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April 9, 2021

ELECTRONIC FILING

Mr. Adam J. Teitzman, Commission Clerk
Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: Docket 20210034-EI, Petition for Rate Increase by Tampa Electric Company

Dear Mr. Teitzman:

Attached for filing on behalf of Tampa Electric Company in the above-referenced docket is the Direct Testimony and Exhibit of Charles R. Beitel.

Thank you for your assistance in connection with this matter.

(Document 19 of 34)

Sincerely,

J. Jeffry Wahlen

JJW/ne
Attachment

cc: Richard Gentry, Public Counsel
Jon Moyle, FIPUG

BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 20210034-EI

IN RE: PETITION FOR RATE INCREASE

BY TAMPA ELECTRIC COMPANY

DIRECT TESTIMONY AND EXHIBIT

OF

CHARLES R. BEITEL

ON BEHALF OF TAMPA ELECTRIC COMPANY

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED DIRECT TESTIMONY

OF

CHARLES R. BEITEL

ON BEHALF OF TAMPA ELECTRIC COMPANY

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

A. My name is Charles R. Beitel. My business address is 55 East Monroe Street, Chicago, IL 60603-5780. I am Senior Vice President & Project Director for Sargent & Lundy.

Q. Please provide a brief outline of your educational background and business experience.

A. I have a Bachelor of Science degree in mechanical engineering from the University of Missouri, and I am a licensed professional engineer. In the course of my twenty-five-year career in the power industry I have served as a mechanical engineer, on-site field engineer during construction, project manager, director, and vice president for a large variety of projects in the electric power industry. This includes new construction of generating facilities (coal and gas fired), large scale environmental air quality control systems, plant services betterment and

upgrades, multiple plant demolition studies and evaluations, and a large amount of project cost estimating services for the above array of projects.

Q. What are the purposes of your direct testimony in this proceeding?

A. The purposes of my prepared direct testimony are to (1) discuss the dismantlement studies Sargent & Lundy conducted for Tampa Electric and submitted to the Commission on December 30, 2020 in Docket No. 20200264-EI and (2) support the reasonableness of our dismantlement study costs included in the company's rate request in this docket.

Q. Have you prepared an exhibit to support your direct testimony?

A. Yes. Exhibit No. CRB-1 was prepared under my direction and supervision. My exhibit consists of two documents:

Document No. 1	Big Bend Power Station Unit 1 and 2 Dismantling Study
Document No. 2	Big Bend Power Station Unit 3 Dismantling Study

Q. What dismantlement studies did Sargent & Lundy perform for Tampa Electric?

A. We performed two dismantlement studies, one for Big Bend Power Station ("Big Bend") Units 1 and 2 and one for Big Bend Unit 3.

Q. What was the reason for performing two dismantlement studies as opposed to a single study addressing all three units?

A. At the time Tampa Electric engaged Sargent & Lundy to perform a dismantlement study for Big Bend Units 1 and 2, the company had not finalized its plans with respect to Big Bend Unit 3. After the dismantlement study for Big Bend Units 1 and 2 was nearly completed, Tampa Electric engaged Sargent & Lundy to perform the dismantlement study for Big Bend Unit 3.

Q. What were the purposes of the two dismantlement studies you performed?

A. The purposes of both studies were the same. We were asked to document the scope, strategy, costs, cash flows, and provide recommendations for execution of selective

dismantlement of Big Bend Units 1 and 2 in the first study and Big Bend Unit 3 in the second study.

Q. What are the differences in the preparation of the Big Bend Unit 3 dismantlement study, compared to the Big Bend Units 1 and 2 study?

A. Apart from fundamental differences in the installed systems and equipment of the operating units, the primary difference between the two studies is that in the Units 1 and 2 study, the Unit 1 turbine equipment and auxiliaries are to remain in service since this turbine generator is being heavily modified and "repowered" with natural gas fired combined cycle technology as part of the Big Bend Modernization project.

Q. How do the two studies differ from a standard dismantlement study?

A. A "standard" dismantlement study of this type would involve wholesale demolition of an entire facility. Dismantlement of Big Bend Units 1 and 2 as well as Unit 3 are a selective demolition of certain portions of the facility, given that some equipment and operating units at this site must continue uninterrupted, safe operation during and after the

demolition activities have taken place. Selective demolition requires a site-specific understanding of the overall design of the facility structure and process systems and an ability to detangle the physical infrastructure that must remain in operation from the portions that are being demolished, from a structural, mechanical, electrical, and controls perspective. An example of this is the coal tripper conveyor structure and systems which will only serve Unit 4 following dismantlement yet are structurally integral to Units 1, 2, and 3. The costs for selective demolition are substantially higher than for wholesale demolition for the reasons I previously mentioned, and given that new structural reinforcements, electrical and control feeds, and process systems are required in certain cases to provide for the aforementioned safe uninterrupted operation of the balance the facility.

Q. Did Sargent & Lundy utilize the same processes, apply the same standards and methods, and utilize the same types of data, key assumptions, and cost estimates for both the Big Bend 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study?

A. Yes, we did.

Q. What process did you follow in preparing the Big Bend Units 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study?

A. Sargent & Lundy has developed our process of demolition scoping and estimating over the course of over two hundred evaluations and estimates performed for power industry clients. We utilize staff that are well versed in power plant design and construction to develop a site-specific plan for the required selective dismantlement. From this plan, our teams use our firm's knowledge of the quantities of materials (concrete, steel, pipe, electrical, etc.) present to prepare detailed "bottoms up" demolition estimates of the work required, factoring in benchmarked labor rates, specialized knowledge to remove equipment containing certain materials, scrap value, and the addition of any new materials, systems, and equipment that must be installed to facilitate uninterrupted, safe operation of the balance of the facility. Our plans and estimates are checked in a "top down" manner against past similar work performed by our firm and our clients, scaled appropriately for unit size.

Q. Are there industry-standard methods used when preparing such studies?

A. Yes. Various organizations and industry committees provide guidance, recommendations, position papers, and lessons learned for the demolition planning and estimating methods that are utilized in a study of this nature. Sargent & Lundy has had continuous participation in national and international technical groups and advisory committees of this type, including the Construction Management Association of America ("CMAA"), Electric Utility and Environmental Conference ("EUEC"), American Nuclear Society ("ANS"), International Atomic Energy Association ("IAEA"), Health Physics Society ("HPS"), Organisation for Economic Cooperation Nuclear Energy Agency ("NEA"), and we include such input into our approach and procedures for performing such work.

Q. Did you apply these industry standards when preparing Tampa Electric's Big Bend Units 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study?

A. Yes, we relied on these standards.

Q. Did Tampa Electric provide data to you for use in the Big Bend Units 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study?

A. Yes.

Q. What data did the company provide?

A. Tampa Electric provided guidance regarding the specific areas of the facility that were to remain in safe, uninterrupted operation during and after dismantlement, as well as input regarding scope and costs for asbestos removal, disposal of consumables, and owner's costs that were factored into our estimates. Tampa Electric stakeholders also collaborated with Sargent & Lundy staff regarding the selection of an appropriate overall contingency based on the level of certainty in the study efforts.

Q. Please describe the key assumptions of the Big Bend Units 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study.

A. Assumptions regarding scrap value, forecasted escalation, and certain labor cost parameters were made as documented. See Section L of each report, included as Document Nos. 1 and 2 of my exhibit, for a concise list of technical assumptions.

Q. How were costs estimated for purposes of the Big Bend Units 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study?

A. As stated earlier, based on the site-specific demolition scope, our teams use our firm's knowledge of the quantities of materials (concrete, steel, pipe, electrical, etc.) present to prepare detailed "bottoms up" demolition estimates of the work required, factoring in benchmarked labor rates, scrap value, and the addition of any new materials, systems, and equipment that must be installed to facilitate uninterrupted and safe operation of the balance of the facility. Our plans and estimates are checked in a "top down" manner against past similar work performed by our firm and our clients, scaled appropriately for unit size.

Q. What are the results of the Big Bend Units 1 and 2 dismantlement study?

A. The selective dismantlement costs for Units 1 and 2 are based on the April 2020 and November 2021 retirement dates for Units 1 and 2, respectively. The total cost estimate is $81,816,224, including engineering, demolition, and pre- and post-demolition costs.

The engineering phase includes developing the scope of work, performing detailed engineering for modifications, developing the specifications, bidding the contracts, and evaluating proposals. Pre-demolition activities required to prepare for demolition include removing consumables, remediation of material containing asbestos, adding bracing, and relocating utilities. Demolition is the physical removal of the identified equipment and structures while allowing the rest of the plant to continue safe, reliable operations. Post-demolition activities are actions necessary to leave the site in a safe, usable site with proper drainage and access.

The selective dismantlement costs by unit follow, and the study is provided as Document No. 1 of my exhibit.

	(000)
Unit 1	$35,075
Unit 2	$46,740

Q. What are the results of the Big Bend Unit 3 dismantlement study?

A. The selective dismantlement costs for Unit 3 are based on its April 2023 retirement date. The total cost estimate is $50,568,243, including engineering, demolition, and pre-

and post-demolition costs. These phases are as previously defined for the Units 1 and 2 dismantlement study. The study is provided as Document No. 2 of my exhibit.

Q. Is it your conclusion that the Big Bend Units 1 and 2 dismantlement study results and those of the Big Bend Unit 3 dismantlement study are reasonable estimates?

A. Yes, the Big Bend Units 1 and 2 dismantlement study and the Big Bend Unit 3 dismantlement study results and cost estimates are reasonable and are useful for planning purposes. It is appropriate for the company to rely on these estimates for inclusion in their dismantlement reserve needs. The subject estimates have been benchmarked against real world projects of similar scope, including past similar work performed at Tampa Electric's former Gannon Station which was converted to the Bayside Station.

Q. Please summarize your direct testimony.

A. My direct testimony describes Sargent & Lundy's work in performing two dismantlement studies for Tampa Electric, one addressing the selective dismantlement of Big Bend Units 1 and 2 and one addressing the selective dismantlement of Big Bend Unit 3. I describe Sargent & Lundy's

qualifications and my experience performing dismantlement studies. I also explain the processes, industry standards and methods, data analyses, key assumptions, and cost estimates Sargent & Lundy utilized for both dismantlement studies. I conclude that the study results and cost estimates for both studies are reasonable, are useful for planning purposes, and are appropriate for Tampa Electric to rely on in determining their dismantlement reserve needs.

Q. Does this conclude your direct testimony?

A. Yes.

DOCKET NO. 20210034-EI
WITNESS: BEITEL

EXHIBIT

OF

CHARLES R. BEITEL

ON BEHALF OF TAMPA ELECTRIC COMPANY

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BIG BEND POWER STATION
Tampa Electric Company

UNIT 1 AND 2 DISMANTLING STUDY

BASIS OF COST ESTIMATE & SCOPE OF WORK

REV. 1, DECEMBER 28, 2020

FOR USE

Project No.: A09476.301

Prepared by:

Sargent & Lundy

55 East Monroe Street • Chicago, IL 60603 USA • 312-269-2000

Table of Contents

Attachments:

1. Cost Estimate Summary, Cash Flow and Individual Estimates
2. Boiler Building Demolition and Bracing Schematics
3. Dismantling Sequence Schedule
4. Repowering List
5. Pullman Chimney Demolition Budgetary Quote
6. Application of Gannon Lessons Learned to Big Bend Dismantling

EXECUTIVE SUMMARY

This report documents the scope and cost associated with partial dismantlement of Big Bend Units 1 and 2. An extensive study was completed during 2018 and included Units 1 through 3. This 2020 version is an update to reflect 1) changes in the retirement schedule, 2) eliminate Unit 3 from the scope, 3) address recent 2020 TEC comments, 4) incorporating additional lessons learned from Gannon dismantling and 5) new coal yard partial dismantlement. In addition, modifications to the cost estimate categorizes the costs into the project phases. Cash flows have also been broken down into quarters rather than a monthly basis.

Detail of the five significant changes are:

1 - The schedule used in developing the cash flows utilizes an April 2020 retirement date for Unit 1 and a fourth quarter 2021 retirement for Unit 2. The Unit 1 retirement date has been moved up 15 months from the 2018 study and Unit 2 has been pushed back approximately four months.

2 - The 2018 Dismantlement Study included Unit 3, which has been eliminated from the current dismantlement plan. As such, the slag dewatering facility that serves Units 1 through 3 has been removed from the demolition estimate.

3 - The dismantlement effort has changed hands internally with TEC and that has led to new comments to the 2018 Dismantlement Study as well as better maintenance areas for Unit 1 turbine deck. Turbine deck openings where the turbine-generator and other areas can be filled in with beams and grating, which will reclaim approximately 4,300 square feet of usable maintenance space during major U1 turbine outages.

4 - Gannon lessons learned were passed on to the project during the 2018 Dismantlement Study. Some of the lessons were incorporated into the cost estimates, but the lessons were not explicitly discussed the report. Attachment 6 has been added to identify whether each of Gannon's lesson learned has been account for in the estimate, will require consideration during detailed engineering, or should be required as contractor scope.

5 - Coal yard partial dismantlement was a late addition to the 2020 estimate and added significant additional costs. The assumptions with this area will be reviewed during a TEC internal meeting on June 29.

New estimating categories are established to segregate each unit costs into the suggested project four phases: engineering, pre-demolition, demolition, and post-demolition. The previous cost estimate only segregated each unit into either demolition or addition activities.

The electrical work to maintain operability of remaining equipment was re-evaluated by staff knowledgeable with BB Modernization electrical scope. In 2018 the modernization project was in progress for determining the scope of modifications to the electrical systems of Unit 1 associated with the repowering of the steam turbine. The Modernization project is now advanced to a point where assumptions no longer need to be made for estimating the Unit 2 costs and remaining Unit 1 cost related to repowering essential equipment not addressed by U1 Modernization. This thorough effort to establish electrical cost has been reviewed with Big Bend electrical staff and the changes incorporated into the cost estimates.

