlet vanes would need to be throttled significantly with a large efficiency penalty throughout the entire load range. This would however be a lower capital cost option. In order to improve performance, the fan could have a VFD added. This would lower the fan curve to intersect with the estimated system curve if at a fan speed of approximately 710 rpm.

Two other options are to replace the existing fan rotating element with a new element, and to replace the existing fan motor with a new, slower, single-speed motor. A new rotating element would modify the fan curve to better fit the new system curve. With the smaller element, the existing fan housing and foundation should be acceptable. Replacing the motor only will allow for the existing fan curve to be reduced due to the lower speed, allowing it to better fit the new system curve. However, the lower speed motor will change the frequency response of the fan and motor system, probably requiring some foundation modification. The efficiencies for these options are based on the vendor supplied fan curves included in Attachment 10.9 and are shown in Figure 13.

This study, however, does not address the current performance of the existing equipment nor the remaining life. These would need to be evaluated prior to finalizing an approach.

6.9 Efficiency and Auxiliary Power Requirements

The points of analysis corresponding with the load ranges identified in section 6.1 are shown in Table 3. The efficiency from the graphs at each point is multiplied by the air horsepower (see equation below) and the number of expected hours of operation at that point in order to determine auxiliary power requirements.

The ideal horsepower is calculated using the following equation from Reference 9.8:

$$AHP = \frac{Q \cdot TP}{6356}$$

where: AHP = air horsepower
Q = flow rate, cfm
TP = total pressure, in-wg

Figures 13 through 16 summarize the efficiency and auxiliary power requirements of various alternatives for both FD and ID fans. The difference in the FD and ID fan flow is due to the different temperature between the flow streams, the different pressure, and leakage flows. Table 3 summarizes the operating points used in performing the economic evaluation.

Table 3. Summary of Operating Points Analyzed

Load Range	% of operating hours	Hours per year*	FD flow per fan, acfm	ID flow per fan, acfm
5-20%	0.6%	49	95,178	165,329
20-40%	8.5%	703	180,562	315,670
40-60%	12.8%	1,054	256,766	458,629
60-70%	12.4%	1,021	302,708	551,081
70-80%	17.8%	1,466	329,098	607,049
80-90%	20.3%	1,677	352,658	659,261
90-100%	27.7%	2,288	374,687	709,811

*assuming continuous operation, 24 hrs per day, 344 days per year (3 weeks shutdown per year)

Figure 13. Efficiency of FD Fan Alternatives

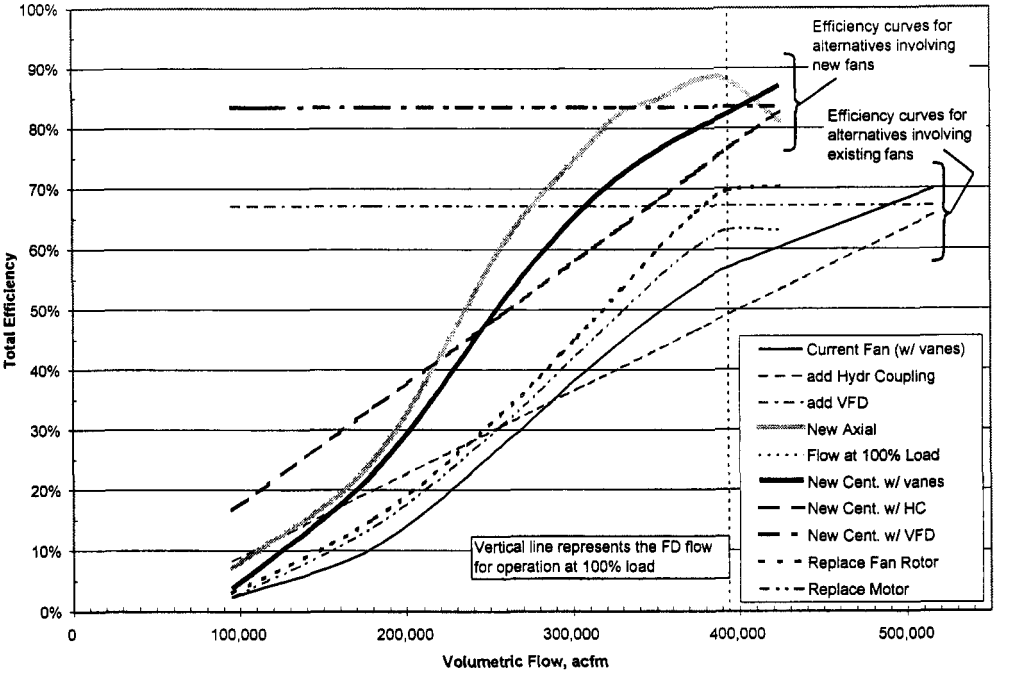


Figure 13 shows how the efficiency for each FD fan alternative changes with the fan volumetric flow. Note that using the existing fan to meet the new system curve (for balanced draft operation) results in less efficiency since it is oversized for the application as discussed in section 6.8. The alternatives involving the existing fan would require significant vane throttling or speed reduction to operate in the required range (to the left of the vertical line representing flow at 100% load). New fans would be designed for an optimal fit with the new system curve, with margin for test block. Some alternatives have higher efficiency than others do at the higher flows, but decrease below others at lower loads. Alternatives with VFDs maintain their efficiency throughout the load range. Note that the best alternative for Big Bend Unit 3 depends on the operating load profile, which is summarized in Table 3.

The efficiencies discussed above affect the amount of auxiliary power used by the fan as shown in Figure 14. The auxiliary power requirement for any of the fan alternative decreases with load. However, the more efficient alternatives will require less power at a given load.

Figure 14. Auxiliary Power Requirement for FD Fan Alternatives

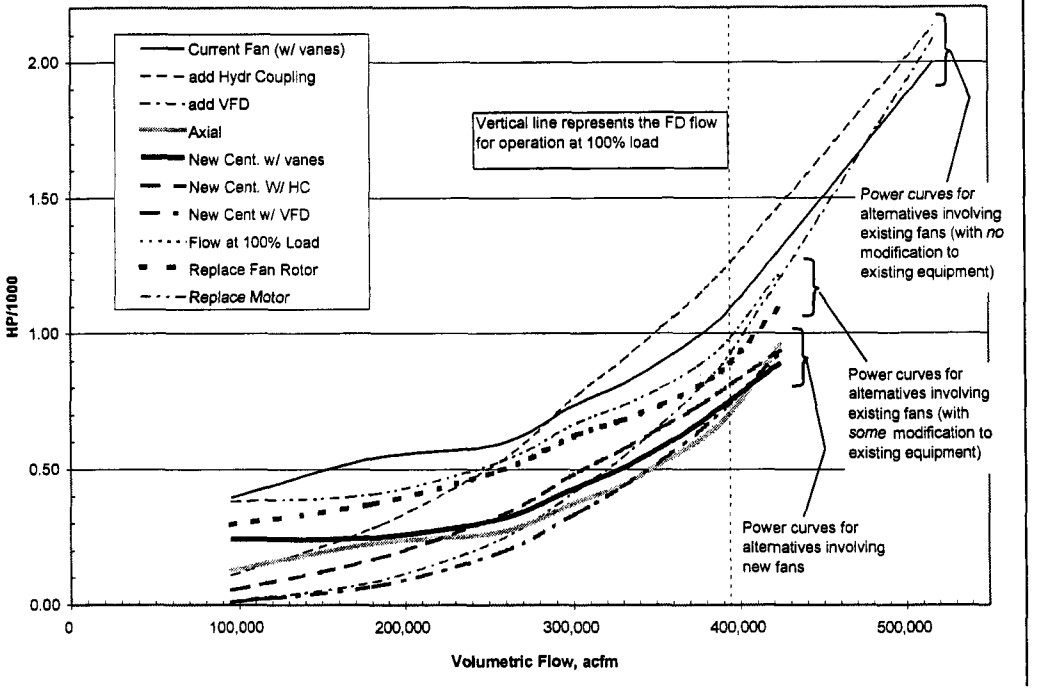


Figure 15. Efficiency of ID Fan Alternatives

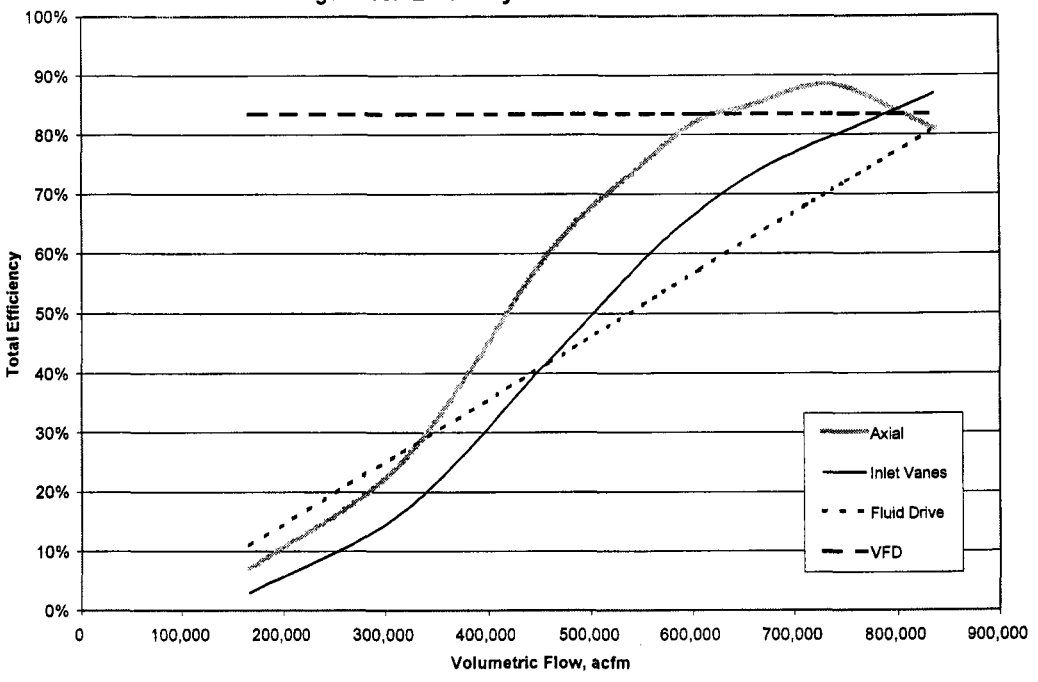
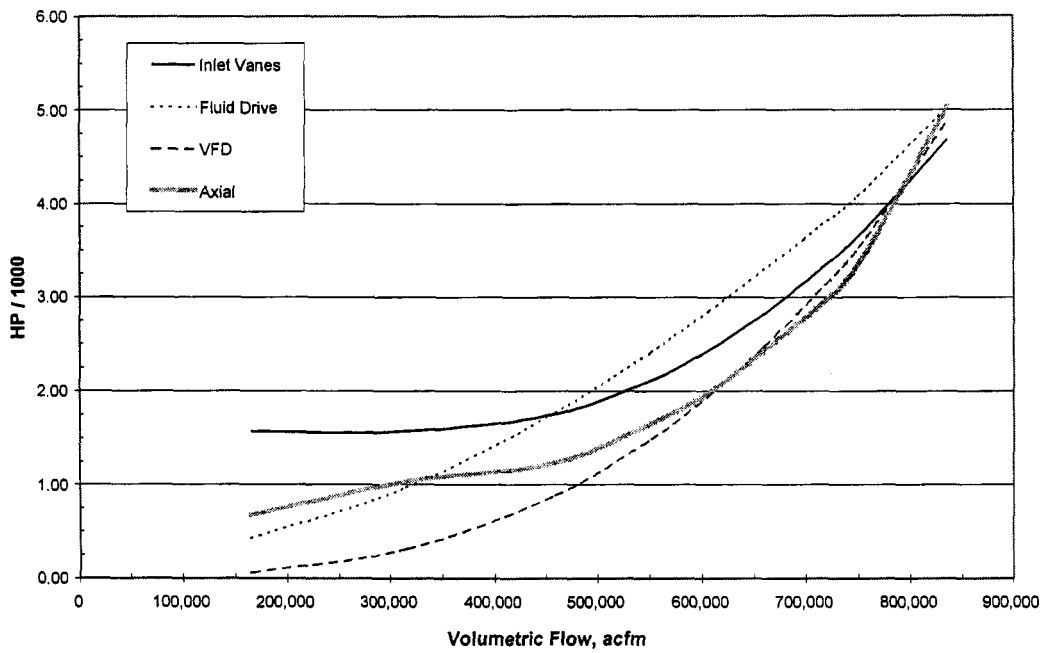


Figure 15 shows the efficiency for each ID fan alternative.

Figure 16. Auxiliary Power Required by ID Fan Alternatives



The ID fan efficiencies from Figure 15 affect the amount of auxiliary power used by the fan as shown in Figure 16. The auxiliary power requirement for any of the fan alternative decreases with load, however, the more efficient alternatives will require less power at a given load.

6.10 Economic Evaluation

The tables below compare the net present value for the different FD and ID fan options considered in this study over the next 20 years. The alternatives are compared to a base case. For the ID fans, the base case is a centrifugal fan with inlet vane control. For FD fans, the base case is the use of the existing centrifugal fan with no modification.