A summary of the costs associated with each unit for the four categories:

	Unit 1	Unit 2
Engineering[4]	$3,402,450	$3,893,150
Pre-Demolition[4]	$4,569,293	$14,682,411
Demolition[4]	$22,362,788	$23,126,554
Post-Demolition[4]	$4,835,665	$5,632,435
Total each unit	$35,170,196	$47,334,550
Cost Adjustments[7]	$(95,336)	$(593,186)
Adjusted Total each unit	$35,074,860	$46,741,364
Adjusted Total for both units	$81,816,224*	

*Notes on cost summary:

1. The above totals do not include scrap value for the demolition materials. Scrap pricing is volatile and should not be relied upon to reduce the cost of the project during the planning phase.
2. The total cost for dismantlement of Units 1 and 2 has increased by 6.8% ($5.23 million) from the 2018 estimate. Project directs, indirects and contingency increased $8.75 million but were partially offset by a reduction in escalation of $3.52 million.
3. Unit 2 costs are higher primary due to new electrical equipment and cables needed for pre-demolition. The direct costs of U2 electrical are about $6.4 million higher than Unit 1.
4. Each of these estimates is based on a 20% contingency, consistent with the 2018 estimate. See page 30 (Attachment A) for a further breakout of contingency, escalation, general conditions, direct and indirect costs. During early 2020 TEC had site meetings with potential demolition contractors on the scope and economic feasibility of the dismantlement effort. Based on these meetings and the contractor's similar project experience, it was recommended to reduce the contingency to 15%. The 5% reduction to contingency is not included in the detailed cost estimates but has been included as a "Cost Adjustments" in the table above and in the Attachment 1 cost summary page.
5. Proposed coal yard changes due to reduced fuel requirements make possible the removal of unnecessary coal yard equipment and backfilling/grading the northern third of the coal storage area. High level costs have been assigned to the identified equipment removals and regrading of the area. The coal yard demolition and regrading amount to direct costs of $4.3 million split equally between Units 1 and 2 in the demolition cost estimate.
6. For the 2020 electrical review with TEC, direct costs increased by about $1.6 million due to additional large cables for electrical redundancy. Added 48,000 LF of 500 kcmil cables from U1 to U3/U4.
7. "Cost Adjustments" include the reduction of contingency and an allowance for Turbine Building ventilation improvements, which includes contingency and escalation.

Schedule

The schedule of the dismantlement end date was reviewed with TEC in April and this estimate assumes a completion date of third quarter 2024 and project is started in September 2020. It is recommended to have engineering for the additional electrical feeds and structural bracing be started in the Fall of 2020. These systems are part of the “Pre-demolition” scope that is required to be installed prior to dismantlement of these key structures and systems.

Basis of Estimate – Big Bend Dismantling Units 1-2

Estimates:

Cost estimates associated with this study are as follows.

35156A – Unit 1 Pre-Demolition Modifications
35157A – Unit 1 Demolition
35158A – Unit 1 Post Demolition
35159A – Unit 1 Engineering Demolition Support
35160A – Unit 2 Pre-Demolition Modifications
35161A – Unit 2 Demolition
35162A – Unit 2 Post Demolition
35163A – Unit 2 Engineering Demolition Support
34565B – Scrap Value

A summary of the estimated costs, cash flow and the estimates are included as Attachment 1. Given that the basis of this project consists of a “decoupling” followed by “demolition”, the costs are substantially higher than would be the case for pure demolition. Total rounded off cost for each unit without scrap value:

Unit 1 $35,075,000

Unit 2 $46,740,000

These values are considered appropriate for project planning purposes. **Opportunities for savings during the course of demolition project execution do exist, and include but are not limited to the following:**

- Optimization of the project execution plan in the early phase of the project. This includes detailed scope development, refinement of the schedule as well as the contracting plan through a well-conceived division of responsibility.
- Use of competitively bid, firm price construction work packages, based on “issued for construction (IFC)” level engineering deliverables, rather than vague references to perceived scope or material takeoffs that create opportunities for contractor change orders.
- Developing a collaborative, value-based working relationship with the successful construction teams, via immediately responsive and capable engineering and construction management staff from both of our organizations. TEC and S&L have a long history of doing this and this project should be no exception.
- Identification of the high value scrap commodities and the means to maximize payback to TEC, at the appropriate time during execution.

We are fully prepared to facilitate the development of these and other cost savings opportunities during the course of project execution.

A. General Information

Big Bend Station is located in Hillsborough County Florida, just north of Apollo Beach. There are four coal-fired boiler units. Units 1 and 2 are to be modernized to a single two-on-one combined cycle configuration utilizing Heat Recovery Steam Generators (HRSG) and a single Steam Turbine Generator (STG) located in the current Unit 1 STG location (Modernization Project). The commercial operation date for the full modernization improvements is January 2023.

Commissioning of Units 1 and 2 occurred 1970 and 1973, respectively. Both units are comprised of 440 MW Riley Power Turbo-Fired Boilers, which have the capability to co-fire natural gas as well. Each unit has an Electrostatic Precipitator (ESP) and Selective Catalytic Reduction (SCR) system with associated ductwork and support structures. The two units share a Flue Gas Desulfurization (FGD) system with a shared chimney.

Project location – 13031 Wyandotte Road, Apollo Beach, FL 33572
Contracting strategy – Multiple lump sum

Decommissioning and Dismantlement Plan (D&D Plan)

Unit 1 has officially ceased operation as of April 2020 and Unit 2 will cease operation the fourth quarter of 2021. The Dismantling Project's scope for Units 1 and 2 is to remove equipment and structure down to the top of foundation to the greatest extent possible while maintaining full function of the turbine building and coal feed conveyor in support of Units 3 and 4. The Modernization Project is responsible for decommissioning and dismantling Unit 1 areas north of column row F½; therefore, cost associated with Unit 1 north of column row F½ will not be part of the dismantling study.

Modifications are not required to common systems such as coal delivery, storage and feed limestone preparation, gypsum dewatering, workshops, warehouses or ponds. However, such systems must be maintained, and many are powered from Unit 1. For example, the coal handling and storage is electrically fed from Unit 1 and that power feed will need to be maintained by the Modernization Project.

The objective of the Decommissioning and Dismantlement (D&D) Plan is to provide information for planning, cost estimating and execution of the Dismantlement of the Big Bend Units 1-3. The dismantlement activities will be performed on an operating power plant site so methods will be restricted so as not to interfere with generating operations or damage infrastructure and systems that are to remain in service.

Given the precise nature of this demolition, it is important that contractors be pre-qualified to ensure that only capable contractors with a good safety record and similar experience be allowed to bid the work. Contractors will be required to consider:

- Effects of ground bearing from demolition equipment on underground utilities, sumps, and the seawall
- Prevention of iron dust in wastewater and storm water drains with regular housekeeping
- Productivity due to LOTO constraints
- Limit vibrations of the demolition due to operating equipment for the remaining unit(s)
- Structural stability during removal of equipment and structures
- Impact of demolition equipment on underground pipes and sumps

- Maintain function of floodwalls and site drainage, being careful not to damage the wall or plug up the drains with debris

TEC is evaluating closure of the northern third of the coal yard operation. A study report created by CBCL Limited provides five options with TEC indicating Option 4 to be preferred. With less coal being consumed due to the retirements, there is not the same need for on hand storage of fuel. TEC requested S&L to incorporate costs for demolition of conveyors, transfer towers and buildings that will no longer be required for operations. The demolition costs for these items is included in the estimates and split equally between Units 1 and 2. However, this CBCL information was made available toward the end of the study and has not been developed to the same level of detail as the remainder of the estimate. Based on CBCL Limited's Option 4, a listing of structures included for demolition is included in Part C, Paragraph 1.c.ii.

The coal yard portion of the study has not been developed to the same level of detail as the other costs presented in the estimates. The costs were prorated from another dismantlement project using bid quotes for the coal yard and upscaling to the Big Bend scope. Additional costs for new conveyors, modifications to existing transfer towers, modification to chute work, permitting or stormwater modifications of the coal yard changes have not been considered as the demo scope. TEC will need to assess the extent of demolition considered and advise if changes are required.

The execution of the dismantling project is broken into four phases.

1. Engineering

   This first phase will develop the scope of work, perform detailed engineering for modifications, develop the specifications, bid out the contracts and evaluate proposals. Work is split between TEC internal staff and an outside engineering firm.

2. Pre-Demolition Construction

   This phase begins preparation for the demolition process with activities to remove consumables, remediate asbestos containing material (ACM), add bracing, and relocate utilities.

3. Demolition

   Physical removal of equipment and structures.

4. Post-Demolition

   Activities required to leave the site in safe, usable state that allows for proper drainage and access.

A level 2 schedule has been developed to illustrate a logical progression and duration of activities. This schedule is included as Attachment 3. **Figure 1** provides a visual of the general sequence of demolition for the major backend structure of Units 1 and 2. Sequenced areas are numbered 1 through 12.

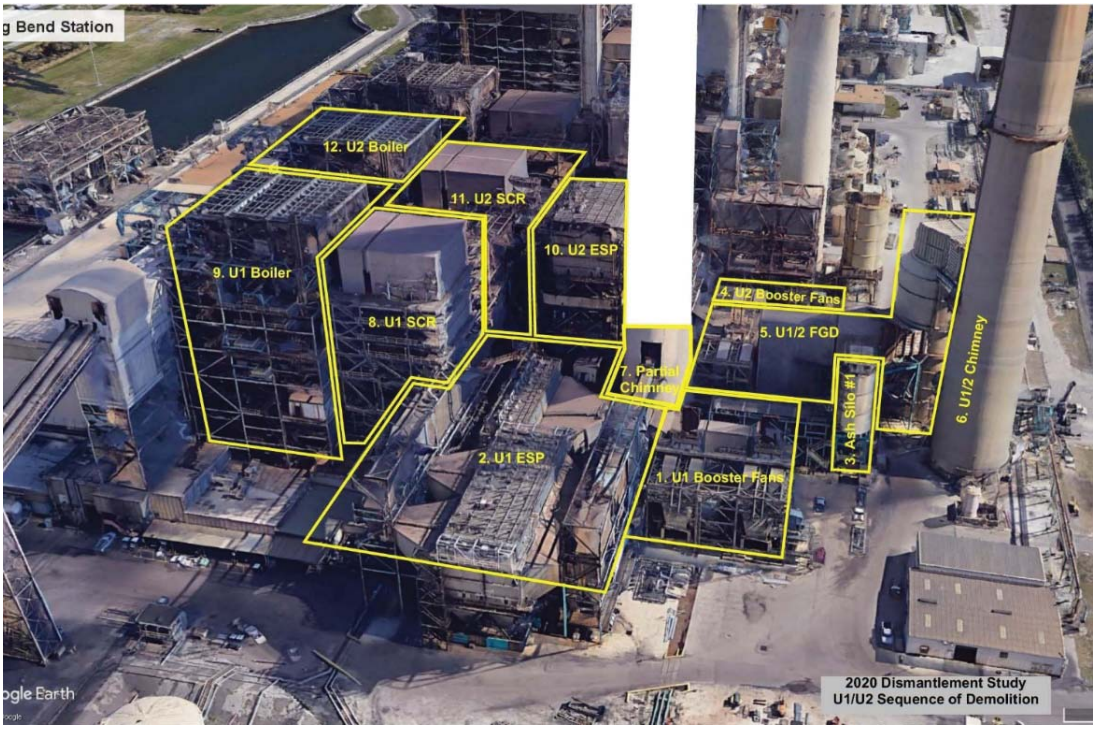


Figure 1 – Demolition Sequence of Units 1 and 2 Backend Major Structures

Phase 1 – Engineering activities

- Secure all necessary permits and authorizations.
- Perform Environmentally Regulated Material Survey
- Conduct a detailed study to determine the method by which the existing equipment and systems will be repowered when the existing unit power distribution system is removed from service.
- Conduct a detailed study of the fire protection system to identify those portions of the existing system that will need to be preserved.
- Conduct a detailed study of all high energy systems and utilities to identify “air gap” points that the owner will be responsible to isolate services suppling the equipment and facilities to be dismantled. Systems should include electrical power, steam, compressed gases and air, water including fire protection and any other utilities present in the impacted area.
- Design new power distribution system to equipment that remains in service.
- Design drainage and stormwater modifications for northern third of the coal yard no longer required.
- Develop a list of services and material that TEC will provide to the contractor.
- Develop a list of materials, equipment and services that the contractor is responsible to provide as part of the scope.
- Hazardous material mitigation plan for pre-demolition activities and development of mitigation procedure to support dismantlement activities

- Design vertical bracing additions to ensure stabilization of structures after removal of the boiler building structure (See "blue" braces in **Figure 2 as a typical braced row**).

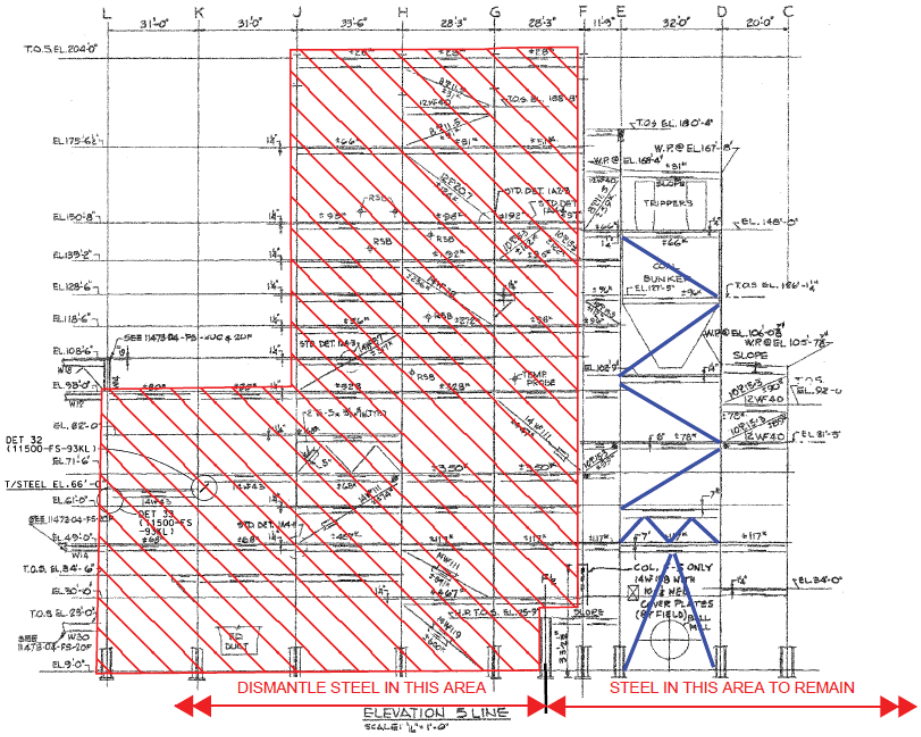


Figure 2 – New Vertical Bracing and Boiler Steel Demolition

- Develop a procurement package for supply and installation of new elements necessary to complete the dismantlement (vertical bracing, power distribution, piping, etc.).
- Develop a procurement package for the dismantlement.

Phase 2 – Pre-dismantlement activities

- Removal of hazardous materials such as ash and SCR catalyst. Drain and decontaminate all equipment and piping, which includes removal of all liquids, gas and solids.
- Abatement of ACM once removal of all the other waste materials is complete.
- Install new vertical bracing to stabilize the Turbine Building prior to removing the boiler area steel (**Figure 2**) in several braced rows.
- "Air Gap" all energy systems.
- Install new power distribution necessary to maintain essential services.
- Mark dismantlement area and contractor access routes. Mark plant personnel access requirement in the impacted area.

Phase 3 – Demolition activities

- Development of a one acre Scrap processing area where materials will be sorted and placed in bins for recycling. See **Figure 3** for plan view of potential scrap processing area.

Figure 3 – Demolition Scrap Processing Area (Outage Laydown Area)

- Removal of Unit 1 booster fans and ESP.
- Removal of transformer and intake area equipment.
- Removal of the Unit 1&2 FGD with the exception that the electrical building is to remain for powering essential equipment (**Figure 4, next page**).
- The combined Unit 1&2 chimney demolition will begin once the Unit 1&2 FGD demolition is complete.
- Removal of Ash Silo #1, Unit 2 booster fans and ESP.
- Demolition of the partial chimney.
- Removal of the Unit 2 Turbine area equipment may begin once the ACM is abated.
- Fill Unit 2 circulating water intake and discharge lines with flowable fill and remove the discharge flume (**Figure 5, next page**).
- Partial demolition of select coal yard conveyors, transfer towers and buildings as well as regrading and seeding the area for proper drainage.

Figure 4 – Units 1 and 2 WFGD Electrical Building-to remain

Figure 5 – Unit 1 and 2 Circulation Water Discharge Area

- After ACM abatement, begin removal of Unit 1&2 back end equipment and steel starting from the south and working north. Portions of the boiler area stairs will need to remain in place until the new stair towers can be built in order to maintain adequate egress from the Tripper Room.
- Remove Unit 1&2 pipe support steel from the Turbine Building roof to the area above the Tripper Room roof.
- Remove the Unit 2 cooling tower.

Phase 4 – Post-Demolition activities

- Install new passenger elevator between Units 1 and 2.
- Install new stair tower between Units 1 and 2.
- In fill of floor openings needs to occur immediately after equipment removal. The operating floor of the Unit 2 Turbine Building has large areas that will be filled in with grating to promote storage area and space for outage maintenance, about 5,700 SF. See **Figure 6** for operating floor areas to be filled in with grating.
- Perform Unit 1-2 Boiler area paving to promote area drainage.
- Repair any flood wall damage.
- Inspect and clean out site drains.
- Repaint remaining indoor and outdoor structural steel.
- Close wall openings created in the south wall of the Turbine building after removing equipment.
- Install new area lighting.
- Perform roof repairs.

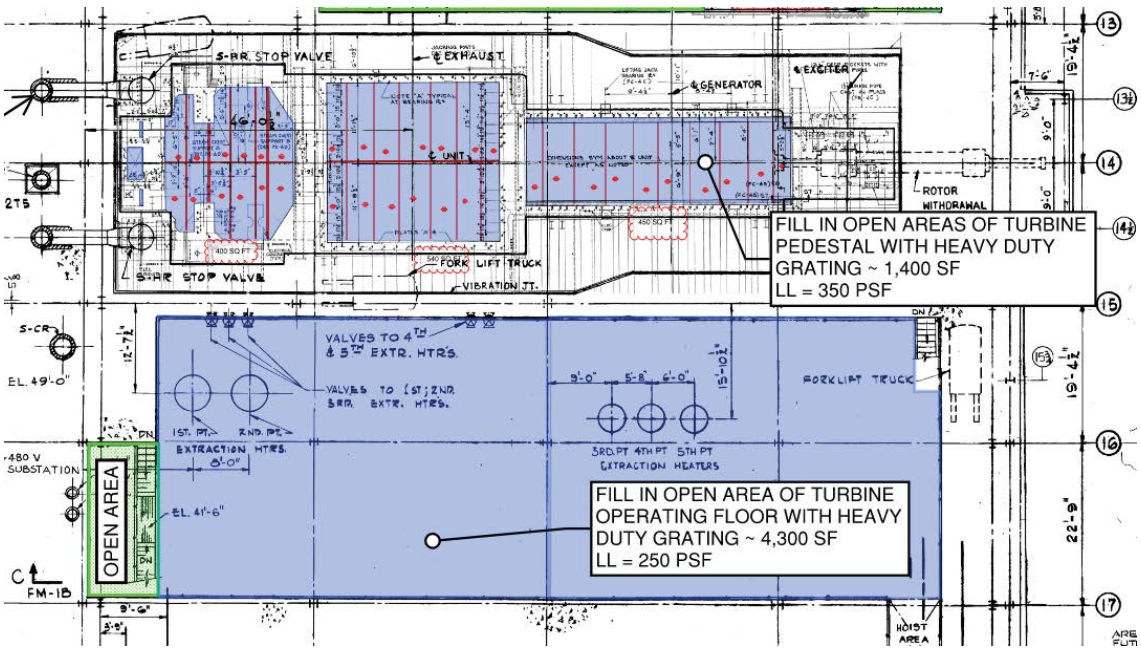


Figure 6 – Turbine Building Operating Floor In-Fill Areas

B. Estimate Approach

The cost estimate is based largely on Sargent & Lundy's experience on similar projects as well as our past project experience at the Big Bend station. This study is not a detailed engineering document, but a cost estimate prepared in advance of the detailed engineering preparations that will be necessary to carry out the full dismantling activities.

Some preliminary engineering was utilized to develop the conceptual modification to lateral load resisting system for the remaining structures and the power distribution system for remaining Unit 1 and 2 equipment that must be repowered. S&L assigned allowances where necessary to cover issues that lack full development at this time. TEC supplied the costs for ACM abatement, removal of hazardous liquids and waste in 2018.

Dismantlement estimates normally achieve a Class 4 level by applying scaling factors to account for size of unit in comparison to demolition costs developed from a past reference project. This estimate uses better-defined quantities to account for known aspects of the equipment and structure slated for removal. The goal is to estimate a level of detail necessary to achieve an estimate in line with Class 3 accuracy.

Project methods to attain this accuracy are:

Electrical:

- The demolition is covered by concentrating on large equipment (large transformers and isophase bus duct systems) using drawings and data.
- Remaining electrical equipment and commodities are included in the demolition quantities used in the estimating group's base estimate, which is used to ratio demolition costs.
- The approach accounts for relighting areas that remain in use or are repurposed after the dismantling. The estimate will include new fixtures and equipment as necessary. The extent of the scope and quantities will be developed based on conceptual engineering.
- The approach to repower any loads that will need to remain in use after the dismantling will be using new cable, raceway, and electrical equipment as necessary. The extent of the scope and quantities will be developed based on conceptual engineering and re-verification of the 2018 assumed scope split between BB modernization and Dismantlement.
- Items that are not quantifiable at this time will be assigned allowances. Such items include lightning protection, DCS modifications, electrical equipment reconfiguration, etc.

Mechanical:

- The demolition estimate for Unit 1 is adjusted to reflect the work covered by the Modernization project (turbine area and mill area north of column row F½) and mechanical equipment that will be left in service (air compressors, sump pumps, building ventilation, etc.) for both units.
- Critical pipe quantities and major equipment tonnages are used to supplement and validate the estimate quantities.
- Based on the information provided by S&L environmental, we will confirm that TEC is managing the SCR catalyst for end of life to coincide with dismantlement, thereby resulting in no salvage value of the catalyst.
- The estimate will not include the design for relocation or re-piping of any mechanical equipment.

- Items that are not quantifiable at this time will be assigned allowances. Such items include new sumps, ventilation equipment, disintegration of Units 3 & 4, etc.

Structural:

- Steel tonnage for the boiler buildings and ESP structures will be estimated based upon the volume of the structure and typical densities of such structures determined from S&L's extensive experience designing these structures.
- Steel & ductwork tonnages for the SCRs were taken from S&L's historical records based upon quantities determined during the design/construction of these structures.
- Steel & ductwork tonnages for the FGD system are determined using a scaling factor applied to known quantities based upon the power generation rating of each unit.
- Demolition estimates for the stacks were obtained from Pullman based upon existing construction documents of the Big Bend stacks.
- Quantities for the demolition of miscellaneous concrete for all units/structures are determined based upon items identified for removal during the site walk down.

Lessons Learned from Gannon:

A listing of lessons learned from the demolition effort of the Gannon Power Plant is included as Attachment 6. The approach that the study has taken to address each of the items is categorized as being addressed by estimate, engineering, or contractor. The intent of each category is the following.

Estimate – indicates that quantities have been included in the estimate to account for that item.

Engineering – indicates an item that will require engineering assessment and direction to the contractor.

Contractor – indicates which items should be specifically included in the contract documentation as part of the contractor's scope.

C. Estimate Scope of Work

In general, all mechanical equipment and facilities used to generate electricity by firing coal will be dismantled for Unit 2. Dismantlement scope for Unit 1 is limited to structures and equipment south of the coal conveyor since the Modernization project is performing modifications to the Turbine Building as part of repowering effort. Continued operation of the repowered Unit 1 turbine, and the continued operation of Unit 3 and Unit 4 require both a careful demolition approach and the need to keep essential systems in operation at the Big Bend station. The turbine building will not be demolished, and the part of the boiler steel required to support the coal conveyors and the turbine building south wall will not be demolished.

The extent of demolition for the units follows these guidelines:

- Removal of hazardous materials, liquids, ash, catalyst and waste materials takes place prior to demolition.
- Demolition will remove as much of the structure as possible up to the tripper support steel. In order to accomplish this, installation of new vertical bracing and a new stair tower is planned. Painting of remaining steel is also included.
- Structures and equipment pedestals will be removed down to the top of foundation.

- Select equipment must remain in service after the demolition. The equipment that serves a common function or is required to stay operational after the dismantlement will be repowered from a new distribution system with new cable routing. See Attachment 4 for a listing of assumptions related to repowering equipment.
- The scope considers removal of the Unit 2 circulating water intake equipment and discharge flume. Filling of the intake and discharge lines with flowable fill is included.
- Demolished equipment and material to be stockpiled by the contractor and disposed by TEC. A one acre scrap processing area at the southeast corner of the coal pile area will be used for this purpose.
- The Unit 2 branch off the existing ammonia loop will be capped. The Unit 1 branch has been modified to supply ammonia to the HRSG SCR as part of the Modernization project. Existing valves on the ammonia loop are to be replaced due to their tendency to leak.
- The natural gas header will be capped downstream of Unit 3.
- One personnel elevator (Unit 1) and one freight elevator (Unit 2) will be removed. A new personnel elevator is included near Unit 2.
- LED fixtures are utilized for any areas requiring new lighting.
- Large floor openings created by equipment removal at the Turbine Operating level will be filled in by grating to provide future storage and outage laydown area.
- The existing flood walls that protect the remaining facilities and area drainage must remain in service after the demolition. The contractor will need to protect both the wall and drainage system from damage during the demolition. Portions of the flood wall that are not required will be removed (i.e., Unit 1 ESP area).
- Removal scope for Unit 2 GSU and SST transformers only extends to the bushings. The high voltage line work will be handled by TEC. The GSU will be saved by TEC and stored in a location on site.

Listed below is a summary level scope (not all inclusive) of facilities included in the estimate:

1. Major Systems Identified for Demolition by Disciplines
    a. Mechanical:
        i. Unit 1
            - Environmentally Regulated Materials removal - All disciplines
                - Survey
                - Pre demolition removal activities
                - On-going removal activities to support dismantlement
            - Ash Handling system
            - Boiler Feed pumps and Auxiliaries
            - Boiler Pressure Systems (steam and water Circuits)
            - Chemical Additive Systems Chemical Feed and water sampling system
            - Combustion air and Gas System (Fans/soot blowers etc.)
            - Controls, Ovation (All systems BBC001)
            - Feedwater System

- Fuel Burning system (Natural Gas Systems): 12” NG pipeline will be capped downstream of Unit 4
- SCR System
- Slag Handling System

ii. Unit 2

- Environmentally Regulated Materials removal - All disciplines
  - Survey
  - Pre demolition removal activities
  - On-going removal activities to support dismantlement
- Ash Handling system
- Boiler Feed pumps and Auxiliaries
- Boiler Pressure Systems (steam and water Circuits)
- Circulating water System
- Chemical Additive Systems
- Chemical Feed and water sampling system
- Combustion air and Gas System (Fans/soot blowers etc.)
- Controls, Ovation (All systems BBC001)
- Feedwater System
- Fuel Burning system (Natural Gas Systems): 12” NG pipeline will be capped downstream of Unit 4
- SCR System
  - Ammonia pipeline to Unit 2 SCR
- Slag Handling System

iii. Unit 1 & 2 Flue Gas Desulfurization System

- Environmentally Regulated Materials removal - All disciplines
  - Survey
  - Pre demolition removal activities
  - On-going removal activities to support dismantlement
- Absorber Tower
- Absorber Agitators
- Absorber Bleed Pumps
- Absorber Ductwork
- Absorber recycle pumps
- Absorber instrument and controls
- Make up water header
- Mist eliminator wash system
- Oxidation air sparger system

- Quenching nozzle spray system
- Reagent Feed Loops
- Continuous emissions monitoring system
- Defoamer Storage tank and pumps
- Forced oxidation blowers
- Unit 1 & 2 Process Gas Flow (dampers)
- Organic acid system
- Primary Dewater system
- Wet chimney
- FGD Common systems are not included in the dismantlement scope
  - Limestone Slurry preparation system
  - Common Gypsum dewatering system

b. Electrical:

i. Unit 1

- 13.8kV Switchgear Bus – 1NPS-SWG-101
- 13.8kV Switchgear Bus A – 1NPS-SWG-102A
- 13.8kV Switchgear Bus B – 1NPS-SWG-102B
- Low voltage switchgears and motor control centers south of column row F½.
- Electrical and control systems associated with the mechanical systems identified in item 1.a.

ii. Unit 2

- Generator 2
- Generator Step up Transformer – MTX2 – to be saved as a spare by TEC
- Station Service Transformer A – SST2A
- Station Service Transformer B – SST2B
- Isolated phase bus duct system
- 4160V Switchgear West Bus – 2NNS-SWGW
- 4160V Reserve Switchgear West Bus – 2RNS-SWGW
- 4160V Switchgear East Bus – 2NNS-SWGE
- 13.8kV Switchgear Bus – 2NPS-SWG-201
- 13.8kV Switchgear Bus A – 2NPS-SWG-202A
- 13.8kV Switchgear Bus B – 2NPS-SWG-202B
- Low voltage switchgears and motor control centers.
- Electrical and control systems associated with the mechanical systems identified in item 1.a.

iii. Reserve Auxiliary System

- Reconfigure to keep in service.

iv. Instrumentation and Controls
- Instruments for all units associated with systems being removed.

c. Structural:

i. Units 1 & 2
- Shared FGD stack
- FGD vessel, ductwork, and structural steel
- SCR reactors, ductwork and structural steel
- Out of service stack
- ESP box, ductwork and structural steel
- Cap and fill circulating water tunnels, Unit 2 only
- Discharge flume, Unit 2 only
- Structural demolition extent
  - Steel removal shall be maximized to decrease future steel maintenance
  - Existing lateral bracing shall be modified, and additional steel shall be added to provide an adequate load path for the new configuration
  - Painting of existing steel
  - Identify and maintain required means of egress per building code including the removal of many existing platforms and eliminating walkways and platforms that will no longer be required
  - Stairways should be modified in order to streamline travel paths and eliminate confusing evacuation routes
  - Elevators should only provide access to areas required for operations.
  - Coal bunker walls and hoppers
- Boiler building to be removed to column row F½
  - Coal Conveyor remains in service for Units 3 and 4.
  - Current truck aisle between column rows C and D to remain open.
  - Current plan is for existing steel to be re-painted, there will be no siding added to the structures that don't currently have siding for this scope of work.

ii. Coal Yard – (demo scope added per TEC request in June 2020)
- Usable coal from the northern third of coal pile will be lowered by TEC as part of normal coal handling operations.
- No cost for excavation or disposal of material is included.
- Area backfilled and graded for proper drainage (2.5 feet of fill over an 11 acre area assumed for the estimate). Evaluation of final grading scheme with respect to overall plant stormwater management will be required.
- Area hydroseeded for dust and erosion control.
- Demolition of conveyors J1, J2, Q1, Q2, R1, R2, T1, T2, U1, W1, W2, and Z1
- Demolition of the Polk and Superior conveyors.