Table 4. FD Fan Evaluation of Alternatives - Values shown in reference to Base (total for 2 fans)

	Equip Cost	Installation Cost	Annualized maint. cost	Annual Aux. Power Cost	PV of maint cost	PV of power cost	Present Value Cost over 20 yr life
Existing Centrifugal Fan (w/ VIV)	Base	Base	Base	Base	Base	Base	Base
Add Hydraulic coupling	$880,000	$580,000	($5,000)	$34,000	($108,000)	$309,000	$1,661,000
Add VFD	$720,000	$210,000	($5,000)	($169,000)	($108,000)	($1,531,000)	($709,000)
New Centrifugal fan and motor							
With variable inlet vanes	$1,120,000	$1,070,000	$0	($188,000)	$0	($1,709,000)	$481,000
with hydraulic coupling	$2,000,000	$1,175,000	($5,000)	($161,000)	($108,000)	($1,459,000)	$1,608,000
With VFD	$1,840,000	$1,115,000	($5,000)	($234,000)	($108,000)	($2,123,000)	$724,000
New rotating element only	$300,000	$100,000	$0	($91,000)	$0	($823,000)	($423,000)
New motor only	$240,000	$400,000	$0	($56,000)	$0	($512,000)	$128,000
New Axial and motor	$990,000	$895,000	$171,000	($223,000)	$2,589,000	($2,018,000)	$2,456,000

Notes: 1. See Assumption 3.8 regarding economic evaluation assumptions
2. *All values in table are estimates*

Table 5. ID Fan Evaluation of Alternatives – Values shown in reference to Base (total for 2 fans)

	Equip Cost	Installation Cost	Annualized maint. cost	Annual Aux. Power Cost	PV of maint cost	PV of power cost	Present Value Cost over 20 yr life
Centrifugal Fan and motor	-	-	-	-	-	-	-
With variable inlet vanes	Base	Base	Base	Base	Base	Base	Base
With hydraulic coupling	$750,000	$110,000	($5,000)	$173,000	($108,000)	$1,573,000	$2,325,000
With VFD	$622,000	$95,000	($5,000)	($322,000)	($108,000)	($2,919,000)	($2,309,000)
Axial Fan and motor	$170,000	($280,000)	$171,000	($270,000)	$2,589,000	($2,452,000)	$28,000

Notes: 1. See Assumption 3.8 regarding economic evaluation assumptions
2. *All values in table are estimates*

7.0 LIMITATIONS

The calculations performed in this evaluation are for comparative purposes only. The results are not meant to be absolute design values, but only provide a means to evaluate the various fan alternatives. The level of detail is adequate for the purpose of this study, but more detailed fan sizing calculations need to be performed after further engineering and design evaluation in order to specify the fans. The fan sizing values presented herein should not be used for procurement purposes.

The reuse of existing equipment will need to be evaluated further to address issues such as current condition and expected remaining life.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Fan Recommendations

Based on the economic evaluations summarized in section 6.10, the following alternatives are recommended:

ID Fans: New centrifugal fan with VFD

FD Fans: Retrofit existing fan with new rotating element

or

Add VFD to existing fan

Both of these FD fan alternatives were clear winners over the other options by a large margin, but are there is an insignificant margin between the two of them. The choice between these two options can be determined by further evaluating the feasibility of retrofitting the existing fan with a new rotating element, and weighing the importance of initial capital cost.

8.2 Issues for Additional Consideration

8.2.1 Plant Outage

A major factor that is not included in this evaluation is the length of outage required to implement each alternative. Outage duration and potential construction issues should be evaluated further.

8.2.2 Vendor Proposals

Proposals for new Unit 3 fans from TLT-Babcock and Howden are included in Attachment 10.9. The TLT vendor only provided detailed estimates for our centrifugal fan alternatives, and recommended centrifugal fans with inlet vane control. These alternatives had an 8-9 month delivery time. The fan curves for inlet vane control submitted by this vendor predict a lower efficiency (approximately 10-20% less, depending on percent of maximum flow) than that

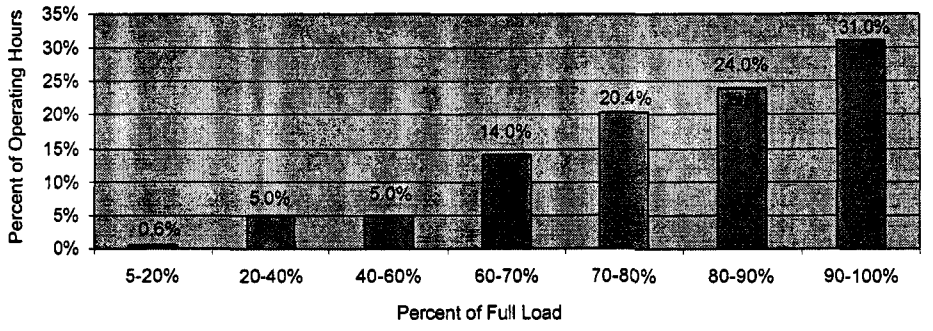
predicted in this evaluation. The Howden submittal provides axial ID fan estimates with 10-12 month delivery times.

Howden also provided fan curves for the FD alternatives involving replacing the fan rotating element and for replacing the motor with a new lower speed motor.

8.2.3 Changes in Load Profile

The plant operating load profile determines the economic impact of the auxiliary power requirements of section 6.9. A plant that operates consistently at high loads will not gain as much benefit from a fan setup that provides high efficiency at low loads, as would a plant that has a tendency to operate at lower loads. The load profile used in this evaluation is based on historical data as discussed in section 6.1. However, Big Bend 3 may plan to operate the plant in a different manner in the future. To investigate the sensitivity of the results, a more base-loaded profile was used as shown in Figure 17.

Figure 17. Hypothetical Operating Hour Breakdown for Base Loaded Scenario



This scenario favored the FD fan rotor replacement by an additional $100,000 over the 20 year life. This effect is relatively insignificant.

8.3 Considerations for Fan Sizing Design Basis

As discussed in section 7.0, further engineering and design evaluation needs to be performed to properly size the fans once a fan arrangement has been chosen. This involves establishing the design basis inputs and fan test block margins (flow and pressure) to be applied for new fan design.

9.0 REFERENCES

9.1 Stone & Webster Calculation No. PM-119, Forced & Induced Draft Fan Sizing Calculation, Tampa Electric Company - Big Bend Sta.- Unit 4, 01/21/85.

9.2 Plant operating data from PI database

9.3 Stone & Webster Heat Balances for Big Bend Unit 3

Dwg. No.	Diagram Title	Date
12178-FM-4A	Maximum Guaranteed Capability	4/12/74
12178-FM-4B	Valves Wide Open (rated conditions)	8/12/74
12178-FM-4C	100% VWO, 5% Overpressure	6/12/74
12178-FM-4D	75% of Boiler MCR	5/12/74
12178-FM-4E	60% of Boiler MCR	6/12/74
12178-FM-4F	50% of Boiler MCR	5/12/74
12178-FM-4G	25% of Boiler MCR	5/12/74
12178-FM-4H	3 valves open, rated pressure	6/12/74
12178-FM-4I	2 valves open, rated pressure	5/12/74
12178-FM-4J	1 valve open, rated pressure	5/12/74

9.4 Fuel analysis from TEC Fuel Group

9.5 TFT ID Fan submittal for Unit 4 (included as Attachment 10.3)

9.6 Unit 3 Existing FD fan curve (included as Attachment 10.4)

9.7 Riley Steam Generating Unit Contract No 71013-15 (selected pages included as Attachment 10.6)

9.8 Lindeburg, Michael R., Mechanical Engineering Reference Manual, Professional Publications, Inc, 2001

9.9 S&L draft report "Gerald Gentleman Station, Evaluation of Axial Versus Centrifugal Induced Draft Fans" 1998.

9.10 S&L MES-13.1, Fan Sizing for a Balanced Draft Boiler, Rev. 3

9.11 Production Economics Guide, Rev 2

10.0 ATTACHMENTS

10.1 Fan Sizing Spreadsheets

10.2 Fan Sizing Formulas

10.3 ID Fan submittal for Unit 4

10.4 Unit 3 FD fan curves

10.5 Sample Performance Curves for a Centrifugal Fan with Variable Inlet Vanes

10.6 Selected pages from Reference 9.7

10.7 Proposed Locations of ID Fans

10.8 Installation Cost Estimates

10.9 Vendor Submittals for Unit 3 Fans

MAINTENANCE & REPAIRS

Common Inlet Ductwork	
BB-3 De-Integration	**Work Order**
10/31/2000 through 11/01/2000	1480143
12/14/2000 through 12/17/2000	1477376
12/27/2000 through 12/30/2000	1501042
05/04/2001 through 05/31/2001	1526715
	1528804
	1533562
06/02/2001 through 06/04/2001	1545852
06/25/2001 through 06/25/2001	1551828
09/09/2002 through 09/19/2002	1671913
02/13/2005 through 02/20/2005	1856845
	1856849
	1856852
	1856856
	1856857
	1856858
	1856861
	1870000
02/21/2006 through 03/01/2006	1927906
	1928083
BB-3 Outage	
09/16/2001 through 09/18/2001	1672890
11/15/2003 through 12/10/2003	1776957
	1776958
	1776959
	1776960
	1776961
	1776962
	1776963
	1709408
	1576703

TECO TAMPA ELECTRIC

Work Order

Number: 1480143
Task: 1

Equipment Description:	Date Opened:
BB 3&4 FGD TWR COMMON INLET DUCT	Sep 28, 2000 09:41 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
(WGI task# 001) Capital Repairs to the Unit 4 FGD Inlet Duct.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
Replace duct section from SS liner to bottom of slope.

PAR Number:	Area: Project Management (Projects)	Skills Requirement	Quantity Hours
349 L61 17 --349			
ACTIVITY Number:	Requester:		
14286	Hill, Charles A.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1480143-1

TECO TAMPA ELECTRIC

Work Order

Number: 1477376
Task: 2

Equipment Description:	Date Opened:
FGD 3&4 Tower inlet, outlet, & i.d. isolation damj	Sep 20, 2000 03:42 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Next
	Reason:

Work Order Problem Description:
Reliability needs for EPA consent decree

Estimates:
Planned By:
Planned Date: 9/21/2000 14:56:01
Approved By: Prestwood, Jack C.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	4.0	12.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$342.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$342.00

Description of Work to be Performed for this Task:
(BRO) ASSIST PLANT ENGINEERING TO OPEN DUCT, INSPECTING DUCT, AND CLOSE UPON COMPLETION OF INSPECTION.
Estimate Includes: Providing supervision and manpower to;
1) Open/close doors to B Tower inlet duct.
2) Assist enginering in inspecting Damper assy.
Note: Up to 3 personnel for a total of 4 hrs = 12mhrs

PAR Number:	Area: Contractor Services Plant Maintenance - Boilers BROWN & ROOT	Skills Requirement	Quantity Hours
349 512 80 --345			
ACTIVITY Number:	Requester:		
13946	Prestwood, Jack C.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1477376-2

TECO TAMPA ELECTRIC

Work Order

Number: 1501042
Task: 1

Equipment Description:	Date Opened:
BB4A I.D. FAN WHEEL CLEANING	Dec 21, 2000 09:56 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / INDUCED DRAFT FANS / A. INDUCED DRAFT FAN - PN96 /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Next
	Reason:

Work Order Problem Description:
Check fan wheel to determine if it needs cleaning.

Estimates:		Teco Labor	$.00
Planned By:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:	Teco Labor:	Teco Other Material	$.00
Approved By:		Contract Labor	$.00
CHECK YOUR TAGS	Tag #:	Contract Material	$.00
		Contract Eqpt Rental	$.00
		Estimates Total:	$.00

Description of Work to be Performed for this Task:
(AVP) Provide labor, materials and equipment to inspect fan wheel for cleanliness, sandblast if required and remove spent sand.

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 512 44 --348	Plant Maintenance - Boilers AVALOTIS PAINT CO.		
ACTIVITY Number:	Requester:		
10895	Alfonso, Carlos		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1501042-1

TECO TAMPA ELECTRIC

Work Order

Number: 1526715
Task: 1

WORKED 5-21-01 THRU 5-25-01

Equipment Description:	Date Opened:
fgd ID fan discharge duct (n-s run)	Mar 26, 2001 04:26 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Non Outage Outage Code: Reason:

Work Order Problem Description:
corroded duct

Estimates:
Planned By: Mack, Leroy C.
Planned Date: 3/29/2001 11:16:23
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:	4.0	8.0

Teco Labor	$168.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$168.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
install patch (water plug) over holes in duct near test ports (east and west sides)

PAR Number:	Area: Mechanical Maintenance	Skills Requirement	Quantity	Hours
349 512 84 --345	FGD Mechanical Maintenance	M - Maint. Mecha	2	4.0
ACTIVITY Number: 13413	Requester: DeCubellis, Samuel L.			

Complete Description of Work Performed:

Completed By: **Date:**

Task Print for 1526715-1

TECO TAMPA ELECTRIC

Work Order

Number: 1528804
Task: 1

WORKED 5-24-01 THRU 5-25-01

Equipment Description:	Date Opened / Needed:
fgd 3&4 common inlet duct repairs	Apr 2, 2001 10:43 AM May 25, 2002
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
corrosion

Estimates:

			Total Job Hours	Total Man Hours
Planned By:	Friedel, John M.	Teco Labor:		
Planned Date:	5/17/2001 11:31:08	Contractor Labor:	.0	.0
Approved By:	Blankenship Jr, Robert			

Teco Labor	$.00
Teco Material	$421.12
Teco Other Material	$.00
Contract Labor	$16,000.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$16,421.12

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(SECM) replace corroded duct surrounding test ports located on the north to south duct run from the ID fans (above truck isle). Plan on replacing 200 FT2 of plate. A36 ,3/16" plate.

PAR Number:	Area: Contractor Services Plant Maintenance - Boilers SOUTHEASTERN CONSTRUCTION & MAINT.	Skills Requirement	Quantity Hours
914 512 84 --212			
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1528804-1

TECO TAMPA ELECTRIC

Work Order

Number: 1528804
Task: 2

WORKED 5-23-01 THRU 5-28-01

Equipment Description:	Date Opened:
fgd 3&4 common inlet duct repairs	Apr 2, 2001 10:55 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
corrosion

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 4/20/2001 07:02:27	Teco Labor:	40.0	200.0
Approved By:			

Teco Labor	$4,200.00
Teco Material	$421.12
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,621.12

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
replace corroded inlet duct on the D tower-mainly surrounding the pantleg inlet to the booster fan--plan on replacing 200 FT2 of A36, 3/16'

PAR Number:	Area: Mechanical Maintenance FGD Mechanical Maintenance SOUTHEASTERN MECHANICAL SVSC. INC.
915 512 84 --052	
ACTIVITY Number:	Requester:
14743	DeCubellis, Samuel L.

Skills Requirement	Quantity Hours
MCW - Mechanic C	3 40.0
M - Maint. Mechar	2 40.0

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1528804-2

TECO TAMPA ELECTRIC

Work Order

Number: 1528804
Task: 3

NO TIME CHARGED

Equipment Description:	Date Opened:
fgd 3&4 common inlet duct repairs	Apr 2, 2001 10:56 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
corrosion

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 4/20/2001 07:07:12	Teco Labor:	40.0	200.0
Approved By:			

Teco Labor	$4,200.00
Teco Material	$421.12
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,621.12

CHECK YOUR TAGS | Tag #:

Description of Work to be Performed for this Task:
replace corroded inlet duct on the C tower-mainly surrounding the pantleg inlet to the booster fan--plan on replacing 200 FT2 of A36, 3/16'

PAR Number:	Area: Mechanical Maintenance	Skills Requirement	Quantity Hours
915 512 84 --052	FGD Mechanical Maintenance	MCW - Mechanic C	3 40.0
		M - Maint. Mecha	2 40.0
ACTIVITY Number: 14743	Requester: DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1528804-3

TECO TAMPA ELECTRIC

Work Order

Number: 1528804
Task: 4

NO TIME CHARGED

Equipment Description:	Date Opened:
fgd 3&4 common inlet duct repairs	Apr 2, 2001 10:58 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
corrosion

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 4/20/2001 07:15:00	Teco Labor:	40.0	200.0
Approved By:			

Teco Labor	$4,200.00
Teco Material	$421.12
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,621.12

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
replace corroded inlet duct on the B tower-mainly surrounding the pantleg inlet to the booster fan--plan on replacing 200 FT2 of A36, 3/16" --work with Scot Bartz-to coordinate ECRC work (fan and duct replacement)

PAR Number:	Area: Mechanical Maintenance	Skills Requirement	Quantity Hours
915 512 84 --052	FGD Mechanical Maintenance	MCW - Mechanic C	3 40.0
		M - Maint. Mecha	2 40.0
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1528804-4

TECO TAMPA ELECTRIC

Work Order

Number: 1528804
Task: 5

NO TIME CHARGED

Equipment Description:	Date Opened:
fgd 3&4 common inlet duct repairs	Apr 2, 2001 10:59 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
corrosion

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 4/20/2001 07:19:08	Teco Labor:	40.0	200.0
Approved By:			

Teco Labor	$4,200.00
Teco Material	$421.12
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,621.12

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
replace corroded inlet duct on the A tower-mainly surrounding the pantleg inlet to the booster fan--plan on replacing 200 FT2 of A36, 3/16" --work with Scot Bartz-to coordinate ECRC work (fan and duct replacement)

PAR Number:	Area: Mechanical Maintenance	Skills Requirement	Quantity	Hours
915 512 84 --052	FGD Mechanical Maintenance	MCW - Mechanic C	3	40.0
		M - Maint. Mecha	2	40.0
ACTIVITY Number:	Requester:			
14743	DeCubellis, Samuel L.			

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1528804-5

TECO TAMPA ELECTRIC

Work Order

Number: 1533562
Task: 1

WORK 5-16-01 THRU 5-28-01

Equipment Description:	Date Opened:
FGD (3&4) inlet duct inspection	Apr 20, 2001 04:44 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
needed to determine future work

Estimates:
Planned By:
Planned Date: 5/20/2001 07:56:41
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	50.0	150.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$4,275.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,275.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
provide mechanical support to conduct thorough UT inspection of all FGD common inlet duct and individual tower inlet duct sections (this task will require making a cable drop for spider climber inspection in all 4 vertical ducts)--Plan on 3 men for 5 days--
Estimate Includes:
1) Stage material and eqpt for this task.
2) Install Stages as requested.
- MORE -

Warning! This job is subject to special safety requirements. See job procedure documentation!

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 512 84 --345	BROWN & ROOT		
ACTIVITY Number:	Requester:		
10597	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1533562-1

TECO TAMPA ELECTRIC

Work Order

Number: 1533562
Task: 1

Full Description of Work to be Performed for this Task:

provide mechanical support to conduct thorough UT inspection of all FGD common inlet duct and individual tower inlet duct sections (this task will require making a cable drop for spider climber inspection in all 4 vertical ducts)--Plan on 3 men for 5 days--

Estimate Includes:
1) Stage material and eqpt for this task.
2) Install Stages as requested.
3) Support Inspection with Hole Watch, Mechanic, and Supervision (Tagging)

Assumptions:
1) Duration and manpower needs described by requestor are the basis this estimate.

Note:
1) Rental Eqpt. (Spider Basket), needed for this task.

TECO TAMPA ELECTRIC

Work Order

Number: 1545852
Task: 1

Equipment Description:	Date Opened:
double louver intergration damper	Jun 4, 2001 06:31 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason:

Work Order Problem Description:
locking mechanism for the lever on the hand wheel will not in guage broken eternally.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Mechanical Maintenance	Skills Requirement	Quantity Hours
349 512 84 --345	FGD Mechanical Maintenance		
ACTIVITY Number:	Requester:		
51284345	Hobbs, Harold B.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1545852-1

TECO TAMPA ELECTRIC

Work Order

Number: 1551828
Task: 1

Equipment Description:	Date Opened:
#2 Stack Inlet Damper MOD 101	Jun 25, 2001 03:35 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / DUCTWORK DAMPER DRIVES / STACK INLET DUCT DAMPER DRIVES /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code: Reason:

Work Order Problem Description:
Please close this INTERGRATION DAMPER. Unable to use handwheel (broken).

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
CHECK YOUR TAGS	Tag #:			Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00

Description of Work to be Performed for this Task:
<Enter description of work to be performed here>

PAR Number:	Area: Mechanical Maintenance FGD Mechanical Maintenance PERSONNEL MANAGEMENT INC.	Skills Requirement	Quantity Hours
349 512 43 --340			
ACTIVITY Number:	Requester:		
10612	Blasco, Anthony R.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1551828-1

TECO TAMPA ELECTRIC

Work Order

Number: 1672890
Task: 1

WORKED 9-6-02 THRU 9-18-02

Equipment Description:	Date Opened:
FGD Common inlet duct repairs	Sep 12, 2002 07:57 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Need to repair holes in duct

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 9/14/2002 11:37:49	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	20.0	139.0

Teco Labor	$.00
Teco Material	$710.16
Teco Other Material	$.00
Contract Labor	$5,268.50
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$5,978.66

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) Door #1 on duct is in bad shape. The frame needs replaced so the door can be rehung.
For Estimate Details See Attached Planning Sheets.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical ZACHRY CONSTRUCTION CORPORATION		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672890-1

TECO TAMPA ELECTRIC

Work Order

Number: 1672890
Task: 2

No Time Charges

Equipment Description: FGD Common inlet duct repairs	Date Opened: Sep 12, 2002 08:01 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Need to repair holes in duct
Covers under scope of the EJ3 Capital Expansion Joint Replacement.

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) Large hole east of Exsp JT 3a. this may be covered under capitol job. This hole is on the floor of the duct and runs entire width of duct. Some support steel work will be needed.

PAR Number: 922 512 84 --001	Area: Big Bend Outage Work (Contractor Mechanical ZACHRY CONSTRUCTION CORPORATION	Skills Requirement	Quantity Hours
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672890-2

TECO TAMPA ELECTRIC

Work Order

Number: 1672890
Task: 4

9-18-02
WORKED 9-17-02 THRU (10-13-02 · 1 CHANGE)

Equipment Description:	Date Opened:
FGD Common inlet duct repairs	Sep 12, 2002 08:03 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Need to repair holes in duct

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 9/16/2002 13:03:43	Teco Labor:		
Approved By: Blankenship Jr, Robert	Contractor Labor:	15.0	94.0

Teco Labor	$.00
Teco Material	$75.00
Teco Other Material	$.00
Contract Labor	$3,782.27
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$3,857.27

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) Where the floor curves down into A booster fan inlet on the west end there is a large hole.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical ZACHRY CONSTRUCTION CORPORATION		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672890-4

TECO TAMPA ELECTRIC

Work Order

Number: 1672890
Task: 5

WORKED 9-18-02 THRU 9-18-02

Equipment Description:	Date Opened:
FGD Common inlet duct repairs	Sep 12, 2002 08:04 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
Need to repair holes in duct

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 9/16/2002 12:35:33	Teco Labor:		
Approved By: Blankenship Jr, Robert	Contractor Labor:	15.0	69.0

Teco Labor	$.00
Teco Material	$75.00
Teco Other Material	$.00
Contract Labor	$2,556.04
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,631.04

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) Going in Door #4 the exp joint to the west of the door, at the bottom north end on the east side is a hole.
For Estimate Details See Attached Planning Sheets.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical ZACHRY CONSTRUCTION CORPORATION		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672890-5

TECO TAMPA ELECTRIC

Work Order

Number: 1672890
Task: 6

WORKED 9-6-02 THRU 9-18-02

Equipment Description:	Date Opened:
FGD Common inlet duct repairs	Sep 12, 2002 08:05 AM
Equipment Name and Failed Component:	Status: Closed
USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Need to repair holes in duct

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 9/14/2002 12:50:05	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	25.0	165.0

Teco Labor	$.00
Teco Material	$210.16
Teco Other Material	$.00
Contract Labor	$6,244.09
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,454.25

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) Door #5 entire area around door frame needs replaced.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical ZACHRY CONSTRUCTION CORPORATION		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672890-6

TECO TAMPA ELECTRIC

Work Order

Number: 1672890
Task: 10

WORKED 9/18-02

Equipment Description:	Date Opened:
FGD Common inlet duct repairs	Sep 17, 2002 11:38 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Need to repair holes in duct

Estimates:		Total Job Hours	Total Man Hours
Planned By: Griffeth, Gordon T.	Teco Labor:		
Planned Date: 9/17/2002 11:38:23	Contractor Labor:	.0	.0
Approved By: Blankenship Jr, Robert			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$500.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$500.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) 1' x 1' plate patch needed to cover a hole just west of the outlet duct expansion joint on the floor. Needed to support an Avalotis patch.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical ZACHRY CONSTRUCTION CORPORATION		
ACTIVITY Number:	Requester:		
14743	Griffeth, Gordon T.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672890-10

TECO TAMPA ELECTRIC

Work Order

Number: 1671913
Task: 1

Equipment Description: #4 UNIT DUCT REPAIR	Date Opened / Needed: Sep 9, 2002 04:27 PM Sep 10, 2002
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / ***Warning! This equipment location has reported Medgate Incident(s). See task in Workman for specifics!***	Status: Closed Approver: Approved: Priority: Urgent Condition: Outage Outage Code: None specified Reason: FGD Deintegration

Work Order Problem Description:
OUTLET DUCT REPAIR

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
Duct repair in progress

PAR Number: 915 512 84 --052	Area: Mechanical Maintenance FGD Mechanical Maintenance	Skills Requirement	Quantity Hours
ACTIVITY Number: 15406	Requester: Shockley, Leslie R.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1671913-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776957
Task: 1

WORKED 11-25-03 THRU 12-1-03

Equipment Description:	Date Opened:
BB FGD Common Inlet duct	Nov 16, 2003 09:18 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Repair holes in duct located in the eastern end of the duct. At least five large areas will need approx 4 4x8 sheets of plate. One will require ladder or scaffold

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 11/18/2003 09:59:19	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	.0	456.0

Teco Labor	$.00
Teco Material	$660.96
Teco Other Material	$.00
Contract Labor	$14,364.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$15,024.96

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair holes in duct located in the eastern end of the duct. At least five large areas will need approximately (4) 4x8 sheets of plate. One will require ladder or scaffold.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776957-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776958
Task: 1

NO CHARGES

Equipment Description:	Date Opened:
BB FGD Common Inlet Duct	Nov 16, 2003 09:21 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Repair holes in area of D tower inlet vanes

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 11/17/2003 12:07:49	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	.0	40.0

Teco Labor	$.00
Teco Material	$25.00
Teco Other Material	$.00
Contract Labor	$1,260.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,285.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair holes in area of D tower inlet vanes.