- Demolition of G1 Stacker Reclaimer conveyor. TEC plans to sell the north stacker reclaimer.
- Demolition of transfer towers T-4, T-5, T-6, and T-7 (crusher house).
- Demolition of BF Building, Blending Bins, and Polk Truck Loadout & Scale.
- The demolition of the Blending Bins structure requires that the coal yard control room be relocated. Detailed costs to relocate this control room are beyond the scope of the study but are considered captured in the contingency for the coal yard portion.

2. Major installations and replacements required due to dismantlement
   a. Mechanical
      i. Separation of the following systems:
         - Common steam line for each units' main steam attemperator
      ii. Natural gas system to be capped downstream of Unit 3.
      iii. Hydrogen and Ammonia System branched to Unit 2 to be capped
      iv. Fill the circulating water intake and discharge tunnels for Unit 2
   b. Structural
      i. Turbine roofing to be replaced
         - Replace roofing at the Unit 2 cooling tower after removal
         - Replace any dismantlement related damaged areas along south edge of roof
         - Roof drains to be replaced
      ii. One new elevator to tripper room to be located between Units 1 and 2
         - Landings only to access areas of remaining operations. (Tripper room, cooling tower, turbine deck, turbine mezzanine, and ground floor)
      iii. New stair tower to tripper room to be located between Units 1 and 2
      iv. Entry way canopies where applicable
      v. Turbine building siding
         - South side of turbine building to close in the remaining structure
      vi. Structural steel bracing to support the structural demolition extent
      vii. Provide floor framing and grating to fill in large openings created by equipment removal in Unit 2. Small opening will also by filled in with grating.
         - Examples:
            - Turbine & Generator voids
            - Coal Handling equipment voids
            - Large open area east of the Turbine at the operating level
      viii. Grating and handrails as required to access Unit 1 operations. (cooling tower, turbine deck, turbine mezzanine, and ground floor)
      ix. Removal of checkered plating and replaced with grating
      x. Paving of dismantled area to promote drainage and provide a smooth walking surface

xi. Painting of existing interior and exterior steel

c. Electrical/I&C
   i. Reconfiguration of the DCS system (Emerson) to move remaining equipment controls to common highway
   ii. New PDC building for repowering remaining equipment loads
   iii. Lightning protection for unprotected structures subsequent to demolition
   iv. Lighting
      - Lighting to account for areas still being utilized by Unit 1 and 2 operations. (cooling tower, turbine deck, turbine mezzanine, and ground floor)
   v. Equipment that will need to be repowered (refer to Attachment 4 for detailed breakout of equipment)
      - Turbine Shop
      - Tagging Office
      - Units 1 and 2 Floor Drain sump equipment
      - Units 1 and 2 Settling Basin sump equipment
      - Sanitary Lift station OPBS STU15 (Unit 2) sump equipment
      - Sanitary Lift station OPBS STU6 (Main) sump equipment
      - Stormwater sumps within the unit boundaries.
      - Air Compressor #3
      - Turbine Building vent fans
      - Unit 4 Clean & Dirty oil tank equipment
      - Turbine Hall cranes
      - Unit 2 Fire Protection Panel

D. Pricing and Quantities

- Costs for bulk materials were derived from S&L database
- Asbestos abatement costs provided by TEC
- Decommissioning (removal and disposal of regulated waste) costs provided by TEC
- TEC's project staffing and security costs provided by TEC
- Permit costs provided by TEC

Bulk quantities and weights of equipment and material commodities used in this cost estimate are intended to be reasonable and representative of projects of this type. Quantities were estimated from Sargent & Lundy in-house database and numerous assumptions. See "Estimate Approach" for further discussion on quantity development.

TEC cost estimate input and assumptions:

Decommissioning – Decommissioning includes boiler draining, contaminate removal (fly ash, coal, slag, lead paint, oil, mercury, radiation, natural gas, hydrogen, and ammonia), elevators repairs as required by an outage, FGD tanks and ducts to be washed out, and condenser and ZBL system

cleaning. Estimated are based off previous work orders found in TEC's Work Management System (Workman).

Asbestos Abatement – Asbestos abatement includes abating known areas of asbestos (turbine building and elevators siding, piping insulation, cable trays, etc.) as well as an allowance for unknown areas that may be discovered. Cost includes an allowance for scaffolding and half of an asbestos supervisor's time during the length of the dismantlement. Estimated are based off previous work orders found in TEC's Work Management System (Workman).

Payroll – Payroll was estimated by accounting for all the TEC team members assumed to work on the project. A total cost was calculated by using their hourly rate and amount of time assumed to be spent on the project. It was assumed that there was less payroll cost for Unit 1 since BBMOD will be removing most of the turbine building equipment.

Security – During dismantlement, the number of contractors onsite will increase resulting in some additional security measures.

Permitting & Compliance – Includes an allowance for environmental studies, environmental compliance fees, legal fees, FAA permits, and Asbestos notifications.

E. Labor Wage Rates

Craft labor rates were developed for TEC as part of the Modernization project through a labor study conducted by S&L. The labor study based rates used in the 2018 study and cost estimates have been escalated for 2020. Costs have been added to cover social security, workmen's compensation, federal and state unemployment insurance. The resulting burdened craft rates were then used to develop typical crew rates applicable to the task being performed. No adjustments to labor rates or productivity have been accounted for in the estimate for long term COVID-19 impacts.

Demolition Estimates: Labor Work Schedule and Incentives - Assumed 5 days x8 hr day work week.

Pre and Post Demolition Estimates: Labor Work Schedule and Incentives - Assumed 5 days x10 hr day work week.

Per diem is not required.

For addition estimates only, a regional labor productivity multiplier of 1.1 is included based on Compass International Global Construction Yearbook. The use of this productivity factor is an approach to compare construction productivity in various locations in the USA to a known basis or benchmark of 1.00 for Texas, Gulf Coast productivity. Productivity multiplier does not include weather related delays.

F. Construction Equipment

Construction equipment cost is included on each estimate line as needed based on the type of activity and construction equipment requirements to perform the work.

G. Construction Direct/Indirect Costs and General Conditions

The estimate is constructed in such a manner where most of the direct construction costs are determined directly and several direct construction cost accounts are determined indirectly by taking a percentage of the directly determined costs. These percentages are based on our experience with similar type and size projects. Listed below are the additional costs included, unless noted as not included.

- Additional Labor Costs:
  - Labor Supervision
  - Show-up time
  - Cost of overtime
  - Per diem – not included
- Site Overheads:
  - Construction Management
  - Field Office Expenses
  - Material & Quality Control
  - Site Services
  - Safety
  - Temporary Facilities
  - Temporary Utilities
  - Mobilization/Demobilization
  - Legal Expenses/Claims
- Other Construction Indirect costs:
  - Small Tools and Consumables
  - Scaffolding
  - General Liability Insurance
  - Construction Equipment Mobilization/Demobilization
  - Freight on Material
  - Freight on Process Equipment – included with equipment cost
  - Sales Tax – not included
  - Contractors General &Administration (G&A) Expense
  - Contractors Profit
- Project Indirect Costs:
  - A/E Engineering Services
  - A/E Construction Management
  - A/E Start-up and Commissioning support
  - Start-Up Spare Parts
  - Owner's cost
  - EPC Fee – not included
  - AFUDC - not included

H. Scrap Value

The scrap values used are the credit to the utility based on current industry data.

- Mixed Steel value @ $191/Ton
- #2 Copper @ $4130/Ton
- #1 Insulated copper wire 65% @ $2175/Ton

Note: 1 ton = 2000 Lbs.

Scrap values have decreased from the 2018 cost estimates. The mixed steel value is down 23% and the copper values are down 9%. Scrap values can fluctuate month-to-month and should not be relied upon to reduce the cost of demolition during the planning stage.

The coal yard demolition has not been factored into the scrap values at this time.

I. Contingency

A 20% contingency was initially used for all costs in the Unit 1 and 2 estimates included with Attachment 1. We consider this to be appropriate and consistent with AACE guidelines, given our experience with fossil plant demolition as well as the level of project definition that has been achieved to date. However, TEC requested that the contingency be modified to 15%. Since this request occurred after completion of the estimates, an adjustment to the total project cost has been included.

Contingency is applied at 10% to scrap value since this decreases the credit from scrap material in the cost estimate.

J. Escalation

Escalation cost is included and calculated based on the following rates, project schedule and cash flow expenditures as reflected in the cash flow curves for each cost category.

Escalation is included considering Unit 1 dismantling beginning in the third quarter of 2021 and Unit 2 beginning in the fourth quarter of 2021.

2.5% / year for materials
3% / year for subcontract costs
3% / year for labor
2.5% / year for construction equipment
3% / year for project indirect costs
0% / year for scrap metal

K. Costs Excluded

All known scope of required physical facilities as provided by the project team to encompass a complete project has been included in the estimate. There are no known intentional omissions.

The cost estimate represents only the costs listed in the estimate. The estimate does not include allowances for any other costs not listed and incurred by the owner. Excluded costs (and some of which are also listed in "Assumptions/Clarifications") are any that are not listed in the estimate.

There may be additional costs that the Owner should consider such as (the list below is not all inclusive):

- Legal costs
- Owner's Bond Fees
- Taxes
- Station insurance costs and taxes are not included
- Performance Bonds

L. Scope Assumptions/Clarifications/Exclusions

Electrical

- All plant systems will be drained, electrical equipment and wiring is de-energized and tagged out by the client prior to demolition activities.
- Switchyards within the plant boundaries are not part of the scope; neither are access roads and rail lines to these facilities
- Overhead transmission towers are not included in this study.
- U4 intake structure loads are already fed from Unit 4. No repowering is necessary.
- Loads are based on expected loading of equipment of this nature.
- New raceway (cable tray/conduit) is included for repowering of the existing loads.
- New raceway is supported from existing steel members.
- An allowance is included to cross tie Unit 1 reserve switchgear to Unit 4 switchgear.
- Cabling between the Modernization Unit 1 switchgear connects to the reserve 3 current limiting reactor. An allowance for this cable to be replaced is included in the estimate.
- Unit 4 reserve switchgear has available capacity and spare feeder breaker to feed the new repowering medium voltage switchgear.
- Coal field is fed from the existing Station reserve system. No repowering is necessary.
- Station reserve system is to remain in place. An allowance is included for some reconfiguration.
- An allowance is included for lighting protection.
- Allowances are included for new access lighting for areas that will remain in use after the dismantling.
- New repowering PDC building will reside on the back end (south) of Unit 2.
- An allowance is included for any DCS reconfiguration and control modifications are required after dismantling.
- Estimate excludes TEC Energy Delivery costs for removal of high voltage lines to the switchyard.

Decommissioning

- All chemicals and oils will be removed by TEC prior to demolition.
- Cleaning and flushing of chemical and oil storage pipes and tanks are by TEC.
- All storage tanks will be emptied by TEC.
- No remediation or removal of contaminated spills is required (no known spills exist).
- Coal bunkers and ash silos will be emptied by TEC.

Structural

- All items that extend more than 1'-0" above top of foundation will be demolished to grade level. Any other items will remain in place.
- A 6" asphalt layer (average thickness) shall be laid in areas where overhead steel will be removed to create a better walking surface, provide adequate drainage and prevent pooling.
- All borrow and backfill soil material is assumed to be purchased from offsite sources.
- Coating system for new steel is galvanized.

Mechanical

- Large diameter cooling water pipes/tunnels will be abandoned in place and filled to prevent ingress of water or collapse.
- The Station Air compressors for Unit 2 (Compressors #3 & #4) must be kept in service. Repowering and controls modifications are required. Additionally, a source of cooling water will be required, preserving of either the Unit 2 cooling tower is being considered as a potential cost savings in the detail engineering phase.
- The Units 1 and 2 Settling Basins must stay in service.
- The Units 1 and 2 Floor Drain Sumps must stay in operation, which will require repowering and controls modification. The Floor and Equipment Drain system in the Boiler and Turbine area must stay in operation, with modifications at equipment drains.
- Auxiliary steam will be routed from Unit 1 to Unit 4 by the Modernization project.
- A new Natural gas header vent will be required at Unit 4 when the header is removed from Units 1 and 2.
- Close Coal chutes in the tripper room for Unit 2 and Unit 3 bunkers.
- Flyash pipe between Ash silos # 1 and # 2 must be cut and capped at #2.
- Unit 1-2 Gypsum pipes to dewatering are to be demolished.
- Fire protection panel for Unit 2 must be interfaced with the DCS.
- Ammonia loop valves will be replaced and the branch to Unit 2 SCR will be capped.
- Detailed design phase required to further investigate assumptions.

General

- All demolished non-metal materials except concrete are considered debris and shall be transported to a licensed landfill.
- It is assumed that concrete will be processed for recycling onsite and removed offsite by a concrete recycling company at no cost or credit to the Utility.
- Scrap value for recoverable metals is included in the estimate as a credit. No resale of equipment or material is included.
- The estimate assumes that all structural steel, miscellaneous building steel, decking grating, piping, and equipment will be removed to drop-off containers as provided by the scrap metal recycling company. The recycling company will assume all responsibility for the safe removal/disposal of lead paint and processing of the steel, which is reflected in the value of scrap metal.
- Cost of removing mobile equipment and machinery is by TEC.
- Site Construction Management costs assume one CM per unit for the duration of pre-demolition and demolition.

M. Cost Comparison to 2018 Estimate

The organization of the estimates into new categories does not allow for direct comparison of the individual estimates created for this study; however, the total cost by unit can be compared.

	2018	2020	Change
Unit 1	$33,143,556	$35,074,860	$1,931,304 (5.8%)
Unit 2	$43,440,936	$46,741,364	$3,300,428 (7.6%)
Total for both units	$76,584,492	$81,816,224	$5,231,732 (6.8%)

Scrap Value Unit 1	$(4,609,221)	$(3,548,900)
Scrap Value Unit 2	$(5,468,548)	$(4,217,943)

The total 2020 cost for dismantlement of Units 1 and 2 has increased by 6.8% from the 2018 estimate. The increase can be attributed to several factors.

While labor rates have increased from those used in the 2018 study, other factors such as escalation and chimney demolition have decreased. Escalation has decreased due Unit 1 retirement having already occurred allowing for work to begin immediately. Unit 2 retirement is now only one year away compared to three years in future during the 2018 estimate. The cost for demolishing the Unit 1 and 2 wet FGD chimney and the partial Unit 1 and 2 concrete shell are based on a budget quote from Pullman. They also provided a budgetary quote in 2018. However, they state a reduced cost based on having obtained new equipment that allows for a more efficient means of chimney demolition. This reduced their cost from 2018 by $1,220,000 (a 25% reduction).

A large portion on the direct cost increase can be attributed to the coal yard demolition and regrading. Those changes make up $4.3 million of the $6.3 million increase in direct costs. Electrical reviews also added $1.6 million in new large cables (48 – 500 kcmil, 48000LF) to add redundancy for Unit 1 with a cross tie.

The decrease of the contingency of the base estimates from 20% to 15% results in a contingency decrease of approximately $3.25 million.

N. Schedule

A level 2 schedule has been developed to reflect the latest retirement dates for Units 1 and 2. See Attachment 3 for the schedule. Planning and engineering can start at any time. The schedule basis is beginning activities in September 2020, which provides a completion date four years after project start.

Near term activities that should begin in 2020:

Task	Responsibility
Project Scope Authorization (PSA)	TEC
Assign internal staff responsibilities	TEC
Hazardous Material Survey	TEC/AE
Pre-demolition design activities – Electrical feed modifications	AE
Pre-demolition design activities – Structural stability bracing	AE
Demolition – Develop Scoping	AE
Permitting	TEC/AE

This schedule was reviewed with TEC in April and is used to develop the cost estimate escalation values and as the cash flow basis. Key engineering activities should start soon after project authorization in order to ensure adequate time is allotted to install essential “Pre-demolition” scope modifications prior to demolition start.

ATTACHMENT 1

Cost Estimate Summary, Cash Flow and Individual Estimates

Tampa Electric Company
Big Bend Station Units 1-2
Dismantling Study

Sargent & Lundy

Project No.: A09476.301
Date: December 28, 2020
Rev. 1, Use

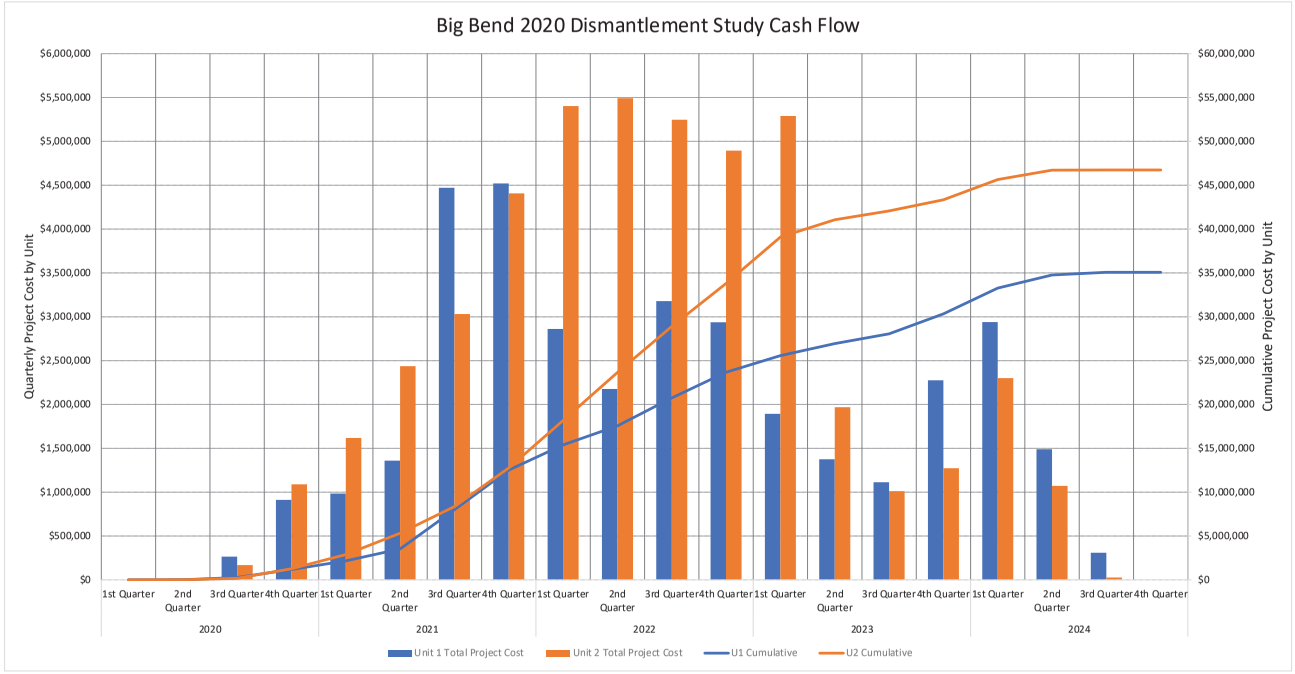
COST ESTIMATE SUMMARY						
	Direct Cost	**General Conditions**	**Project Indirect Costs**	**Contingency**	**Escalation**	**Total**
Unit 1						
Pre Demolition Modifications	$2,236,875	$1,341,113	$71,560	$729,910	$189,835	$4,569,293
Demolition	$11,459,211	$1,975,702	$4,160,295	$3,519,041	$1,248,539	$22,362,788
Post Demolition	$2,421,821	$571,936	$617,695	$722,291	$501,922	$4,835,665
Engineering Demolition Support	$0	$0	$2,705,250	$541,100	$156,100	$3,402,450
Contingency Adjustment to 15%	$0	$0	$0	$(1,378,086)	$0	$(1,378,086)
Allowance - Turbine Building Ventilation	$1,000,000	$0	$0	$150,000	$132,750	$1,282,750
Total	$17,117,907	$3,888,751	$7,554,800	$4,284,256	$2,229,146	**$35,074,860**
Unit 2						
Pre Demolition Modifications	$8,518,417	$3,294,121	$236,251	$2,409,758	$223,864	$14,682,411
Demolition	$12,848,141	$2,263,374	$2,945,415	$3,611,386	$1,458,238	$23,126,554
Post Demolition	$2,422,165	$1,149,600	$733,370	$861,000	$466,300	$5,632,435
Engineering Demolition Support	$0	$0	$3,108,050	$621,600	$163,500	$3,893,150
Contingency Adjustment to 15%	$0	$0	$0	$(1,875,936)	$0	$(1,875,936)
Allowance - Turbine Building Ventilation	$1,000,000	$0	$0	$150,000	$132,750	$1,282,750
Total	$24,788,723	$6,707,095	$7,023,086	$5,777,808	$2,444,652	**$46,741,364**
Grand Total Unit 1 and 2	$41,906,630	$10,595,846	$14,577,886	$10,062,064	$4,673,798	**$81,816,224**

Unit 1 Scrap Value	$3,548,900
Unit 2 Scrap Value	$4,217,943
Total Scrap Value	$7,766,843

Tampa Electric Company
Big Bend Station Units 1-2
Dismantling Study

Project No.: A09476.301
Date: December 28, 2020
Rev. 1, Use

	Total	2020				2021				2022				2023				2024			
	($000s)	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Unit 1 Total Project Cost	35,075	0	12	265	912	984	1,360	4,471	4,520	2,861	2,176	3,178	2,938	1,893	1,375	1,113	2,277	2,940	1,489	309	0
Cumulative		0	12	278	1,190	2,174	3,534	8,005	12,525	15,386	17,562	20,741	23,679	25,572	26,947	28,060	30,337	33,277	34,766	35,075	35,075
Unit 2 Total Project Cost	46,741	0	12	169	1,089	1,618	2,437	3,031	4,407	5,402	5,492	5,247	4,894	5,289	1,968	1,012	1,273	2,301	1,072	28	0
Cumulative		0	12	181	1,271	2,889	5,326	8,357	12,764	18,166	23,658	28,905	33,799	39,088	41,056	42,068	43,341	45,642	46,713	46,741	46,741



TEC
BIG BEND STATION
UNIT 1 PRE DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35156A
Cost index	FLTAM

Estimate No.: 35156A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 1 PRE DEMOLITION

Sargent & Lundy

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
21.00.00	CIVIL WORK			11,580	137	7,967	2,140	21,687
22.00.00	CONCRETE			10,704	471	21,386	3,614	35,703
23.00.00	STEEL			284,540	4,782	261,681	108,869	655,090
35.00.00	PIPING	350,000						350,000
42.00.00	RACEWAY, CABLE TRAY & CONDUIT	200,000		158,630	10,572	618,465	12,974	990,069
43.00.00	CABLE			80,747	1,406	83,380	20,198	184,325
	TOTAL DIRECT	550,000		546,201	17,369	992,880	147,794	2,236,875

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Estimate Totals

Description	Amount	Totals	Hours
Labor	992,880		17,369
Material	546,201		
Subcontract	550,000		
Construction Equipment	147,794		
Process Equipment			
	2,236,875	2,236,875	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	59,573		
90-2 Show-up Time	19,858		
90-3 Cost Due To OT 5-10's	194,259		
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	214,923		
91-2 Field Office Expenses	132,119		
91-3 Material&Quality Control	33,488		
91-4 Site Services	27,505		
91-5 Safety	21,183		
91-6 Temporary Facilities	16,117		
91-7 Temporary Utilities	17,661		
91-8 Mobilization/Demob.	16,985		
91-9 Legal Expenses/Claims	2,509		
Other Construction Indirects			
92-1 Small Tools & Consumables	32,169		
92-2 Scaffolding	75,062		
92-3 General Liability Insur.	10,723		
92-4 Constr. Equip. Mob/Demob	1,478		
92-5 Freight on Material	27,310		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	180,432		
92-9 Contractors Profit	257,759		
	1,341,113	3,577,988	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning	71,560		
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
	71,560	3,649,548	
Contingency			
94-1 Contingency on Const Eq	34,879		
94-3 Contingency on Material	134,202		
94-4 Contingency on Labor	436,517		
94-5 Contingency on Subcontr.	110,000		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	14,312		
	729,910	4,379,458	
Escalation			
96-1 Escalation on Const Equip	6,503		
96-3 Escalation on Material	25,287		
96-4 Escalation on Labor	122,416		
96-5 Escalation on Subcontract	30,848		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	4,781		
	189,835	4,569,293	
98 Interest During Constr			
		4,569,293	
Total		**4,569,293**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
21.00.00		CIVIL WORK									
	21.17.00	EXCAVATION									
		FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE	FOUNDATION FOR CABLE RACK	335.11 CY	-	-		55	3,213	863	4,076
		EXCAVATION						55	3,213	863	4,076
	21.19.00	DISPOSAL									
		DISPOSAL OF EXCESS MATERIAL USING DUMP TRUCK, 4 MI ROUND TRIP	FOUNDATION FOR CABLE RACK	335.11 CY	-	-		22	1,285	345	1,630
		DISPOSAL						22	1,285	345	1,630
	21.20.00	BACKFILL									
		FOUNDATION BACKFILL, SELECT STRUCTURAL FILL	FOUNDATION FOR CABLE RACK	361.87 CY	-	-	11,580	60	3,469	932	15,981
		BACKFILL					11,580	60	3,469	932	15,981
		CIVIL WORK					11,580	137	7,967	2,140	21,687
22.00.00		CONCRETE									
	22.13.00	CONCRETE									
		MAT FOUNDATION LESS THAN 5 FT THICK, 4500 PSI	FOUNDATION FOR CABLE RACK	27.70 CY	-	-	3,463	38	1,449	438	5,350
		CONCRETE					3,463	38	1,449	438	5,350
	22.15.00	EMBEDMENT									
		EMBEDMENTS, CARBON STEEL	FOUNDATION FOR CABLE RACK	277.04 LB	-	-	831	15	659	25	1,515
		EMBEDMENT					831	15	659	25	1,515
	22.17.00	FORMWORK									
		BUILT UP INSTALL & STRIP	FOUNDATION FOR CABLE RACK	1,712.00 SF	-	-	4,280	377	17,188	2,739	24,207
		FORMWORK					4,280	377	17,188	2,739	24,207
	22.25.00	REINFORCING									
		UNCOATED A615 GR60	FOUNDATION FOR CABLE RACK	2.08 TN	-	-	2,130	41	2,090	411	4,631
		REINFORCING					2,130	41	2,090	411	4,631
		CONCRETE					10,704	471	21,386	3,614	35,703
23.00.00		STEEL									
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	CABLE RACK	22.00 TN	-	-	69,410	411	22,514	10,292	102,217
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	STABILITY BRACING FOR TURBINE BUILDING	46.00 TN	-	-	145,130	1,290	70,612	21,521	237,263
		REINFORCING EXISTING STRUCTURAL STEEL WITH COVER PLATES		20.00 TN	-	-	70,000	3,080	168,554	77,056	315,610
		ROLLED SHAPE					284,540	4,782	261,681	108,869	655,090
		STEEL					284,540	4,782	261,681	108,869	655,090
35.00.00		PIPING									
	35.13.45	MISC. ABOVE GROUND, PROCESS AREA									
		MODIFICATIONS TO EXISTING PIPE SYSTEMS: NATURAL GAS HEADER, AMMONIA SUPPLY HEADER, FIRE PROTECTION, SERVICE WATER, COMPRESS AIR AND GASES PIPING		1.00 LS	350,000	-					350,000
		MISC. ABOVE GROUND, PROCESS AREA			350,000						350,000
		PIPING			350,000						350,000
42.00.00		RACEWAY, CABLE TRAY & CONDUIT									
	42.13.02	CABLE TRAY COVER, ALUMINUM									
		24 IN WIDE INCLUDING FITTINGS		1,000.00 LF	-	-	2,880	76	4,441	93	7,414
		CABLE TRAY COVER, ALUMINUM					2,880	76	4,441	93	7,414
	42.13.37	CABLE TRAY, ALUMINUM									
		24 IN WIDE LADDER TYPE INCLUDING SUPPORTS AND FITTINGS		1,000.00 LF	-	-	25,630	1,924	112,559	2,361	140,551