PAR Number:	Area: Big Bend Outage Work (Contractor Mechanical THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
922 512 84 --001			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776958-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776959
Task: 1

Worked 11-28-03 Thru 11-28-03

Equipment Description: BB FGD Common Inlet Duct	Date Opened: Nov 16, 2003 09:22 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Repair holes in area at C tower inlet vanes

Estimates:
Planned By:
Planned Date: 11/17/2003 12:06:32
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	40.0

Teco Labor	$.00
Teco Material	$25.00
Teco Other Material	$.00
Contract Labor	$1,260.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,285.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair holes in area at C tower inlet vanes.

PAR Number: 922 512 84 --001	Area: Big Bend Outage Work (Contractor Mechanical THE INDUSTRIAL COMPANY	Skills Requirement Quantity Hours
ACTIVITY Number: 14743	Requester: Price, Kent L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776959-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776960
Task: 1

WORKED 12-4-03 THRU 12-4-03

Equipment Description:	Date Opened:
BB FGD Common Inlet Duct	Nov 16, 2003 09:26 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major
	Reason:

Work Order Problem Description:
Wash N/S section of duct

Estimates:
Planned By:
Planned Date: 11/17/2003 13:18:52
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	50.0

Teco Labor	$.00
Teco Material	$25.00
Teco Other Material	$.00
Contract Labor	$1,575.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,600.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Wash N/S section of duct.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776960-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776961
Task: 1

WORKED 12-2-03

Equipment Description:	Date Opened:
BB FGD Common Inlet Duct	Nov 16, 2003 09:31 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
In N/S section just south on where unit 3 comes in, there is a section of floor wallpaper with small holes. Install plate over this. This is alloy plate.

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 11/17/2003 12:48:44	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	.0	50.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$100.00
Teco Other Material	$.00
Contract Labor	$1,575.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,675.00

Description of Work to be Performed for this Task:
(TIC) In N/S section just south of where unit 3 comes in, there is a section of floor wallpaper with small holes. Install plate over this. This is alloy plate.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776961-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776962
Task: 1

WORKED 1-29-03

Equipment Description:	Date Opened:
BB FGD Common Inlet Duct	Nov 16, 2003 09:34 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
In the N/S section near the west wall the floor drain has small holes

Estimates:
Planned By:
Planned Date: 11/18/2003 13:44:23
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	72.0

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$.00
Contract Labor	$2,268.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,468.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) In the N/S section near the west wall the floor drain has small holes.

PAR Number:	Area:	Skills Requirement	Quantity Hours
922 512 84 --001	Big Bend Outage Work (Contractor Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776962-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776963
Task: 1

worked 11-29-03

Equipment Description:	Date Opened:
BB FGD Common Inlet Duct	Nov 16, 2003 09:36 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
In duct leading from unit 3, 5 ft from where it jooins com in duct there is a large hole

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 11/17/2003 13:52:36	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	.0	80.0

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$.00
Contract Labor	$2,520.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,720.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) In duct leading from unit 3, 5 ft from where it joins common inlet duct, there is a large hole. Please repair.

PAR Number:	Area:	Skills Requirement	Quantity Hours
922 512 84 --001	Big Bend Outage Work (Contractor Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776963-1

TECO TAMPA ELECTRIC

Work Order

Number: 1709408
Task: 12

CHARGE ON 2-3-04

Equipment Description:	Date Opened:
BB3&4 FGD Common Inlet Duct (R72-22/B71-77)	May 23, 2003 08:38 AM

Equipment Name and Failed Component:	Status: Closed
USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason: Capital/Specific

Work Order Problem Description:
Common Inlet Duct has deteriorated beyond repair and requires replacement.
Capital Account R72-22/B71-77)

Estimates:
Planned By: Turner, Douglas W.
Planned Date: 6/16/2003 09:31:02
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	7,387.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$775,066.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$775,066.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC)(I) Work to include the fabrication and installation of the new Common Inlet Duct section with turning vane shall extend from the expansion joint (#4FGB-EJ3-A) flange (4'- 11 15/16") west of column (29 2), to the flange (18'-0) east of the centerline of "A" boosterfan. Work also includes the installation of one (1) new expansion joint at west cut line, including new frames and new bolting hardware. (Scope of work contract # BBX-02-03-02235 has been attached).

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 B71 77 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Skeens, Claude D.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1709408-12

TECO TAMPA ELECTRIC

Work Order

Number: 1709408
Task: 17

11-3-03 THRU 12-5-03

Equipment Description:	Date Opened:
BB3&4 FGD Common Inlet Duct (R72-22/B71-77)	Oct 29, 2003 09:56 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Common Inlet Duct has deteriorated beyond repair and requires replacement.
Capital Account R72-22/B71-77)

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 10/29/2003 12:03:11	Teco Labor:		
Approved By:	Contractor Labor:	.0	720.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$22,680.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$22,680.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Provide operator for elevator in the FGD area, due to increasd traffic during outage.

PAR Number:	Area: Big Bend Outage Work (Contractor Misc. Other THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
922 B71 77 --001			
ACTIVITY Number: 14743	Requester: Dalebout, Jody L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1709408-17

TECO TAMPA ELECTRIC

Work Order

Number: 1709408
Task: 11

CHANGED DATES 1-28-04 TO 2-3-04

Equipment Description:	Date Opened:
BB3&4 FGD Common Inlet Duct (R72-22/B71-77)	May 23, 2003 08:18 AM

Equipment Name and Failed Component:	Status: Closed
USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason: Capital/Specific

Work Order Problem Description:
Common Inlet Duct has deteriorated beyond repair and requires replacement.
Capital Account R72-22/B71-77)

Estimates:
Planned By: Turner, Douglas W.
Planned Date: 6/16/2003 09:30:11
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	141.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$14,802.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$14,802.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC)(R) Work to include the removal of the existing Common Inlet Duct section including turning vane shall extend from the expansion joint (#4FGB-EJ3-A) flange located (4'-11 15/16") to the west of column line 29.2, to the flange 18'-0 east of the centerline of "A" booster fan. Work includes the removal of one (1) expansion joint at west cut line. (Scope of work contract # BBX-02-030-2295)

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 R72 22 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Skeens, Claude D.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1709408-11

TECO TAMPA ELECTRIC

Work Order

Number: 1576703
Task: 1

WORKED UNDER 1709408

Equipment Description:	Date Opened:
FGD (3&4) COMMON INLET DUCT (ECRC-CAP)	Sep 17, 2001 07:30 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
REQUIRED TO MEET EPA CD-CORROSION

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:				

Description of Work to be Performed for this Task:
MECHANICAL--INSTALL NEW DUCT SECTION FROM THE BOTTOM OF SLOPED SECTION TO THE EAST SIDE OF (A) TOWER INLET SECTION (INCLUDE SIDES AND ROOF OVER (A) TOWER INLET SECTION

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
915 512 84 --211	FGD Maintenance		
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1576703-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856845
Task: 1

Equipment Description:	Date Opened:
BB FGD 3&4 common Outlet duct	Dec 14, 2004 02:31 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
The drain east of 401/402 dampers is plugged. Please clear the line

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 12/29/2004 15:36:34	Teco Labor:		
Approved By:	Contractor Labor:	.0	60.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$1,950.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,950.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
The drain east of 401/402 dampers is plugged. Please clear the line.TIC-Flush drain line from inside of duct using white fire hoses (depending on pluggage, may require Bay Area to assist with clearing line.)

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856845-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856849
Task: 1

WORKED 2-19-05 THRU 3-09-05

Equipment Description:	Date Opened:
BB FGD 3&4 common inlet duct	Dec 14, 2004 02:35 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK / EXPANSION JOINTS, INLET FLUE DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Repair expansion joint in north south section of the duct east of the stacks. The hole is in the middle bottom of the fabric on the south edge.

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 1/10/2005 13:27:17	Teco Labor:		
Approved By:	Contractor Labor:	.0	200.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$6,500.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,500.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(tic) Repair expansion joint in north south section of the duct east of the stacks. The hole is in the middle bottom of the fabric on the south edge.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856849-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856852
Task: 1

WORKED 2-18-05

Equipment Description:	Date Opened:
BB FGD 3&4 Common inlet duct	Dec 14, 2004 02:37 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Repair hole in the C276 lining just south of the expansion joint in the north south running section. This is a small hole in the weld.

Estimates:
Planned By:
Planned Date: 1/5/2005 11:48:48
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	60.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$1,950.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,950.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair hole in the C276 lining just south of the expansion joint in the north south running section. This is a small hole in the weld.

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
915 512 84 --211	FGD Maintenance THE INDUSTRIAL COMPANY		
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856852-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856856
Task: 1

WORKED 2-13-05 THRU 2-15-05

Equipment Description:	Date Opened:
BB FGD Common inlet duct	Dec 14, 2004 02:48 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Numerous areas of holes in duct. On east and west faces just south of damper mod 5

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 1/5/2005 12:42:00	Teco Labor:		
Approved By:	Contractor Labor:	.0	200.0

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$.00
Contract Labor	$6,500.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,700.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(tic) Numerous areas of holes in duct. On east and west faces just south of damper mod 5. REPAIR SCOPE UNDEFINED PENDING INSPECTION, ALLOWED 5 MEN X (4) 10HR SHIFTS.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856856-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856857
Task: 1

Worked 2-14-05 THRU 2-16-05

Equipment Description:	Date Opened:
BB FGD 3&4 Common inlet duct	Dec 14, 2004 02:50 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
Repair holes in duct above D booster fan inlet damper. Holes are in south and north walls

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 1/5/2005 12:39:53	Teco Labor:		
Approved By:	Contractor Labor:	.0	200.0

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$.00
Contract Labor	$6,500.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,700.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(tic) Repair holes in duct above D booster fan inlet damper. Holes are in south and north walls.REPAIR SCOPE UNDEFINED PENDING INSPECTION, ALLOWED 5 MEN X (4) 10HR SHIFTS

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
915 512 84 --211	FGD Maintenance THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856857-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856858
Task: 1

WORKED 2-14-05 2-19-05 THRU 2-21-05 AND 3-8-05

Equipment Description:	Date Opened:
BB FGD 3&4 Common inlet duct	Dec 14, 2004 02:51 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
Repair holes in duct above and just east of C booster fan inlet damper

Estimates:
Planned By:
Planned Date: 1/5/2005 11:52:47
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	200.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$.00
Contract Labor	$6,500.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,700.00

Description of Work to be Performed for this Task:
(TIC) Repair holes in duct above and just east of C booster fan inlet damper. REPAIR SCOPE UNDEFINED PENDING INSPECTION, ALLOWED 5 MEN X 94) 10HR SHIFTS.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856858-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856861
Task: 1

WORKED 2-14-05 AND 2-23-05

Equipment Description:	Date Opened:
BB FGD 3&4 Common inlet duct	Dec 14, 2004 02:53 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK / EXPANSION JOINTS, INLET FLUE DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Repair hole in the expansion joint west of A booster fan inlet. Hole is in the top of the joint at the north end.

Estimates:
Planned By:
Planned Date: 1/10/2005 13:26:25
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	120.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$3,900.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$3,900.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair hole in the expansion joint west of A booster fan inlet. Hole is in the top of the joint at the north end.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856861-1

TECO TAMPA ELECTRIC

Work Order

Number: 1870000
Task: 1

Worked 2-21-05

Equipment Description:	Date Opened:
FGD Common Inlet Duct	Feb 19, 2005 11:38 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
The weld just before the stack, the entire bottom of the duct and several spots up the sides needs repaired

Estimates:
Planned By:
Planned Date: 2/20/2005 14:52:07
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	80.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$2,600.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,600.00

Description of Work to be Performed for this Task:
Clean, prep & repair weld

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Szymanski, Richard P.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1870000-1

TECO TAMPA ELECTRIC

Work Order

Number: 1927906
Task: 2

WORKED 2-25-06 THRU 2-28-06

Equipment Description: BB FGD 3&4 Common Inlet Duct	Date Opened: Feb 23, 2006 04:59 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assit engineering with inspections

Estimates:		Total Job Hours	Total Man Hours
Planned By: May (TIC), Dewey D.	Teco Labor:		
Planned Date: 2/24/2006 12:47:13	Contractor Labor:	.0	288.0
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$9,360.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$9,360.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Task to make repairs to holes in the east end of the duct

PAR Number: 915 512 84 --211	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927906-2

TECO TAMPA ELECTRIC

Work Order

Number: 1927906
Task: 3

workers 3-2-06

Equipment Description: BB FGD 3&4 Common Inlet Duct	Date Opened: Feb 23, 2006 05:00 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assit engineering with inspections

Estimates:		Total Job Hours	Total Man Hours
Planned By: May (TIC), Dewey D.	Teco Labor:		
Planned Date: 2/24/2006 12:54:04	Contractor Labor:	.0	144.0
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$4,680.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,680.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Task to make repairs to the hastelloy section of the duct.