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
		CABLE TRAY, ALUMINUM					25,630	1,924	112,559	2,361	140,551
	42.15.13	CONDUIT, ALUMINUM									
		1 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		21,000.00 LF	-	-	59,220	4,967	290,569	6,095	355,885
		1-1/2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		2,000.00 LF	-	-	9,400	563	32,951	691	43,042
		2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		2,000.00 LF	-	-	12,800	697	40,802	856	54,458
		2-1/2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		2,000.00 LF	-	-	18,500	906	53,030	1,112	72,642
		3 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		1,000.00 LF	-	-	12,150	639	37,391	784	50,325
		4 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		1,000.00 LF	-	-	18,050	799	46,723	980	65,753
		MISCELLANEOUS SIZE CONDUITS	ALLOWANCE	1.00 LS	200,000	-					200,000
		CONDUIT, ALUMINUM			200,000		130,120	8,572	501,465	10,519	842,105
		RACEWAY, CABLE TRAY & CONDUIT			200,000		158,630	10,572	618,465	12,974	990,069
43.00.00		CABLE									
	43.20.00	600V CABLE & TERMINATION									
		600V #10 3/C CU XLPE LSZH	11 CABLES x 1000FT=	11,000.00 LF	-	-	15,840	339	20,089	4,866	40,796
		600V #8 4/C CU EPR TS-CPE	10 CABLES x 1000FT=	10,000.00 LF	-	-	22,400	495	29,351	7,110	58,861
		600V #4 3/C CU EPR TS-CPE	2 CABLES x 1000FT=	2,000.00 LF	-	-	6,140	119	7,044	1,706	14,891
		600V #1/0 3/C W/G CU EPR TS-CPE	2 CABLES x 1000FT=	2,000.00 LF	-	-	11,700	172	10,175	2,465	24,340
		600V #4/0 3/C CU	2 CABLES x 1000FT=	2,000.00 LF	-	-	23,640	213	12,654	3,065	39,359
		TERMINATION - COMPRESSION LUG, #10, 1 HOLE, COPPER	11 CABLES x 3 x 2=	66.00 EA	-	-	145	18	1,076	261	1,482
		TERMINATION - COMPRESSION LUG, #8, 2 HOLE, COPPER	10 CABLES x 3 x 2=	60.00 EA	-	-	390	20	1,174	284	1,848
		TERMINATION - COMPRESSION LUG, #4, 2 HOLE, COPPER	2 CABLES x 3 x 2=	12.00 EA	-	-	111	7	391	95	597
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	2 CABLES x 3 x 2=	12.00 EA	-	-	165	10	564	137	865
		TERMINATION - COMPRESSION LUG, #4/0, 2 HOLE, COPPER	2 CABLES x 3 x 2=	12.00 EA	-	-	216	15	861	209	1,286
		600V CABLE & TERMINATION					80,747	1,406	83,380	20,198	184,325
		CABLE					80,747	1,406	83,380	20,198	184,325

TEC
BIG BEND STATION
UNIT 1 DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35157A

Estimate No.: 35157A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 1 DEMOLITION

Sargent & Lundy

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00	WHOLE PLANT DEMOLITION	6,618,897			52,972	2,502,332	1,112,503	10,233,733
11.00.00	DEMOLITION				367	20,096	10,107	30,203
21.00.00	CIVIL WORK	595,310		64,178	226	10,368	10,471	680,328
22.00.00	CONCRETE	40,000						40,000
23.00.00	STEEL			316,965	1,921	105,117	52,866	474,948
	TOTAL DIRECT	7,254,207		381,143	55,486	2,637,914	1,185,947	11,459,211

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Estimate Totals

Description	Amount	Totals	Hours
Labor	2,637,914		55,486
Material	381,143		
Subcontract	7,254,207		
Construction Equipment	1,185,947		
Process Equipment			
	11,459,211	**11,459,211**	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	158,275		
90-2 Show-up Time	52,758		
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	571,014		
91-2 Field Office Expenses	62,677		
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety	56,281		
91-6 Temporary Facilities	42,820		
91-7 Temporary Utilities			
91-8 Mobilization/Demob.	45,127		
91-9 Legal Expenses/Claims	6,667		
Other Construction Indirects			
92-1 Small Tools & Consumables	28,489		
92-2 Scaffolding			
92-3 General Liability Insur.	28,489		
92-4 Constr. Equip. Mob/Demob	11,859		
92-5 Freight on Material	19,057		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	367,372		
92-9 Contractors Profit	524,817		
	1,975,702	**13,434,913**	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost	4,160,295		
93-8 EPC Fee			
	4,160,295	**17,595,208**	
Contingency			
94-1 Contingency on Const Eq	279,883		
94-3 Contingency on Material	93,647		
94-4 Contingency on Labor	862,611		
94-5 Contingency on Subcontr.	1,450,841		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	832,059		
	3,519,041	**21,114,249**	
Escalation			
96-1 Escalation on Const Equip	81,110		
96-3 Escalation on Material	18,251		
96-4 Escalation on Labor	377,908		
96-5 Escalation on Subcontract	513,334		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	257,936		
	1,248,539	**22,362,788**	
98 Interest During Constr			
		22,362,788	
Total		**22,362,788**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00		WHOLE PLANT DEMOLITION									
	10.21.00	CIVIL WORK									
		REMOVE GEOTEXTILE FABRIC	SCRAP PROCESSING AREA	5,220.00 SY	-	-		52	1,885	217	2,103
		CIVIL WORK						52	1,885	217	2,103
	10.22.00	CONCRETE									
		BUILDING/EQUIPMENT FOUNDATION/PAD		1,213.00 CY	-	-		2,456	135,147	53,204	188,351
		CONCRETE						2,456	135,147	53,204	188,351
	10.23.00	STEEL									
		STRUCTURAL, GIRT AND GALLERY STEEL	BOILER	2,347.00 TN	-	-		3,815	190,612	61,655	252,267
		STRUCTURAL, GIRT AND GALLERY STEEL	PRECIP BOX	1,368.00 TN	-	-		1,807	90,270	29,199	119,469
		STRUCTURAL, GIRT AND GALLERY STEEL	PRECIP STEEL	603.00 TN	-	-		796	39,790	12,871	52,661
		STRUCTURAL, GIRT AND GALLERY STEEL	FGD (50% SPLIT BETEEN UNITS 1 & 2)	389.00 TN	-	-	0	514	25,669	8,303	33,972
		STRUCTURAL, GIRT AND GALLERY STEEL	FLY ASH SILO #1 AND STEEL (50% SPLIT UNIT 1 & 2)	46.00 TN	-	-		61	3,035	982	4,017
		STRUCTURAL, GIRT AND GALLERY STEEL	BALANCED DRAFT STEEL	212.00 TN	-	-		280	13,989	4,525	18,514
		STRUCTURAL, GIRT AND GALLERY STEEL	SCR	950.00 TN	-	-		1,255	62,688	20,277	82,965
		DUCTWORK AND STEEL SUPPORTS	DUCTWORK REMOVAL	1,468.00 TN	-	-		5,099	215,443	114,427	329,870
		DUCTWORK AND STEEL SUPPORTS	SCR DUCTWORK REMOVAL	764.00 TN	-	-		2,654	112,124	59,552	171,676
		STEEL						16,281	753,621	311,790	1,065,411
	10.25.00	CONCRETE CHIMNEY & STACK									
		CONCRETE CHIMNEY	50% OF WET STACK COST	0.50 LS	1,725,000	-					1,725,000
		CONCRETE CHIMNEY	50% DRY STACK COST	0.50 LS	150,000	-					150,000
		CONCRETE CHIMNEY & STACK			1,875,000						1,875,000
	10.26.00	MISCELLANEOUS STRUCTURAL ITEM									
		PROTECT WFGD ELECTRICAL BUILDING		1.00 LS	125,000	-					125,000
		MISCELLANEOUS STRUCTURAL ITEM			125,000						125,000
	10.31.00	MECHANICAL EQUIPMENT									
		MAIN BOILER AND APPURTENANCES	QUANTITY REFLECTS MATERIALS REMOVED BY MODERNIZATION PROJECT	7,500.00 TN	-	-		21,720	1,085,146	467,638	1,552,784
		FEEDWATER DEARATING EQUIPMENT	QUANTITY REFLECTS MATERIALS REMOVED BY MODERNIZATION PROJECT	147.00 TN	-	-		387	16,350	8,684	25,034
		BOP EQUIPMENT INCLUDING PUMPS, HEAT EXCHANGERS, COMPRESSORS, TANKS, CHEMICAL FEED, WATER AND OIL SYSTEMS, ETC.	QUANTITY REFLECTS MATERIALS REMOVED BY MODERNIZATION PROJECT	800.00 TN	-	-		2,106	88,979	47,259	136,237
		ASH / DUST COLLECTOR EQUIPMENT	DUST COLLECTOR CONVEYIING EQUIPMENT INCLUDING BLOWERS, PUMPS, VALVES, ETC.	183.00 TN	-	-		482	20,354	10,810	31,164
		FGD EQUIPMENT		220.00 TN	-	-		579	24,469	12,996	37,465
		MECHANICAL EQUIPMENT						25,274	1,235,297	547,387	1,782,684
	10.33.00	MATERIAL HANDLING EQUIPMENT									
		COAL HANDLING FACILITIES	50% SPLIT BETWEEN UNITS 1 & 2	1.00 LS	1,600,000	-					1,600,000
		MATERIAL HANDLING EQUIPMENT			1,600,000						1,600,000
	10.35.00	PIPING									
		PIPING, VALVES AND HANGERS	QUANTITY REFLECTS MATERIALS REMOVED BY MODERNIZATION PROJECT. INCLUDES PIPING SYSTEMS WITHIN THE BOILER AND TURBINE AREA SUCH AS: MAIN STEAM, HOT/COLD REHEAT, BOILER FEED, FEEDWATER, CONDENSATE, SERVICE WATER, ETC.	1,500.00 TN	-	-		5,210	220,139	116,921	337,061
		PIPING						5,210	220,139	116,921	337,061
	10.37.00	ASBESTOS REMOVAL									
		ASBESTOS ABATEMENT	COST PROVIDED BY TECO	1.00 LS	2,938,897	-	-		-	-	2,938,897
		ASBESTOS REMOVAL			2,938,897						2,938,897
	10.41.00	ELECTRICAL EQUIPMENT									
		MISCELLANEOUS ELECTRICAL EQUIPMENT	MCC'S, CABINETS, PANELS, ETC.	256.00 TN	-	-		684	28,900	15,350	44,250
		ELECTRICAL EQUIPMENT						684	28,900	15,350	44,250
	10.42.00	RACEWAY, CABLE TRAY, & CONDUIT									
		CONDUIT		76.00 TN	-	-		494	20,872	11,085	31,957

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	10.42.00	RACEWAY, CABLE TRAY, & CONDUIT									
		CABLE TRAY		200.00 TN	-	-		1,200	50,700	26,928	77,628
		RACEWAY, CABLE TRAY, & CONDUIT						1,694	71,572	38,013	109,585
	10.43.00	CABLE									
		CABLE STRIPPABLE		132.00 TN	-	-		1,320	55,770	29,621	85,391
		CABLE						1,320	55,770	29,621	85,391
	10.99.00	DEMOLITION, MISCELLANEOUS									
		DRAIN PROTECTION		1.00 LS	80,000	-					80,000
		DEMOLITION, MISCELLANEOUS			80,000						80,000
		WHOLE PLANT DEMOLITION			6,618,897			52,972	2,502,332	1,112,503	10,233,733
11.00.00		DEMOLITION									
	11.23.00	STEEL									
		STRUCTURAL STEEL	REMOVE TEMPORARY STEEL FOR SCR	75.00 TN	-	-		244	13,338	6,708	20,046
		STRUCTURAL STEEL	REMOVE TEMPORARY STEEL FOR BOILER	38.00 TN	-	-		124	6,758	3,399	10,157
		STEEL						367	20,096	10,107	30,203
		DEMOLITION						367	20,096	10,107	30,203
21.00.00		CIVIL WORK									
	21.14.00	STRIP & STOCKPILE									
		STRIP TOPSOIL 4" DEEP, 300 FT HAUL		1.08 AC	-	-		35	1,987	3,268	5,255
		STRIP CRUSHED ROCK 12" DEEP, 300 FT HAUL	STRIP ROCK SURFACING IN "SCRAP PROCESSING AREA"	1.08 AC	-	-		35	1,987	3,268	5,255
		STRIP & STOCKPILE						69	3,974	6,536	10,510
	21.21.00	MASS FILL									
		MASS FILL, COMMON EARTH	BACKFILL COAL PILE AREA WITH 2.5 FT OF SOIL	22,250.00 CY	534,000						534,000
		MASS FILL			534,000						534,000
	21.41.00	SURFACING									
		CRUSHED ROCK SURFACING, 12" DEEP	SCRAP PROCESSING AREA	5,222.00 SY	-	-	55,614	104	4,508	3,718	63,840
		GEOTEXTILE FABRIC	SCRAP PROCESSING AREA	5,222.00 SY	-	-	8,564	52	1,886	217	10,668
		SURFACING					64,178	157	6,394	3,935	74,508
	21.47.00	LANDSCAPING									
		HYDRO SEEDING	COAL PILE AREA	7.50 AC	17,310	-	-		-	-	17,310
		LANDSCAPING			17,310						17,310
	21.52.00	WASTE DISPOSAL									
		WASTE DISPOSAL		4,000.00 CY	44,000	-					44,000
		WASTE DISPOSAL			44,000						44,000
		CIVIL WORK			595,310		64,178	226	10,368	10,471	680,328
22.00.00		CONCRETE									
	22.13.00	CONCRETE									
		CONCRETE FLOOD WALL REPAIRS		1.00 LS	40,000	-					40,000
		CONCRETE			40,000						40,000
		CONCRETE			40,000						40,000
23.00.00		STEEL									
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, PRIME PAINTED ONLY	TEMPORARY STEEL FOR SCR	75.00 TN	-	-	210,375	1,275	69,768	35,088	315,231
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, PRIME PAINTED ONLY	TEMPORARY STEEL FOR BOILER	38.00 TN	-	-	106,590	646	35,349	17,778	159,717
		ROLLED SHAPE					316,965	1,921	105,117	52,866	474,948
		STEEL					316,965	1,921	105,117	52,866	474,948