PAR Number: 915 512 84 --211	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement / Quantity Hours
ACTIVITY Number: 14743	Requester: Price, Kent L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927906-3

TECO TAMPA ELECTRIC

Work Order

Number: 1927906
Task: 4

WORKED 2-25-06 THRU 2-28-06

Equipment Description:	Date Opened:
BB FGD 3&4 Common Inlet Duct	Feb 23, 2006 05:01 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assit engineering with inspections

Estimates:
Planned By: May (TIC), Dewey D.
Planned Date: 2/24/2006 13:08:31
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	510.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$16,575.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$16,575.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Task to repair the duct just east of 301 damper. Install plate around both sides and top.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927906-4

TECO TAMPA ELECTRIC

Work Order

Number: 1927906
Task: 5

WORKED 3-5-06 THRU 3-6-06

Equipment Description:	Date Opened:
BB FGD 3&4 Common Inlet Duct	Feb 23, 2006 05:02 PM

Equipment Name and Failed Component:	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assit engineering with inspections

Estimates:
Planned By: May (TIC), Dewey D.
Planned Date: 2/24/2006 12:52:05
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	48.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$1,560.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,560.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Task to clean out west end of duct. Wash, squeegee, and remove debris.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927906-5

TECO TAMPA ELECTRIC

Work Order

Number: 1928083
Task: 1

WORKED 2-27-06

Equipment Description: BB FGD 3&4 Common Inlet Duct	Date Opened: Dec 28, 2005 10:11 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / INLET FLUE GAS DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Provide manpower and equipment to assist engineering to inspect bottom of common inlet duct just to the east and north of #3 stack. Will require snorkel lift

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 1/10/2006 09:11:27	Teco Labor:		
Approved By:	Contractor Labor:	.0	48.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$1,560.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,560.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Provide manpower and equipment to assist engineering to inspect bottom of common inlet duct just to the west and north of #3 stack. Will require Plant snorkel lift. Allow 2 men x (2) 12hr shifts to support this task.

PAR Number: 915 512 84 --211	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement / Quantity Hours
ACTIVITY Number: 14743	Requester: Price, Kent L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1928083-1

TAMPA ELECTRIC COMPANY
DOCKET NO. 050958-EI
FILED: FEBRUARY 20, 2007
EXHIBIT JVS-2, DOCUMENT NO. 4
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MAINTENANCE & REPAIRS

Common Outlet Ductwork	
BB-3 De-Integration	**Work Order**
06/18/2000 through 06/26/2000	1444869
09/22/2000 through 09/25/2000	1477258
12/27/2000 through 12/30/2000	1501624
02/13/2005 through 02/20/2005	1856855
02/21/2006 through 03/01/2006	1927909
BB-3 Outage	
08/14/2002 through 09/30/2002	1584803
11/06/2003 through 11/08/2003	1671613
	1671614
11/28/03 through 11/30/03	1776953
12/01/2003 through 12/09/2003	1672934
	1776953
12/04/2004 through 12/04/2004	1855180

TECO TAMPA ELECTRIC

Work Order

Number: 1444869
Task: 1

worked 6-18-00, 6-19, 6-22, 6-26, & 8-16-00

Equipment Description:	Date Opened:
FGD 3&4 common outlet ductwork coating repairs	May 25, 2000 07:40 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Next
	Reason: Undefined Scope

Work Order Problem Description:
need to inspect for epa consent decree plan

Estimates:		Total Job Hours	Total Man Hours
Planned By: Friedel, John M.	Teco Labor:		
Planned Date: 06/08/00 08:32:52	Contractor Labor:	40.0	200.0
Approved By: Malinchak, Michael E.			

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$600.00
Contract Labor	$5,700.00
Contract Material	$.00
Contract Eqpt Rental	$200.00
Estimates Total:	$6,700.00

CHECK YOUR TAGS | Tag #:

Description of Work to be Performed for this Task:
(AVP) Provide labor and supervision and all material in order to repair any duct coating problems--there is a large duct leak around A and D tower just north of the isolation dampers-make a complete inspection of all outlet ductwork prior to the outage and also during the outage --document all findings on this work order or draw a sketch and give to Sam DeCubellis. remove approx. 10 coating samples (label and bag each sample)-See Sam D. for sample locations--repair sample sites

PAR Number:	Area: Contractor Services Plant Maintenance - Boilers AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
349 512 80 --348			
ACTIVITY Number: 13198	Requester: DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1444869-1

TECO TAMPA ELECTRIC

Work Order

Number: 1477258
Task: 1

WORKED 9-22-00 THRU 9-25-00

Equipment Description:	Date Opened:
FGD (3&4) COMMON OUTLET DUCT WORK REPAIRS	Sep 20, 2000 08:17 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Next Reason:

Work Order Problem Description:
LEAKING ACID IN WALL PAPER AREA GOING TO NO. 3 STACK

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 09/21/00 14:04:13	Teco Labor:		
Approved By:	Contractor Labor:	48.0	240.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$6,840.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,840.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(BRO) PROVIDE LABOR, SUPERVISION AND ALL MATERIAL IN ORDER TO REPAIR (ELIMINATE) OUTLET DUCT ACID LEAKS IN WALL PAPER. THE PREVIOUS INSPECTION REVEALED CORROSION PITTING AT THE PLUG WELDS WHICH FASTENS THE WALL PAPER--RE-WELD PITTED AREA (C276 MATERIAL) AND REPAIR ANY OTHER OPENINGS FOUND--PLEASE LOOK CAREFULLY FOR HOLES.--CONCENTRATE ON REPAIRING THE FLOOR.
Estimate Includes: Providing supervision and labor to;
- MORE -

PAR Number:	Area: Contractor Services Plant Maintenance - Boilers BROWN & ROOT	Skills Requirement	Quantity Hours
349 512 84 --345			
ACTIVITY Number: 9671	Requester: DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1477258-1

TECO TAMPA ELECTRIC

Work Order

Number: 1477258
Task: 1

Full Description of Work to be Performed for this Task:

(BRO) PROVIDE LABOR, SUPERVISION AND ALL MATERIAL IN ORDER TO REPAIR (ELIMINATE) OUTLET DUCT ACID LEAKS IN WALL PAPER. THE PREVIOUS INSPECTION REVEALED CORROSION PITTING AT THE PLUG WELDS WHICH FASTENS THE WALL PAPER--RE-WELD PITTED AREA (C276 MATERIAL)AND REPAIR ANY OTHER OPENINGS FOUND--PLEASE LOOK CAREFULLY FOR HOLES.--CONCENTRATE ON REPAIRING THE FLOOR.

Estimate Includes: Providing supervision and labor to;

1) Stage equipment and material necessary to perform task.
2) Make entry into duct work clean floors if necessary, and inspect for damage as described above.
3) Make repairs to hastelloy wall paper as required by inspection.
4) Rollback and cleanup from areas.

Assumptions: Extent of repairs will be determined by inspection. Estimate is based on the premise that we will work this task with 6 men on days x 12 hrs x 2 days, and 4 men on nights x 12 hrs x 2 days.

TECO TAMPA ELECTRIC

Work Order

Number: 1477258
Task: 3

NO CHARGES

Equipment Description:	Date Opened:
FGD (3&4) COMMON OUTLET DUCT WORK REPAIRS	Sep 21, 2000 02:10 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Next
	Reason:

Work Order Problem Description:
LEAKING ACID IN WALL PAPER AREA GOING TO NO. 3 STACK

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:				

Description of Work to be Performed for this Task:
(AVP) Make repairs to coating as needed.
No time charged/ avp on call during outage on as need basis. pjo.

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 512 84 --348	AVALOTIS PAINT CO.		
ACTIVITY Number:	Requester:		
9671	Friedel, John M.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1477258-3

TECO TAMPA ELECTRIC

Work Order

Number: 1501624
Task: 1

WORKED 12-27-00

Equipment Description: BYPASS DUCT	Date Opened: Dec 27, 2000 12:08 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: Urgent Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
BUILDUP IN DUCT AND POSSIBLY CONE

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
AFTER TAGGING OUT EQUIPMENT, REMOVE ACESS COVER, INSPECT DUCT FOR BUILDUP, AND CONE INSIDE DUCT. SEE MIKE VANWINKLE FOR DETAILS.LET BILL HARRE KNOW WHEN DUCT IS OPEN.

PAR Number: 349 512 84 --345	Area: Mechanical Maintenance FGD Mechanical Maintenance	Skills Requirement	Quantity Hours
ACTIVITY Number: 51284345	Requester: Harre Jr, William A.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1501624-1

TECO TAMPA ELECTRIC

Work Order

Number: 1584803
Task: 1

WORKED 8/4/02 THRU 9-30-02

Equipment Description:	Date Opened / Needed:
FGD Common Outlet & Inlet duct	Oct 16, 2001 11:06 AM May 3, 2002
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Work this job the next time BB4 is off the line---Water is leaking above A fan (base of slope) and on N-S duct run to no. 3 stack--water is also leaking around D tower

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 06/27/02 12:18:08	Teco Labor:		
Approved By: Blankenship Jr, Robert	Contractor Labor:	60.0	525.0

Teco Labor	$.00
Teco Material	$1,223.94
Teco Other Material	$.00
Contract Labor	$19,032.05
Contract Material	$.00
Contract Eqpt Rental	$314.11
Estimates Total:	$20,570.10

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZCC) Common Outlet,
1) Replace Section Of Expansion Joint, Complete Bottom Including 6' Ea. Side,
A) Remove Temporary Wooden Pan App. 24' x 4',
B) Erect/Dismantle Scaffold To Access Expansion Joint, App 5' x 28' x 10' W/ 5' Kneeouts,
C) Repairs To Flanges, Assume 64'sf Of Plate Repairs, App. 961f Weld,
- MORE -

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical ZACHRY CONSTRUCTION CORPORATION		
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1584803-1

TECO TAMPA ELECTRIC

Work Order

Number: 1584803
Task: 1

Full Description of Work to be Performed for this Task:

(ZCC) Common Outlet,

1) Replace Section Of Expansion Joint, Complete Bottom Including 6' Ea. Side,
A) Remove Temporary Wooden Pan App. 24' x 4',
B) Erect/Dismantle Scaffold To Access Expansion Joint, App 5' x 28' x 10' W/ 5' Kneeouts,
C) Repairs To Flanges, Assume 64'sf Of Plate Repairs, App. 96lf Weld,
D) R&R Section Of Expansion Joint App.32lf

TECO TAMPA ELECTRIC

Work Order

Number: 1584803
Task: 2

NO CHARGES

Equipment Description:	Date Opened / Needed:
FGD Common Outlet & Inlet duct	Mar 18, 2002 11:47 AM May 3, 2002
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
Work this job the next time BB4 is off the line---Water is leaking above A fan (base of slope) and on N-S duct run to no. 3 stack--water is also leaking around D tower

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
(GAF) water-blast all outlet duct drains-until drain is completely open--contact Sam Decubellis for final drain inspection.

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
915 512 84 --212	FGD Maintenance		
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1584803-2

TECO TAMPA ELECTRIC

Work Order

Number: 1584803
Task: 3

WORKED 9-13-02 THRU 9-23-02

Equipment Description:	Date Opened / Needed:
FGD Common Outlet & Inlet duct	Mar 18, 2002 11:50 AM May 3, 2002
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Work this job the next time BB4 is off the line---Water is leaking above A fan (base of slope) and on N-S duct run to no. 3 stack--water is also leaking around D tower

Estimates:			Total Job Hours	Total Man Hours
Planned By:	Griffeth, Gordon T.	Teco Labor:		
Planned Date:	07/24/02 12:28:05	Contractor Labor:	40.0	200.0
Approved By:	Blankenship Jr, Robert			

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$1,900.00
Contract Labor	$5,800.00
Contract Material	$.00
Contract Eqpt Rental	$950.00
Estimates Total:	$8,850.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVP) Inspect and repair outlet duct damage--bad leaks around base of slope, near A&D towers, and on N-S duct run--Need to plan on making repairs around outlet joint located at base of slope. In addition, take samples of outlet duct coating for coating life assessment.
estimate based on 5 men at 5 days - unknown no. of repairs areas. nuetralize/prep and coat with cielcote material. Mob and demob. / confine space procedures. ** estimate based on using trowel grade flakeline material to do spot repairs.

PAR Number:	Area: Big Bend Outage Work (Contractor Painting AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
922 512 84 --001			
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1584803-3

TECO TAMPA ELECTRIC

Work Order

Number: 1584803
Task: 5

WORKED 9-6-02 THRU 9-20-02

Equipment Description:	Date Opened / Needed:
FGD Common Outlet & Inlet duct	Apr 29, 2002 10:15 AM May 3, 2002
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Work this job the next time BB4 is off the line---Water is leaking above A fan (base of slope) and on N-S duct run to no. 3 stack--water is also leaking around D tower

Estimates:
Planned By: Swindle (ESI), Rick
Planned Date: 08/28/02 15:08:59
Approved By: Blankenship Jr, Robert

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	160.0

Teco Labor	$.00
Teco Material	$500.00
Teco Other Material	$.00
Contract Labor	$6,000.00
Contract Material	$1,600.00
Contract Eqpt Rental	$.00
Estimates Total:	$8,100.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ESI) R/R insulation and lagging around the inlet and outlet duct expansion joints that will be replaced. Also on the bottom of the inlet duct just west of the A booster fan there will be an access cut into the duct that will require r/r of insulation.See Zachry for exact location and approx. size of opening needed.
ESI - 6/25/02 - ESTIMATE INCLUDES:
REVISED///9-6-02/ ESTIMATE INCLUDES.
- MORE -

PAR Number:	Area: Big Bend Outage Work (Contractor Insulation ENERGY SERVICE INSULATION INC.	Skills Requirement	Quantity Hours
922 512 84 --001			
ACTIVITY Number:	Requester:		
14743	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1584803-5

TECO TAMPA ELECTRIC

Work Order

Number: 1584803
Task: 5

Full Description of Work to be Performed for this Task:

(ESI) R/R insulation and lagging around the inlet and outlet duct expansion joints that will be replaced. Also on the bottom of the inlet duct just west of the A booster fan there will be an access cut into the duct that will require r/r of insulation.See Zachry for exact location and approx. size of opening needed.

ESI - 6/25/02 - ESTIMATE INCLUDES:

REVISED///9-6-02/ ESTIMATE INCLUDES.

REMOVE AND REPLACE INSULATION AND METAL APPROX. 2' TO 4' ON EACH SIDE OF EXPANSION JOINT BOTTOM AND 8' UP EACH SIDE.

1) REMOVE AND REPLACE INSULATION AND METAL FOR (9) AREAS (1480SQ.FT.) TOP INLET.

2) REMOVE AND REPLACE INSULATION AND METAL FOR TOP & 6' EACH SIDE EXPANSION JOINT INLET. (SCAFFOLD)

3) REMOVE AND REPLACE INSULATION AND METAL FOR (2) AREAS 8' X 8' BOTTOM INLET. (SCAFFOLD)

4) REMOVE AND REPLACE INSULATION AND METAL FOR (6) AREAS (1300SQ.FT.) TOP OUTLET. (SCAFFOLD)

5) REMOVE AND REPLACE INSULATION AND METAL FOR (2) AREAS (220SQ.FT.) SIDE & BOTTOM OUTLET. (SCAFFOLD)

6) REMOVE AND REPLACE INSULATION ANDMETAL FOR BOTTOM & 6' EACH SIDE EXPANSION JOINT OUTLET. (SCAFFOLD)

REVISED/8-28-02/ ESI ESTIMATE INCLUDES

REMOVE AND REPLACE INSULATION AND METAL FOR (5)AREAS INLET ROOF 694 SQ. FT., (3) AREAS OUTLET ROOF 1032 SQ. FT. AND (2) AREAS INLET BOTTOM 128 SQ.FT.

TECO TAMPA ELECTRIC

Work Order

Number: 1671613
Task: 1

Worked 11-6-03, 11-8, 11-28, 11-30,

Equipment Description: FGD Common outlet duct, Exp Jt EJ3	Date Opened: Sep 8, 2002 07:48 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK / EXPANSION JOINTS, OUTLET FLUE DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Hole in frame on bottom of joint

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 07/21/03 07:23:50	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	48.0	192.0

Teco Labor	$.00
Teco Material	$136.98
Teco Other Material	$.00
Contract Labor	$6,048.00
Contract Material	$.00
Contract Eqpt Rental	$150.00
Estimates Total:	$6,334.98

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair hole in frame on the bottom of the joint.

PAR Number: 922 512 84 --001	Area: Big Bend Outage Work (Contractor Mechanical THE INDUSTRIAL COMPANY	Skills Requirement / Quantity Hours
ACTIVITY Number: 14743	Requester: Price, Kent L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1671613-1

TECO TAMPA ELECTRIC

Work Order

Number: 1671613
Task: 2

NO CHARGES

Equipment Description:	Date Opened:
FGD Common outlet duct, Exp Jt EJ3	Jul 17, 2003 06:46 AM
Equipment Name and Failed Component:	Status: Closed
USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK / EXPANSION JOINTS, OUTLET FLUE DUCTWORK /	Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Hole in frame on bottom of joint

Estimates:
Planned By: Perez (AVP), Paul
Planned Date: 07/25/03 13:23:11
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	8.0	24.0

Teco Labor	$.00
Teco Material	$40.00
Teco Other Material	$812.00
Contract Labor	$720.00
Contract Material	$.00
Contract Eqpt Rental	$200.00
Estimates Total:	$1,572.00

CHECK YOUR TAGS | Tag #:

Description of Work to be Performed for this Task:
(AVP) Apply coating as required after repairs have been made to duct. AVP estimate based on 3 men crew. Will spot blast or power tool grind as nesessary to archive profile. Apply a primer coat of Ceilcote 380, an intermidiate coat of Ceilcote 180 (traulable) and a top coat of Ceilcote 242. Perez

Warning! This job is subject to special safety requirements. See job procedure documentation!

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Painting AVALOTIS PAINT CO.		
ACTIVITY Number:	Requester:		
14743	Skeens, Claude D.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1671613-2

TECO TAMPA ELECTRIC

Work Order

Number: 1671614
Task: 1

WORKED 11-25-03

Equipment Description:	Date Opened:
FGD Common outlet duct Exp Jt. EJ6	Sep 8, 2002 07:50 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK / EXPANSION JOINTS, OUTLET FLUE DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Exp Jt EJ6, hole in bottom of frame

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 07/21/03 07:35:43	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	48.0	192.0

Teco Labor	$.00
Teco Material	$136.96
Teco Other Material	$.00
Contract Labor	$6,048.00
Contract Material	$.00
Contract Eqpt Rental	$150.00
Estimates Total:	$6,334.96

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) Repair hole in frame on the bottom of the expansion joint.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1671614-1

TECO TAMPA ELECTRIC

Work Order

Number: 1671614
Task: 2

NO CHARGES

Equipment Description: FGD Common outlet duct Exp Jt. EJ6	Date Opened: Jul 17, 2003 06:48 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK / EXPANSION JOINTS, OUTLET FLUE DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Exp Jt EJ6, hole in bottom of frame

Estimates:			Total Job Hours	Total Man Hours
Planned By:	Perez (AVP), Paul	Teco Labor:		
Planned Date:	07/25/03 13:12:24	Contractor Labor:	8.0	24.0
Approved By:	Turner, Douglas W.			

Teco Labor	$.00
Teco Material	$40.00
Teco Other Material	$204.00
Contract Labor	$720.00
Contract Material	$.00
Contract Eqpt Rental	$200.00
Estimates Total:	$1,164.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVP) Apply coating as required after repairs have been made to duct. AVP estimate based on 3men crew to spot blast as needed apply aprimer coat of Ceilcote 380, an intermidiate coat of Ceilcote180 (traulable) and a top coat of Ceilcote 242. Perez.

PAR Number: 922 512 84 --001	Area: Big Bend Outage Work (Contractor Painting AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
ACTIVITY Number: 14743	Requester: Skeens, Claude D.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1671614-2

TECO TAMPA ELECTRIC

Work Order

Number: 1671614
Task: 3

NO CHARGE

Equipment Description:	Date Opened:
FGD Common outlet duct Exp Jt. EJ6	Nov 14, 2003 08:42 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK / EXPANSION JOINTS, OUTLET FLUE DUCTWORK /	Status: Open Approver: Approved: Priority: High Condition: Outage Outage Code: Major
	Reason: FGD Deintegration

Work Order Problem Description:
Exp Jt EJ6, hole in bottom of frame

Estimates:		Total Job Hours	Total Man Hours		
Planned By:	Teco Labor:			Teco Labor	$.00
Planned Date:				Teco Material	$.00
Approved By:				Teco Other Material	$.00
				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:				

Description of Work to be Performed for this Task:
FGD DEINTEGRATION DUE TO REPAIRS/MAJOR OUTAGE

PAR Number:	Area: Plant Operations	Skills Requirement	Quantity Hours
919 512 84 --152	FGD Operations (Tyson)		
ACTIVITY Number:	Requester:		
14743	Lewis III, Benjamin		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1671614-3

TECO TAMPA ELECTRIC

Work Order

Number: 1776953
Task: 1

WORKED 11-27-03 THRU 11-29-03

Equipment Description: BB FGD Common Outlet Duct	Date Opened: Nov 16, 2003 08:58 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Wash entire duct

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 11/19/03 08:03:11	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	.0	120.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$200.00
Teco Other Material	$.00
Contract Labor	$3,780.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$3,980.00

Description of Work to be Performed for this Task:
(TIC) perform duct wash as needed, several inches of buildup in duct.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Misc. Other THE INDUSTRIAL COMPANY		
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776953-1

TECO TAMPA ELECTRIC

Work Order

Number: 1672934
Task: 1

worked 12-4-03 thru 12-5-03, 12-8-03, 12-9-03

Equipment Description:	Date Opened:
FGD Common outlet Duct	Sep 12, 2002 10:22 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Repair holes in coating see tasks for specific areas. This work should be done by Avalotis.

Estimates:
Planned By: Hill, Charles A.
Planned Date: 10/16/03 09:14:03
Approved By: Turner, Douglas W.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	44.0	176.0

Teco Labor	$.00
Teco Material	$145.00
Teco Other Material	$1,774.00
Contract Labor	$5,680.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$7,599.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVP) 1.Many areas in common outlet duct where rust is showing, this indicates coating is cracked and needs redone. See Kent Price. AVP,estimate based on conversation with Kent Price to figure estimate on 25 sg.Ft.-Will figure 2 men plus hole watch one week to do task reguired.Scaffold if needed is not part of this estimate.375 CFM conpresor needed for duration of task. Perez

- MORE -

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Painting AVALOTIS PAINT CO.		
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672934-1

TECO
TAMPA ELECTRIC

Work Order

Number: 1672934
Task: 1

Full Description of Work to be Performed for this Task:

(AVP) 1.Many areas in common outlet duct where rust is showing, this indicates coating is cracked and needs redone. See Kent Price. AVP,estimate based on conversation with Kent Price to figure estimate on 25 sg.Ft.-Will figure 2 men plus hole watch one week to do task reguired.Scaffold if needed is not part of this estimate.375 CFM conpresor needed for duration of task. Perez

2 .Also repair hole in coating near north wall at C tower, 2" in diameter. AVP est based on 1 sq. ft. 2 men plus hole watch.

3.Also repair hole in coating at outlet duct of C tower, south of expansion in horizontal section. AVP est based on 2 men plus hole watch. Scaffolding, if needed, is not in estimate.

TECO TAMPA ELECTRIC

Work Order

Number: 1672934
Task: 2

Completed on Task 1

Equipment Description:	Date Opened:
FGD Common outlet Duct	Sep 12, 2002 10:38 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Repair holes in coating see tasks for specific areas. This work should be done by Avalotis.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
			Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVP) 1.Many areas in common outlet duct where rust is showing, this indicates coating is cracked and needs redone. See Kent Price. AVP,estimate based on conversation with Kent Price to figure estimate on 25 sg.Ft.-Will figure 2 men plus hole watch one week to do task reguired.Scaffold if needed is not part of this estimate.375 CFM conpresor needed for duration of task. Perez

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Painting AVALOTIS PAINT CO.		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672934-2

TECO TAMPA ELECTRIC

Work Order

Number: 1672934
Task: 3

Completed on TASK 1

Equipment Description:	Date Opened:
FGD Common outlet Duct	Sep 12, 2002 12:51 PM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
Repair holes in coating see tasks for specific areas. This work should be done by Avalotis.

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
(AVP) Hole in outlet duct of C tower, south of expansion in horizontal section.
AVP estimates based on 2 men plus hole watch. If scaffold is needed it is not part of this estimate. Perez

PAR Number:	Area: Big Bend Outage Work (Contractor Painting AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
922 512 84 --001			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1672934-3

TECO TAMPA ELECTRIC

Work Order

Number: 1776954
Task: 1

WORKED 12-5-03

Equipment Description:	Date Opened:
BB FGD Common Outlet Duct	Nov 16, 2003 09:01 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
In N/S section east side hole at third port up from bottom

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 11/17/03 13:17:23	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	.0	50.0

Teco Labor	$.00
Teco Material	$50.00
Teco Other Material	$.00
Contract Labor	$1,575.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,625.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) In N/S section east side hole at third port up from bottom.

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Mechanical THE INDUSTRIAL COMPANY		
ACTIVITY Number:	Requester:		
14743	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776954-1

TECO TAMPA ELECTRIC

Work Order

Number: 1776954
Task: 2

NO CHARGES

Equipment Description:	Date Opened:
BB FGD Common Outlet Duct	Nov 17, 2003 11:06 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: Non-Critical Condition: Outage Outage Code: Major Reason:

Work Order Problem Description:
In N/S section east side hole at third port up from bottom

Estimates:		Total Job Hours	Total Man Hours
Planned By: Perez (AVP), Paul			
Planned Date: 11/17/03 13:40:56	Teco Labor:		
Approved By: Turner, Douglas W.	Contractor Labor:	24.0	24.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$296.00
Contract Labor	$750.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,046.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVP) Apply coating to repaired areas. AVP estimates to powertool affected areas aplly a primer coat of Ceilcote 380 an intermidiate coat of Ceilcote 180 and a top coat of Ceilcote 242 fiber glass layer wii be used as needed

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 84 --001	Painting AVALOTIS PAINT CO.		
ACTIVITY Number:	Requester:		
14743	Griffeth, Gordon T.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1776954-2

TECO TAMPA ELECTRIC

Work Order

Number: 1855180
Task: 1

WORKED 12-4-04

Equipment Description:	Date Opened:
BB FGD 3&4 Common outlet duct	Dec 4, 2004 11:49 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason:

Work Order Problem Description:
Repair hole in epoxy lining on the floor north of "A" damper. Approx 6in diameter

Estimates:
Planned By: Perez (AVP), Paul
Planned Date: 12/06/04 09:17:54
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	6.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$180.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$180.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVP) Repair hole in floor.