TEC
BIG BEND STATION
UNIT 1 POST DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35158A
Cost index	FLTAM

Estimate No.: 35158A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 1 POST DEMOLITION

Sargent & Lundy

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00	WHOLE PLANT DEMOLITION	250,000						250,000
21.00.00	CIVIL WORK			149,886	433	20,843	8,944	179,672
24.00.00	ARCHITECTURAL	1,272,000		23,200	503	23,154	3,692	1,322,046
27.00.00	PAINTING & COATING			103,500	7,970	371,974	44,629	520,103
41.00.00	ELECTRICAL EQUIPMENT	150,000						150,000
	TOTAL DIRECT	1,672,000		276,586	8,907	415,970	57,265	2,421,821

Estimate Totals

Description	Amount	Totals	Hours
Labor	415,970		8,907
Material	276,586		
Subcontract	1,672,000		
Construction Equipment	57,265		
Process Equipment			
	2,421,821	**2,421,821**	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	24,958		
90-2 Show-up Time	8,319		
90-3 Cost Due To OT 5-10's	81,385		
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	90,043		
91-2 Field Office Expenses	55,352		
91-3 Material&Quality Control	14,030		
91-4 Site Services	11,523		
91-5 Safety	8,875		
91-6 Temporary Facilities	6,752		
91-7 Temporary Utilities	7,399		
91-8 Mobilization/Demob.	7,116		
91-9 Legal Expenses/Claims	1,051		
Other Construction Indirects			
92-1 Small Tools & Consumables	13,477		
92-2 Scaffolding	31,447		
92-3 General Liability Insur.	4,492		
92-4 Constr. Equip. Mob/Demob	573		
92-5 Freight on Material	13,829		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	78,777		
92-9 Contractors Profit	112,538		
	571,936	**2,993,757**	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost	617,695		
93-8 EPC Fee			
	617,695	**3,611,452**	
Contingency			
94-1 Contingency on Const Eq	13,515		
94-3 Contingency on Material	67,957		
94-4 Contingency on Labor	182,880		
94-5 Contingency on Subcontr.	334,400		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	123,539		
	722,291	**4,333,743**	
Escalation			
96-1 Escalation on Const Equip	6,474		
96-3 Escalation on Material	40,989		
96-4 Escalation on Labor	133,320		
96-5 Escalation on Subcontract	231,621		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	89,518		
	501,922	**4,835,665**	
98 Interest During Constr			
		4,835,665	
Total		**4,835,665**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00		WHOLE PLANT DEMOLITION									
	10.99.00	DEMOLITION, MISCELLANEOUS									
		INSPECT, CLEAN OUT AND REPAIR DRAINS		1.00 LS	250,000	-					250,000
		DEMOLITION, MISCELLANEOUS			250,000						250,000
		WHOLE PLANT DEMOLITION			250,000						250,000
21.00.00		CIVIL WORK									
	21.57.00	ROAD, PARKING AREA, & SURFACED AREA									
		BITUMINOUS ASPHALT (50,000 - 99,999 SF)	ASPHALT TO REPAVE REMOVED BOILER AREA AND TO THE SOUTH	1,514.00 TN	-	-	149,886	433	20,843	8,944	179,672
		ROAD, PARKING AREA, & SURFACED AREA					149,886	433	20,843	8,944	179,672
		CIVIL WORK					149,886	433	20,843	8,944	179,672
24.00.00		ARCHITECTURAL									
	24.17.00	ELEVATOR									
		PERSONNEL ELEVATOR		1.00 LS	1,272,000	-					1,272,000
		ELEVATOR			1,272,000						1,272,000
	24.37.00	ROOFING									
		REPAIR ROOF	TURBINE BUILDING ROOF	2,400.00 SF	-	-	10,200	143	5,578	365	16,143
		ROOFING					10,200	143	5,578	365	16,143
	24.41.00	SIDING									
		METAL, UNINSULATED, 24 GA, GALVANIZED CORRUGATED	CLOSING OPENINGS AND REPLACING SIDING AS REQUIRED	4,000.00 SF	-	-	13,000	361	17,576	3,326	33,903
		SIDING					13,000	361	17,576	3,326	33,903
		ARCHITECTURAL			1,272,000		23,200	503	23,154	3,692	1,322,046
27.00.00		PAINTING & COATING									
	27.17.00	PAINTING									
		STEEL PAINTING	EXTERIOR PAINTING, POST DISMANTLEMENT	35,500.00 SF	-	-	35,500	2,734	127,585	15,308	178,393
		STEEL PAINTING	INTERIOR PAINTING, TURBINE BUILDING	68,000.00 SF	-	-	68,000	5,237	244,389	29,322	341,710
		PAINTING					103,500	7,970	371,974	44,629	520,103
		PAINTING & COATING					103,500	7,970	371,974	44,629	520,103
41.00.00		ELECTRICAL EQUIPMENT									
	41.35.00	LIGHTNING PROTECTION									
		LIGHTNING PROTECTION	ALLOWANCE	1.00 LS	100,000	-					100,000
		LIGHTNING PROTECTION			100,000						100,000
	41.37.00	LIGHTING ACCESSORY (FIXTURE)									
		LIGHTING - FIXTURES, ACCESSORY	ALLOWANCE	1.00 LS	50,000	-					50,000
		LIGHTING ACCESSORY (FIXTURE)			50,000						50,000
		ELECTRICAL EQUIPMENT			150,000						150,000

TEC
BIG BEND STATION
UNIT 1 ENGINEERING DEMOLITION SUPPORT

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35159A
Cost index	FLTAM

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Estimate No.: 35159A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 1 ENGINEERING DEMOLITION SUPPORT

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost

Estimate Totals

Description	Amount	Totals	Hours
Labor			
Material			
Subcontract			
Construction Equipment			
Process Equipment			
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision			
90-2 Show-up Time			
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management			
91-2 Field Office Expenses			
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety			
91-6 Temporary Facilities			
91-7 Temporary Utilities			
91-8 Mobilization/Demob.			
91-9 Legal Expenses/Claims			
Other Construction Indirects			
92-1 Small Tools & Consumables			
92-2 Scaffolding			
92-3 General Liability Insur.			
92-4 Constr. Equip. Mob/Demob			
92-5 Freight on Material			
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A			
92-9 Contractors Profit			
Project Indirect Costs			
93-1 Engineering Services	1,480,250		
93-2 CM Support	1,225,000		
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
	2,705,250	**2,705,250**	
Contingency			
94-1 Contingency on Const Eq			
94-3 Contingency on Material			
94-4 Contingency on Labor			
94-5 Contingency on Subcontr.			
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	541,100		
	541,100	**3,246,350**	
Escalation			
96-1 Escalation on Const Equip			
96-3 Escalation on Material			
96-4 Escalation on Labor			
96-5 Escalation on Subcontract			
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	156,100		
	156,100	**3,402,450**	
98 Interest During Constr			
		3,402,450	
Total		**3,402,450**	

TEC
BIG BEND STATION
UNIT 2 PRE DEMOLITION MODIFICATIONS

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
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Estimate No.	35160A
Cost index	FLTAM

Estimate No.: 35160A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 2 PRE DEMOLITION MODIFICATIONS

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
21.00.00	CIVIL WORK				53	3,102	833	3,935
22.00.00	CONCRETE			52,836	874	39,234	7,833	99,904
23.00.00	STEEL			199,355	4,230	231,491	96,237	527,084
35.00.00	PIPING	350,000						350,000
41.00.00	ELECTRICAL EQUIPMENT	130,000	2,800,000		3,357	181,107	38,466	3,149,573
42.00.00	RACEWAY, CABLE TRAY & CONDUIT	400,000		302,540	20,411	1,194,069	25,048	1,921,657
43.00.00	CABLE	300,000		913,553	12,935	766,932	185,779	2,166,264
44.00.00	CONTROL & INSTRUMENTATION	300,000						300,000
	TOTAL DIRECT	1,480,000	2,800,000	1,468,284	41,862	2,415,936	354,197	8,518,417

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Estimate Totals

Description	Amount	Totals	Hours
Labor	2,415,936		41,862
Material	1,468,284		
Subcontract	1,480,000		
Construction Equipment	354,197		
Process Equipment	2,800,000		
	8,518,417	8,518,417	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	144,956		
90-2 Show-up Time	48,319		
90-3 Cost Due To OT 5-10's	472,683		
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	522,964		
91-2 Field Office Expenses	321,481		
91-3 Material&Quality Control	81,486		
91-4 Site Services	66,926		
91-5 Safety	51,545		
91-6 Temporary Facilities	39,216		
91-7 Temporary Utilities	42,974		
91-8 Mobilization/Demob.	41,330		
91-9 Legal Expenses/Claims	6,106		
Other Construction Indirects			
92-1 Small Tools & Consumables	78,276		
92-2 Scaffolding	182,645		
92-3 General Liability Insur.	26,092		
92-4 Constr. Equip. Mob/Demob	3,542		
92-5 Freight on Material	73,414		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	448,892		
92-9 Contractors Profit	641,274		
	3,294,121	11,812,538	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning	236,251		
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
	236,251	12,048,789	
Contingency			
94-1 Contingency on Const Eq	83,591		
94-3 Contingency on Material	360,757		
94-4 Contingency on Labor	1,062,160		
94-5 Contingency on Subcontr.	296,000		
94-6 Contingency on Process Eq	560,000		
94-7 Contingency on Indirect	47,250		
	2,409,758	14,458,547	
Escalation			
96-1 Escalation on Const Equip	7,650		
96-3 Escalation on Material	26,366		
96-4 Escalation on Labor	145,656		
96-5 Escalation on Subcontract	34,953		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	9,239		
	223,864	14,682,411	
98 Interest During Constr			
		14,682,411	
Total		**14,682,411**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
21.00.00		CIVIL WORK									
	21.17.00	EXCAVATION									
		FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	202.50 CY	-	-		33	1,941	522	2,463
		EXCAVATION						33	1,941	522	2,463
	21.19.00	DISPOSAL									
		DISPOSAL OF EXCESS MATERIAL USING DUMP TRUCK, 4 MI ROUND TRIP	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	135.74 CY	-	-		9	521	140	660
		DISPOSAL						9	521	140	660
	21.20.00	BACKFILL									
		FOUNDATION BACKFILL, PREVIOUSLY EXCAVATED MATERIAL	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	66.76 CY	-	-		11	640	172	812
		BACKFILL						11	640	172	812
		CIVIL WORK						53	3,102	833	3,935
22.00.00		CONCRETE									
	22.13.00	CONCRETE									
		MAT FOUNDATION LESS THAN 5 FT THICK, 4500 PSI	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	173.33 CY	-	-	21,667	238	9,067	2,739	33,472
		MAT FOUNDATION LESS THAN 5 FT THICK, 4500 PSI	ROUND PIER, 3FT DIA X 4FT HIGH	31.42 CY	-	-	3,928	43	1,644	496	6,068
		CONCRETE					25,594	282	10,711	3,235	39,540
	22.15.00	EMBEDMENT									
		EMBEDMENTS, CARBON STEEL	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	1,733.33 LB	-	-	5,200	95	4,123	158	9,480
		EMBEDMENTS, CARBON STEEL	ROUND PIER, 3FT DIA X 4FT HIGH	310.00 LB	-	-	930	17	737	28	1,696
		EMBEDMENT					6,130	112	4,860	186	11,176
	22.17.00	FORMWORK									
		BUILT UP INSTALL & STRIP	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	534.00 SF	-	-	1,335	117	5,361	854	7,551
		3FT DIA ROUND FIBER TUBE	ROUND PIER, 3FT DIA X 4FT HIGH	120.00 LF		-	2,352	26	1,205	192	3,749
		FORMWORK					3,687	144	6,566	1,046	11,299
	22.25.00	REINFORCING									
		UNCOATED A615 GR60	65FT L x 24FT W X 3FTD FOUNDATION FOR PDC BUILDING	13.00 TN	-	-	13,325	257	13,075	2,574	28,974
		UNCOATED A615 GR60	ROUND PIER, 3FT DIA X 4FT HIGH	4.00 TN	-	-	4,100	79	4,023	792	8,915
		REINFORCING					17,425	337	17,098	3,366	37,889
		CONCRETE					52,836	874	39,234	7,833	99,904
23.00.00		STEEL									
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	BRACING FOR ADDITIONS	41.00 TN	-	-	129,355	1,150	62,937	19,181	211,473
		REINFORCING EXISTING STRUCTURAL STEEL WITH COVER PLATES	STABILITY BRACING FOR TURBINE BUILDING	20.00 TN	-	-	70,000	3,080	168,554	77,056	315,610
		ROLLED SHAPE					199,355	4,230	231,491	96,237	527,084
		STEEL					199,355	4,230	231,491	96,237	527,084
35.00.00		PIPING									
	35.13.45	MISC. ABOVE GROUND, PROCESS AREA									
		MODIFICATIONS TO EXISTING PIPE SYSTEMS: NATURAL GAS HEADER, AMMONIA SUPPLY HEADER, FIRE PROTECTION, SERVICE WATER, COMPRESS AIR AND GASES PIPING		1.00 LS	350,000	-					350,000
		MISC. ABOVE GROUND, PROCESS AREA			350,000						350,000
		PIPING			350,000						350,000
41.00.00		ELECTRICAL EQUIPMENT									