PAR Number:	Area: Contractor Services FGD Maintenance AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
915 512 84 --212			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1855180-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856855
Task: 1

WORKED 2-13-05 THRU 2-21-05

Equipment Description:	Date Opened:
BB FGD Common outlet duct	Dec 14, 2004 02:47 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Repair numerous failed sections of the epoxy liner. They can be seen as rust areas in the epoxy

Estimates:		Total Job Hours	Total Man Hours
Planned By: Perez (AVP), Paul	Teco Labor:		
Planned Date: 12/28/04 16:45:46	Contractor Labor:	.0	150.0
Approved By:			

Teco Labor	$.00
Teco Material	$75.00
Teco Other Material	$1,027.80
Contract Labor	$4,500.00
Contract Material	$.00
Contract Eqpt Rental	$150.00
Estimates Total:	$5,752.80

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVI) Repair numerous failed sections of the epoxy liner. They can be seen as rust areas in the epoxy
Estimate based on 2 men plus hole watch for one week to inspect and repairs rusted areas
If large areas are found steel repairs and patch welding are not included in this estimate
Perez

PAR Number:	Area: Contractor Services FGD Maintenance AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856855-1

TECO TAMPA ELECTRIC

Work Order

Number: 1856855
Task: 2

NO CHARGES COMPLETED TASK 1

Equipment Description:	Date Opened:
BB FGD Common outlet duct	Feb 21, 2005 08:30 AM

Equipment Name and Failed Component:	Status: Closed
Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
Repair numerous failed sections of the epoxy liner. They can be seen as rust areas in the epoxy

Estimates:
Planned By: Perez (AVP), Paul
Planned Date: 02/21/05 12:59:28
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	40.0

Teco Labor	$.00
Teco Material	$25.00
Teco Other Material	$.00
Contract Labor	$1,200.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,225.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVI) MAKE ADITIONAL REPAIRS FOUND DURING INSPECTION
Avalotis to make additional coating repairs to outlet duct coating after weld repairs to these areas. Perez

PAR Number:	Area: Contractor Services FGD Maintenance AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number:	Requester:		
14743	Bisesto, Gary B.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1856855-2

TECO TAMPA ELECTRIC

Work Order

Number: 1927909
Task: 1

weeks 2-21-06 THRU 2-23-06 & 3-3-06

Equipment Description:	Date Opened:
BB FGD 3&4 Common Outlet Duct	Dec 27, 2005 10:53 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assist engineering with inspections

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 01/10/06 09:13:55	Teco Labor:		
Approved By:	Contractor Labor:	.0	72.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$2,340.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,340.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Open all doors and provide manpower to assist engineering with inspections, allow 2 men x (3) 12hr shifts to support this task.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927909-1

TECO TAMPA ELECTRIC

Work Order

Number: 1927909
Task: 2

Worked 2-23-06 THUR 2-2?-06

Equipment Description:	Date Opened:
BB FGD 3&4 Common Outlet Duct	Jan 12, 2006 11:24 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assist engineering with inspections

Estimates:
Planned By: Perez (AVP), Paul
Planned Date: 01/12/06 11:44:23
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	120.0

Teco Labor	$.00
Teco Material	$25.00
Teco Other Material	$1,424.20
Contract Labor	$3,600.00
Contract Material	$.00
Contract Eqpt Rental	$250.00
Estimates Total:	$5,299.20

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(AVALOTIS) Make fiberglass repairs.
Avalotis estimate based on 2 men and hole watch for one week. Please note that there is no scope of work and estimate might change after actual site inspection is conducted.
Perez

PAR Number:	Area: Contractor Services FGD Maintenance AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Peeples, Jr., Robert G.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927909-2

TECO TAMPA ELECTRIC

Work Order

Number: 1927909
Task: 3

Worked 2-21-06 & 2-28-06 & 3-3-06

Equipment Description:	Date Opened:
BB FGD 3&4 Common Outlet Duct	Feb 23, 2006 05:03 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assist engineering with inspections

Estimates:
Planned By: May (TIC), Dewey D.
Planned Date: 02/27/06 16:38:32
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	144.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$4,680.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,680.00

Description of Work to be Performed for this Task:
(TIC) - Task to clean hastelloy area of duct and make weld repairs

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927909-3

TECO TAMPA ELECTRIC

Work Order

Number: 1927909
Task: 4

WORKED 3-3-06 & 7-14-06

Equipment Description:	Date Opened:
BB FGD 3&4 Common Outlet Duct	Feb 23, 2006 05:04 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #3 & 4 FLUE GAS DESULFURIZATION SYSTEM / FLUE GAS PROCESSING EQUIPMENT / DUCTS / FLUE GAS OUTLET DUCTWORK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Open all doors and provide manpower to assist engineering with inspections

Estimates:
Planned By: May (TIC), Dewey D.
Planned Date: 02/24/06 12:45:24
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	64.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$2,080.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$2,080.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(TIC) - Task to repair expansion joint area just north of all four tower outlet dampers.

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 84 --211			
ACTIVITY Number: 14743	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1927909-4

TAMPA ELECTRIC COMPANY
DOCKET NO. 050958-EI
FILED: FEBRUARY 20, 2007
EXHIBIT JVS-2, DOCUMENT NO. 4
Page 77 of 105

MAINTENANCE & REPAIRS

Common Stack 2	
BB-3 Outage	**Work Order**
08/09/2000 through 08/09/2002	1429241
	1429246
	1429249
Common Stack 3	
BB-3 De-Integration	
05/07/2001 through 05/10/2001	1533568
BB-3 Outage	
08/03/2001 through 08/03/2001	1533568
01/04/2006 through 01/04/2006	1787465

TECO TAMPA ELECTRIC

Work Order

Number: 1429241
Task: 1

Completed on 5-9-2000 NO HOURLY CHARGES ACTUAL $ 33,511.85

Equipment Description: NO. 2 STACK LINER EXP. JT. REPL. (LOWER WEST SIDE	Date Opened: Apr 3, 2000 11:49 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:
Planned By: DeCubellis, Samuel L.
Planned Date: 04/03/00 11:55:16
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$30,000.00
Contract Material	$25,000.00
Contract Eqpt Rental	$.00
Estimates Total:	$55,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZBD) INSTALL NEW STACK LINER EXPANSION JOINT ON THE WEST LOWER DUCT--IN ADDITION INSTALL NEW FASTENERS AND SUPPORTS FOR JOINT

PAR Number: 349 A75 27 --348	Area: Contractor Services ZURN BALCKE-DURR	Skills Requirement Quantity Hours
ACTIVITY Number: 13231	Requester: DeCubellis, Samuel L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429241-1

TECO TAMPA ELECTRIC

Work Order

Number: 1429241
Task: 2

NO HOURLY ACTUAL $22,655 CLOSED 8-05-00

Equipment Description: NO. 2 STACK LINER EXP. JT. REPL. (LOWER WEST SIDE	Date Opened: Apr 3, 2000 11:58 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:
Planned By: DeCubellis, Samuel L.
Planned Date: 04/03/00 11:58:15
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$3,000.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$3,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZBD) REMOVE EXPANSION JOINT AND DAMAGED FASTENERS/SUPPORTS

PAR Number: 349 P75 22 --439	Area: Contractor Services ZURN BALCKE-DURR	Skills Requirement / Quantity Hours
ACTIVITY Number: 13231	Requester: DeCubellis, Samuel L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429241-2

TECO TAMPA ELECTRIC

Work Order

Number: 1429241
Task: 4

NO CHARGES

Equipment Description: NO. 2 STACK LINER EXP. JT. REPL. (LOWER WEST SIDE	Date Opened: May 10, 2000 12:00 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:
Planned By:
Planned Date: 07/21/00 10:46:22
Approved By: Malinchak, Michael E.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	4.5	216.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$6,156.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$6,156.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
complete cleaning of stack bowl area after joint installation job by ZBD ESTIMATE INCLUDES: LABOR AND SUPERVISION TO CLEAN DEBRIS IN STACK BOWL AREA, # 2 STACK, WHICH WERE MADE DURING JOINT INSTALLATION BY ZBD. SCRAP DEBRIS ACCORDINGLY. 6 MEN X 4 1/2 DAYS. CJM BRO

PAR Number: 349 A75 27 --347	Area: Contractor Services Plant Maintenance - Boilers BROWN & ROOT	Skills Requirement / Quantity Hours
ACTIVITY Number: 13231	Requester: DeCubellis, Samuel L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429241-4

TECO TAMPA ELECTRIC

Work Order

Number: 1429246
Task: 1

Closed 8-9-00 NO HOURLY CHARGES ACTUAL $33,511.

Equipment Description: NO. 2 STACK LINER EXP. JT. REPL. (UPPER WEST SIDE	Date Opened: Apr 3, 2000 12:01 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:
Planned By: DeCubellis, Samuel L.
Planned Date: 04/03/00 12:03:36
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$30,000.00
Contract Material	$25,000.00
Contract Eqpt Rental	$.00
Estimates Total:	$55,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZBD) INSTALL NEW STACK LINER EXPANSION JOINT ON THE WEST UPPER DUCT--IN ADDITION INSTALL NEW FASTENERS AND SUPPORTS FOR JOINT

PAR Number: 349 A75 26 --348	Area: Contractor Services ZURN BALCKE-DURR	Skills Requirement Quantity Hours
ACTIVITY Number: 13230	Requester: DeCubellis, Samuel L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429246-1

TECO TAMPA ELECTRIC

Work Order

Number: 1429246
Task: 1

Completed 8-9-00 Amount $33 511.00

Equipment Description:	Date Opened:
NO. 2 STACK LINER EXP. JT. REPL. (UPPER WEST SIDE	Apr 3, 2000 12:01 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:				Teco Labor	$.00
Planned By:	DeCubellis, Samuel L.		Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:	04/03/00 12:03:36	Teco Labor:		Teco Other Material	$.00
Approved By:		Contractor Labor:	.0 .0	Contract Labor	$30,000.00
				Contract Material	$25,000.00
CHECK YOUR TAGS	Tag #:			Contract Eqpt Rental	$.00
				Estimates Total:	$55,000.00

Description of Work to be Performed for this Task:
(ZBD) INSTALL NEW STACK LINER EXPANSION JOINT ON THE WEST UPPER DUCT--IN ADDITION INSTALL NEW FASTENERS AND SUPPORTS FOR JOINT

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 A75 26 --348	ZURN BALCKE-DURR		
ACTIVITY Number:	Requester:		
13230	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429246-1

TECO TAMPA ELECTRIC

Work Order

Number: 1429246
Task: 4

Closed 8-5-00 NO HOURLY CHARGE ACTUAL $22,655.

Equipment Description:	Date Opened:
NO. 2 STACK LINER EXP. JT. REPL. (UPPER WEST SIDE	Apr 5, 2000 06:46 PM

Equipment Name and Failed Component:	Status: Closed
Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Approver: Approved: Priority: Urgent Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:
Planned By: Sanders (TIC), Lanni E.
Planned Date: 04/06/00 16:55:12
Approved By: Friedel, John M.

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	40.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$1,140.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$1,140.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
REPAIR C-276 AT DUCT OPENING.

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 512 43 --346	BROWN & ROOT		
ACTIVITY Number: 9671	Requester: Peeples, Jr., Robert G.		

Complete Description of Work Performed:

Completed By: Date:

Task Print for 1429246-4

TECO TAMPA ELECTRIC

Work Order

Number: 1429249
Task: 1

Complete 10-3-00 Actuals $33,511.00

Equipment Description:	Date Opened:
NO. 2 STACK LINER EXP. JT. REPL. (FGD OUTLET)	Apr 3, 2000 12:10 PM

Equipment Name and Failed Component:	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:		Total Job Hours	Total Man Hours
Planned By: DeCubellis, Samuel L.	Teco Labor:		
Planned Date: 04/03/00 12:12:43	Contractor Labor:	.0	.0
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$30,000.00
Contract Material	$25,000.00
Contract Eqpt Rental	$.00
Estimates Total:	$55,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZBD) INSTALL NEW STACK LINER EXPANSION JOINT ON THE EAST SIDE (FGD OUTLET DUCT)--IN ADDITION INSTALL NEW FASTENERS AND SUPPORTS FOR JOINT

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 A75 25 --348	ZURN BALCKE-DURR		
ACTIVITY Number:	Requester:		
13229	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429249-1

TECO TAMPA ELECTRIC

Work Order

Number: 1429249
Task: 2

Completed 8-9-00 ACTUALS $22,655

Equipment Description: NO. 2 STACK LINER EXP. JT. REPL. (FGD OUTLET)	Date Opened: Apr 3, 2000 12:14 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #3 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason: Capital/Blanket

Work Order Problem Description:
COMPLETELY DETERIATED JOINT

Estimates:
Planned By: DeCubellis, Samuel L.
Planned Date: 04/03/00 12:14:35
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$3,000.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$3,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(ZBD) REMOVE EXPANSION JOINT AND DAMAGED FASTENERS/SUPPORTS

PAR Number: 349 P75 22 --439	Area: Contractor Services ZURN BALCKE-DURR	Skills Requirement Quantity Hours
ACTIVITY Number: 13229	Requester: DeCubellis, Samuel L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1429249-2

TECO TAMPA ELECTRIC

Work Order

Number: 1533568
Task: 2

WORKED 5-7-01 THRU 5-10-01

Equipment Description:	Date Opened:
FGD no. 3 stack annual PM	May 4, 2001 10:11 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
required for reliable operation

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 05/04/01 11:26:07	Teco Labor:	8.0	8.0
Approved By:			

Teco Labor	$168.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$168.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
assist Pullman Power with stack maintenance--provide tagging for Pullman

PAR Number:	Area: Mechanical Maintenance	Skills Requirement	Quantity	Hours
349 512 44 --348	FGD Mechanical Maintenance	M - Maint. Mechar	1	8.0
ACTIVITY Number: 9672	Requester: DeCubellis, Samuel L.			

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1533568-2

TECO TAMPA ELECTRIC

Work Order

Number: 1533568
Task: 3

NO CHARGES

Equipment Description:	Date Opened:
FGD no. 3 stack annual PM	May 7, 2001 03:46 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
required for reliable operation

Estimates:		Total Job Hours	Total Man Hours	Teco Labor	$.00
Planned By:	Teco Labor:			Teco Material	$.00
Planned Date:				Teco Other Material	$.00
Approved By:				Contract Labor	$.00
				Contract Material	$.00
				Contract Eqpt Rental	$.00
				Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
vacuum truck needed to remove debris from stack liner washing

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 512 44 --348	SOUTHEAST INDUSTRIAL		
ACTIVITY Number:	Requester:		
9672	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1533568-3

TECO TAMPA ELECTRIC

Work Order

Number: 1533568
Task: 1

Completed 8-3-01 Actuals $5,807.00

Equipment Description:	Date Opened:
FGD no. 3 stack annual PM	Apr 20, 2001 05:17 PM

Equipment Name and Failed Component:	Status: Closed
Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel Reason:

Work Order Problem Description:
required for reliable operation

Estimates:		Total Job Hours	Total Man Hours
Planned By: DeCubellis, Samuel L.	Teco Labor:		
Planned Date: 05/10/01 11:23:37	Contractor Labor:	.0	.0
Approved By: Blankenship Jr, Robert			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$50,000.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$50,000.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
Thoroughly inspect liner inside and outside, thoroughly inspect all structure inside annulus, inspect all breeching connections to liner (inside and outside). inspect all breeching duct expansion joints, repair damaged liner bands, report on all findingsto Sam DeCubellis for repair plan, repair/replace shell door at 250' EL-inspect all stack ports and doors and make repair recommendations--provide short term and long term needs list for all inspections. Falling brick (debris) is not
- MORE -

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
349 512 44 --345	PULLMAN POWER PRODUCTS CORP		
ACTIVITY Number:	Requester:		
9672	DeCubellis, Samuel L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1533568-1

TECO TAMPA ELECTRIC

Work Order

Number: 1533568
Task: 1

Full Description of Work to be Performed for this Task:

Thoroughly inspect liner inside and outside, thoroughly inspect all structure inside annulus, inspect all breeching connections to liner (inside and outside). inspect all breeching duct expansion joints, repair damaged liner bands, report on all findingsto Sam DeCubellis for repair plan, repair/replace shell door at 250' EL-inspect all stack ports and doors and make repair recommendations--provide short term and long term needs list for all inspections. Falling brick (debris) is not acceptable-identifyroot cause of falling or potential falling material. Install (4) new 304SS band cables (supply labor and material)

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 1

Completed 1-4-06 NO CHARGES

Equipment Description: BB #3 Stack	Date Opened: Jan 9, 2004 10:19 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates: Planned By: Planned Date: Approved By:	Total Job Hours Total Man Hours Teco Labor:	Teco Labor	$.00
		Teco Material	$.00
		Teco Other Material	$.00
		Contract Labor	$.00
		Contract Material	$.00
		Contract Eqpt Rental	$.00
		Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:		

Description of Work to be Performed for this Task:
Clear debris from all platforms in the stack

PAR Number: 922 512 44 --002	Area: Big Bend Outage Work (Contractor PULLMAN POWER PRODUCTS CORP	Skills Requirement Quantity Hours
ACTIVITY Number: 15406	Requester: Price, Kent L.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-1

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 2

NO CHARGES

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:22 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
Replace all broken interior lights at platforms and ladder sections

PAR Number:	Area: Outside Contractor Resources Plant Boilers PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
914 512 44 --210			
ACTIVITY Number:	Requester:		
15406	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-2

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 3

NO CHARGES

Equipment Description: BB #3 Stack	Date Opened: Jan 9, 2004 10:23 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates: Planned By: Planned Date: Approved By:	Total Job Hours Total Man Hours Teco Labor:	Teco Labor	$.00
		Teco Material	$.00
		Teco Other Material	$.00
		Contract Labor	$.00
		Contract Material	$.00
		Contract Eqpt Rental	$.00
		Estimates Total:	$.00
CHECK YOUR TAGS	Tag #:		

Description of Work to be Performed for this Task:
Replace the buckstays and the 24 opening tension bands

PAR Number: 922 512 44 --002	Area: Big Bend Outage Work (Contractor PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-3

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 4

NO CHARGES

Equipment Description: BB #3 Stack	Date Opened: Jan 9, 2004 10:23 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates: Planned By: Planned Date: Approved By:	Total Job Hours Total Man Hours Teco Labor:	Teco Labor Teco Material Teco Other Material Contract Labor Contract Material Contract Eqpt Rental Estimates Total:	$.00 $.00 $.00 $.00 $.00 $.00 $.00
CHECK YOUR TAGS	Tag #:		

Description of Work to be Performed for this Task:
Replace the upper brick liner cap sections

PAR Number: 922 512 44 --002	Area: Big Bend Outage Work (Contractor PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-4

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 5

No charges

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:25 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
repair or replace the lower concrete lintel beam and protectively cover on the lower opening

PAR Number:	Area: Outside Contractor Resources	Skills Requirement	Quantity Hours
914 512 44 --210	Plant Boilers PULLMAN POWER PRODUCTS CORP		
ACTIVITY Number:	Requester:		
15406	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-5

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 6

No CHARGES

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:27 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
Investigate reason breaching ducts are separating from the liner.
Devise repairs and or replacement

PAR Number:	Area: Outside Contractor Resources	Skills Requirement	Quantity Hours
914 512 44 --210	Plant Boilers PULLMAN POWER PRODUCTS CORP		
ACTIVITY Number:	*Requester:*		
15406	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-6

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 7

No charges

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:27 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date:	Teco Labor:		
Approved By:			

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
Repair the upper concrete lintel beam on the upper opening.

PAR Number:	Area: Outside Contractor Resources Plant Boilers PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
914 512 44 --210			
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-7

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 8

NO charges

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:28 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

CHECK YOUR TAGS | Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
Sandblast, repair, and recoat the two concrete sill beams,

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
914 512 44 --212	Plant Maintenance - Boilers AVALOTIS PAINT CO.		
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-8

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 9

NO CHARGES

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:29 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Teco Labor	$.00
Planned By:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:	Teco Labor:	Teco Other Material	$.00
Approved By:		Contract Labor	$.00
CHECK YOUR TAGS	Tag #:	Contract Material	$.00
		Contract Eqpt Rental	$.00
		Estimates Total:	$.00

Description of Work to be Performed for this Task:
Remove all debris from the base of the chimney

PAR Number:	Area: Contractor Services FGD Maintenance THE INDUSTRIAL COMPANY	Skills Requirement	Quantity Hours
915 512 44 --212			
ACTIVITY Number:	Requester:		
15406	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-9

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 10

NO CHARGES

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:30 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified
	Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
CHECK YOUR TAGS	Tag #:		Contract Material	$.00
			Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
replace the four louvered vents near the top of the chimney with SS

PAR Number:	Area: Big Bend Outage Work (Contractor	Skills Requirement	Quantity Hours
922 512 44 --002	PULLMAN POWER PRODUCTS CORP		
ACTIVITY Number:	Requester:		
15406	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-10

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 11

No charges

Equipment Description: BB #3 Stack	Date Opened: Jan 9, 2004 10:34 AM
Equipment Name and Failed Component: USA / Florida / Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Teco Labor	$.00
Planned By:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:	Teco Labor:	Teco Other Material	$.00
Approved By:		Contract Labor	$.00
CHECK YOUR TAGS	Tag #:	Contract Material	$.00
		Contract Eqpt Rental	$.00
		Estimates Total:	$.00

Description of Work to be Performed for this Task:
Replace the missing lightning protection air terminals

PAR Number: 922 512 44 --002	Area: Big Bend Outage Work (Contractor PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-11

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 12

NO charges

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:35 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:			Teco Labor	$.00
Planned By:	Teco Labor:	Total Job Hours Total Man Hours	Teco Material	$.00
Planned Date:			Teco Other Material	$.00
Approved By:			Contract Labor	$.00
			Contract Material	$.00
CHECK YOUR TAGS	Tag #:		Contract Eqpt Rental	$.00
			Estimates Total:	$.00

Description of Work to be Performed for this Task:
Coat the liner interior to prevent further acid permeation.

PAR Number:	Area: Contractor Services Plant Maintenance - Boilers AVALOTIS PAINT CO.	Skills Requirement	Quantity Hours
914 512 44 --212			
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-12

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 13

No charges

Equipment Description:	Date Opened:
BB #3 Stack	Jan 9, 2004 10:37 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Planning in Proc Approver: Approved: Priority: High Condition: Outage Outage Code: None specified Reason:

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Total Job Hours	Total Man Hours
Planned By:	Teco Labor:		
Planned Date:			
Approved By:			

CHECK YOUR TAGS — Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

Description of Work to be Performed for this Task:
Remove permeated acid residue from liner exterior

PAR Number:	Area: Outside Contractor Resources	Skills Requirement	Quantity Hours
914 512 44 --210	Plant Boilers PULLMAN POWER PRODUCTS CORP		
ACTIVITY Number:	Requester:		
15406	Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-13

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 14

Complete on another work order

Equipment Description: BB #3 Stack	Date Opened: Jan 9, 2004 10:38 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:	Total Job Hours	Total Man Hours
Planned By:		
Planned Date:	Teco Labor:	
Approved By:		

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(PULLMAN) - Clean and repair all interior ladders and platforms after liner has been repaired and cleaned.

PAR Number: 914 512 44 --211	Area: Contractor Services Plant Maintenance - Boilers PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-14

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 15

NO charges

Equipment Description:	Date Opened:
BB #3 Stack	Jan 4, 2006 11:41 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:
Planned By: Alvarez, Tony
Planned Date: 01/10/06 09:03:01
Approved By:

	Total Job Hours	Total Man Hours
Teco Labor:		
Contractor Labor:	.0	96.0

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$77,700.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$77,700.00

CHECK YOUR TAGS Tag #:

Description of Work to be Performed for this Task:
(PULLMAN) - Repair replace failed bands on stack liner. Install safety clips to bands and replace CS with SS allthread on exisitng bands

PAR Number:	Area: Contractor Services Plant Maintenance - Boilers PULLMAN POWER PRODUCTS CORP	Skills Requirement	Quantity Hours
914 512 44 --211			
ACTIVITY Number: 15406	Requester: Price, Kent L.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-15

TECO TAMPA ELECTRIC

Work Order

Number: 1787465
Task: 16

Workers 2-21-06, 2-22, 2-23, 2-24, 2-27, 2-28, 3-1, 3-9, 3-10, 3-13 3-14

Equipment Description:	Date Opened:
BB #3 Stack	Jan 25, 2006 06:36 AM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / UNIT #4 / MAINTENANCE OF BOILER PLANT / COMBUSTION AIR & GAS SYS (FANS/SOOTBLOWE / STACK /	Status: Closed Approver: Approved: Priority: High Condition: Outage Outage Code: Fuel
	Reason: Work Cd 4-'06 Spring

Work Order Problem Description:
Inpsction revealed many issues which need addressed. See the tasks for details.

Estimates:		Total Job Hours	Total Man Hours
Planned By:			
Planned Date: 01/25/06 11:03:37	Teco Labor:		
Approved By:	Contractor Labor:	.0	140.0

CHECK YOUR TAGS Tag #:

Teco Labor	$.00
Teco Material	$.00
Teco Other Material	$.00
Contract Labor	$4,065.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$4,065.00

Description of Work to be Performed for this Task:
(TIC) Assist Pullman with inspection. Allow 1 man x (14) 10hr shifts

PAR Number:	Area: Contractor Services	Skills Requirement	Quantity Hours
914 512 44 --211	Plant Maintenance - Boilers THE INDUSTRIAL COMPANY		
ACTIVITY Number: 15406	Requester: Peeples, Jr., Robert G.		

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1787465-16

TECO TAMPA ELECTRIC

Work Order

Number: 1783897
Task: 1

Equipment Description: A Vacuum Filter	Date Opened: Dec 19, 2003 09:06 PM
Equipment Name and Failed Component: Hillsborough County / BIG BEND STATION / COMMON (UNIT #9) / MAINTENANCE OF BOILER PLANT / #1 Thru #4 FGD COMMON SYSTEMS / FINAL GYPSUM DEWATERING SYSTEM / ROTARY DRUM VACUUM FILTER 4-FDS-FLTM-1A / CLOTH, A. ROTARY DRUM VACUUM FILTER - UU /	Status: Closed Approver: Approved: Priority: Emergency Condition: Non Outage Outage Code:
	Reason: FGD Deintegration

Work Order Problem Description:
A Vacvuum Filter has broken a string and we need cloth and string changed

Estimates:
Planned By: Bulnes, George L.
Planned Date: 12/20/03 03:28:54
Approved By:
Teco Labor:
Total Job Hours Total Man Hours

CHECK YOUR TAGS
Tag #:

Teco Labor	$.00
Teco Material	$896.54
Teco Other Material	$.00
Contract Labor	$.00
Contract Material	$.00
Contract Eqpt Rental	$.00
Estimates Total:	$896.54

Description of Work to be Performed for this Task:
replace cloth

PAR Number: 915 512 85 --050	Area: Mechanical Maintenance FGD Mechanical Maintenance PERSONNEL MANAGEMENT INC.	Skills Requirement Quantity Hours
ACTIVITY Number: 15029	Requester: Shockley, Leslie R.	

Complete Description of Work Performed:

Completed By:	Date:

Task Print for 1783897-1