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	41.45.00	MOTOR CONTROL CENTER (MCC), COMPLETE									
		1600A, 480V (MCC:A)	(15) VERTICAL SECTIONS, MAIN BREAKER, STARTERS, FUSED DISCONNECTS, INSTALL IN PDC ENCLOSURE	1.00 EA	-	150,000		360	19,210	1,148	170,358
		1600A, 480V (MCC:B)	(15) VERTICAL SECTIONS, MAIN BREAKER, STARTERS, FUSED DISCONNECTS, INSTALL IN PDC ENCLOSURE	1.00 EA	-	150,000		360	19,210	1,148	170,358
		CALIBRATION, LOAD ADJUSTMENT, TESTING	TEST & DOCUMENTATION	1.00 LT	-			53	3,131	758	3,889
		MOTOR CONTROL CENTER (MCC), COMPLETE				300,000		773	41,550	3,055	344,605
	41.47.00	PANEL: CONTROL, DISTRIBUTION, & RELAY									
		STATION RESERVE SYSTEM RECONFIGURATION	ALLOWANCE	1.00 LS	100,000	-					100,000
		PANEL: CONTROL, DISTRIBUTION, & RELAY			100,000						100,000
	41.51.00	POWER TRANSFORMER									
		2500/3333 KVA, 4160V-480V DRY TYPE TRANSFORMER: A	INSTALL ON BOTH END OF SUBSTATION - INSTALL INSIDE OF PDC BUILDING (ALLOWANCE)	2.00 EA	-	300,000		330	17,558	4,683	322,241
		2500/3333 KVA, 4160V-480V DRY TYPE TRANSFORMER: B	INSTALL ON BOTH END OF SUBSTATION - INSTALL INSIDE OF PDC BUILDING (ALLOWANCE)	2.00 EA	-	300,000		330	17,558	4,683	322,241
		POWER TRANSFORMER				600,000		660	35,116	9,366	644,482
	41.52.00	POWER DISTRIBUTION CENTER (PDC)									
		POWER DISTRIBUTION CENTER (PDC)	ASSUMED 1560SF. INCLUDING: HVAC, LIGHTING, COMMUNICATION, FIRE ALARM, POWER BACKUP UPS SYSTEMS, ASSOCIATED CONDUIT WIRE AND STAIRS, @ FRONT & BACK SIDE OF PREFAB ENCLOSURE W/STEEL FRAME SUPPORT (ALLOWANCE)	1,560.00 SF	-	750,000		858	46,954	21,466	818,420
		POWER FOR PDC BUILDING	ALLOWANCE	1.00 LT	30,000	-					30,000
		POWER DISTRIBUTION CENTER (PDC)			30,000	750,000		858	46,954	21,466	848,420
	41.55.00	SWITCHGEAR, COMPLETE									
		4000A, 480V, SWITCHGEAR: A DOUBLE END SUBSTATION	(4) VERTICAL SECTIONS, (2)MAIN BREAKERS, (1) 4000A BREAKER, INSTALL IN PDC ENCLOSURE	1.00 LS	-	275,000		240	12,806	766	288,572
		4000A, 480V, SWITCHGEAR: B DOUBLE END SUBSTATION	(4) VERTICAL SECTIONS, (2)MAIN BREAKERS, (1) 4000A BREAKER, INSTALL IN PDC ENCLOSURE	1.00 LS	-	275,000		240	12,806	766	288,572
		3000A, 4160V, SWITCHGEAR: A DOUBLE END SUBSTATION	(4) VERTICAL SECTIONS, INSTALL IN PDC ENCLOSURE	1.00 LS	-	300,000		240	12,806	766	313,572
		3000A, 4160V, SWITCHGEAR: B DOUBLE END SUBSTATION	(4) VERTICAL SECTIONS, INSTALL IN PDC ENCLOSURE	1.00 LS	-	300,000		240	12,806	766	313,572
		CALIBRATION, LOAD ADJUSTMENT, TESTING	TEST & DOCUMENTATION	1.00 LS	-	-		106	6,262	1,517	7,778
		SWITCHGEAR, COMPLETE				1,150,000		1,066	57,487	4,579	1,212,066
		ELECTRICAL EQUIPMENT			**130,000**	**2,800,000**		**3,357**	**181,107**	**38,466**	**3,149,573**
42.00.00		**RACEWAY, CABLE TRAY & CONDUIT**									
	42.13.06	CABLE TRAY COVER, GALVANIZED STEEL									
		36 IN WIDE INCLUDING FITTINGS	RACEWAY TO THE NEW 4.16KB GEAR	2,000.00 LF	-	-	13,240	385	22,525	473	36,237
		CABLE TRAY COVER, GALVANIZED STEEL					13,240	385	22,525	473	36,237
	42.13.47	CABLE TRAY, GALVANIZED STEEL									
		36 IN WIDE LADDER TYPE INCLUDING SUPPORTS AND FITTINGS	RACEWAY TO THE NEW 4.16KB GEAR	3,000.00 LF	-	-	103,560	6,941	406,025	8,517	518,102
		CABLE TRAY, GALVANIZED STEEL					103,560	6,941	406,025	8,517	518,102
	42.15.13	CONDUIT, ALUMINUM									
		1 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		37,000.00 LF	-	-	104,340	8,751	511,955	10,739	627,035
		1-1/2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		4,000.00 LF	-	-	18,800	1,127	65,901	1,382	86,083
		2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		4,000.00 LF	-	-	25,600	1,395	81,604	1,712	108,916

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	42.15.13	**CONDUIT, ALUMINUM**									
		2-1/2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		4,000.00 LF	-	-	37,000	1,813	106,059	2,225	145,284
		MISCELLANEOUS SIZE CONDUITS	ALLOWANCE	1.00 LS	400,000	-					400,000
		CONDUIT, ALUMINUM			**400,000**		**185,740**	**13,086**	**765,520**	**16,058**	**1,367,318**
		RACEWAY, CABLE TRAY & CONDUIT			**400,000**		**302,540**	**20,411**	**1,194,069**	**25,048**	**1,921,657**
43.00.00		**CABLE**									
	43.10.00	**CONTROL/INSTRUMENTATION/COMMUNICATION CABLE & TERMINATION**									
		CONTROL/INSTRUMENTATION/COMMUNICATION CABLES + TERMINATION	ALLOWANCE	1.00 LS	200,000	-		0	0		200,000
		CONTROL/INSTRUMENTATION/COMMUNICATION CABLES + TERMINATION	ALLOWANCE	1.00 LS	100,000	-		0	0		100,000
		CONTROL/INSTRUMENTATION/COMMUNICATION CABLE & TERMINATION			**300,000**			**0**	**0**		**300,000**
	43.20.00	**600V CABLE & TERMINATION**									
		600V #10 3/C CU XLPE LSZH	36 CABLES x 1000FT=	36,000.00 LF	-	-	51,840	1,109	65,747	15,926	133,514
		600V #8 3/C CU EPR TS-CPE	22 CABLES x 1000FT=	22,000.00 LF	-	-	41,580	774	45,919	11,123	98,622
		600V #6 3/C CU EPR TS-CPE	11 CABLES x 1000FT=	11,000.00 LF	-	-	27,060	557	33,004	7,995	68,059
		600V #4 3/C CU EPR TS-CPE	4 CABLES x 1000FT=	4,000.00 LF	-	-	12,280	238	14,089	3,413	29,782
		600V #1/0 3/C W/G CU EPR TS-CPE	8 CABLES x 1000FT=	8,000.00 LF	-	-	46,800	686	40,701	9,859	97,360
		600V #4/0 3/C CU	6 CABLES x 1000FT=	6,000.00 LF	-	-	70,920	640	37,961	9,196	118,077
		600V #750 KCMIL 3/C CU	FOR TURBINE SHOP FEEDER	1,000.00 LF	-	-	29,350	274	16,241	3,934	49,525
		TERMINATION - COMPRESSION LUG, #10, 1 HOLE, COPPER	36 CABLES x 3 x 2=	216.00 EA	-	-	475	59	3,522	853	4,851
		TERMINATION - COMPRESSION LUG, #8, 2 HOLE, COPPER	22 CABLES x 3 x 2=	132.00 EA	-	-	858	44	2,583	626	4,067
		TERMINATION - COMPRESSION LUG, #6, 2 HOLE, COPPER	11 CABLES x 3 x 2=	66.00 EA	-	-	594	29	1,722	417	2,733
		TERMINATION - COMPRESSION LUG, #4, 2 HOLE, COPPER	4 CABLES x 3 x 2=	24.00 EA	-	-	222	13	783	190	1,194
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	8 CABLES x 3 x 2=	48.00 EA	-	-	660	38	2,254	546	3,460
		TERMINATION - COMPRESSION LUG, #4/0, 2 HOLE, COPPER	6 CABLES x 3 x 2=	36.00 EA	-	-	648	44	2,583	626	3,857
		TERMINATION - COMPRESSION LUG, #750, 2 HOLE, COPPER	FOR TURBINE SHOP FEEDER TERMINATIONS	6.00 EA	-	-	372	20	1,186	287	1,845
		600V CABLE & TERMINATION					**283,659**	**4,525**	**268,295**	**64,991**	**616,945**
	43.40.00	**5/8KV CABLE & TERMINATION**									
		5KV #1/0 3/C CU EPR TS-CPE	FOR AIR COMRESSOR:3	1,000.00 LF	-	-	12,550	79	4,664	1,130	18,343
		5/8KV #500 KCMIL 1/C CU	48 CABLES, CROSS TIE BETWEEN UNIT 1 SWITCHGEAR TO UNIT 4 EXISTING SWITCHGEAR FOR RESERVE 1 CONNECTION. CROSS TIE BETEEN UNIT 1 RESERVE SWITCHGEAR TO RESERVE 3 CONNECTION.	48,000.00 LF	-	-	318,240	4,488	266,120	64,464	648,824
		5/8KV #750 KCMIL 1/C CU	FOR MAIN FEEDER TO 4160V SWITCHGEAR - (2) X 2 CIRCUIT	6,000.00 LF	-	-	58,380	640	37,961	9,196	105,537
		5/8KV #750 KCMIL 1/C CU	12 CABLES x 1000FT, FOR NEW 4.16KV SWITCHGEAR "A" FEED	12,000.00 LF	-	-	116,760	1,281	75,923	18,391	211,074
		5/8KV #750 KCMIL 1/C CU	12 CABLES x 1000FT, FOR NEW 4.16KV SWITCHGEAR "B" FEED	12,000.00 LF	-	-	116,760	1,281	75,923	18,391	211,074
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	FOR AIR COMRESSOR:3	6.00 EA	-	-	84	13	783	190	1,056
		TERMINATION - COMPRESSION LUG, #500, 2 HOLE, COPPER	CROSS TIE BETWEEN UNIT 1 SWITCHGEAR TO UNIT 4 EXISTING SWITCHGEAR FOR RESERVE 1 CONNECTION	96.00 EA	-	-	3,648	349	20,663	5,005	29,317
		TERMINATION - COMPRESSION LUG, #750, 2 HOLE, COPPER	FOR MAIN FEEDER TO 4160V SWITCHGEAR - (2) X 2 CIRCUIT	8.00 EA	-	-	496	40	2,372	574	3,442
		TERMINATION - COMPRESSION LUG, #750, 2 HOLE, COPPER	FOR NEW 4.16KV SWITCHGEAR	48.00 EA	-	-	2,976	240	14,230	3,447	20,653
		5/8KV CABLE & TERMINATION					**629,894**	**8,410**	**498,637**	**120,788**	**1,249,320**

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
		CABLE			**300,000**		**913,553**	**12,935**	**766,932**	**185,779**	**2,166,264**
44.00.00		**CONTROL & INSTRUMENTATION**									
	44.13.00	**CONTROL SYSTEM**									
		DISTRIBUTED CONTROL SYSTEM, RE-PROGRAMMING COST	SERVICE BY VENDOR (ALLOWANCE)	1.00 EA	300,000	-					300,000
		CONTROL SYSTEM			**300,000**						**300,000**
		CONTROL & INSTRUMENTATION			**300,000**						**300,000**

TEC
BIG BEND STATION
UNIT 2 DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35161A

Estimate No.: 35161A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 2 DEMOLITION

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00	WHOLE PLANT DEMOLITION	7,333,198			60,553	2,818,845	1,285,679	11,437,722
11.00.00	DEMOLITION				374	20,452	10,286	30,737
21.00.00	CIVIL WORK	595,310						595,310
22.00.00	CONCRETE	40,000		206,055	1,085	41,254	13,708	301,017
23.00.00	STEEL			322,575	1,955	106,978	53,802	483,354
	TOTAL DIRECT	7,968,508		528,630	63,966	2,987,528	1,363,475	12,848,141

Estimate Totals

Description	Amount	Totals	Hours
Labor	2,987,528		63,966
Material	528,630		
Subcontract	7,968,508		
Construction Equipment	1,363,475		
Process Equipment			
	12,848,141	12,848,141	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	179,252		
90-2 Show-up Time	59,751		
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	646,694		
91-2 Field Office Expenses	70,984		
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety	63,740		
91-6 Temporary Facilities	48,495		
91-7 Temporary Utilities			
91-8 Mobilization/Demob.	51,108		
91-9 Legal Expenses/Claims	7,550		
Other Construction Indirects			
92-1 Small Tools & Consumables	32,265		
92-2 Scaffolding			
92-3 General Liability Insur.	32,265		
92-4 Constr. Equip. Mob/Demob	13,635		
92-5 Freight on Material	26,432		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	424,613		
92-9 Contractors Profit	606,590		
	2,263,374	15,111,515	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost	2,945,415		
93-8 EPC Fee			
	2,945,415	18,056,930	
Contingency			
94-1 Contingency on Const Eq	321,780		
94-3 Contingency on Material	129,884		
94-4 Contingency on Labor	976,937		
94-5 Contingency on Subcontr.	1,593,702		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	589,083		
	3,611,386	21,668,316	
Escalation			
96-1 Escalation on Const Equip	103,304		
96-3 Escalation on Material	28,641		
96-4 Escalation on Labor	474,683		
96-5 Escalation on Subcontract	602,941		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	248,669		
	1,458,238	23,126,554	
98 Interest During Constr			
		23,126,554	
Total		**23,126,554**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00		WHOLE PLANT DEMOLITION									
	10.22.00	CONCRETE									
		BUILDING/EQUIPMENT FOUNDATION/PAD		1,130.00 CY	-	-		2,288	125,900	49,564	175,463
		CONCRETE						2,288	125,900	49,564	175,463
	10.23.00	STEEL									
		STRUCTURAL, GIRT AND GALLERY STEEL	BOILER	2,347.00 TN	-	-		3,815	190,612	61,655	252,267
		STRUCTURAL, GIRT AND GALLERY STEEL	PRECIP BOX	1,292.00 TN	-	-		1,706	85,255	27,577	112,832
		STRUCTURAL, GIRT AND GALLERY STEEL	PRECIP STEEL	401.00 TN	-	-		530	26,461	8,559	35,020
		STRUCTURAL, GIRT AND GALLERY STEEL	FGD (50% SPLIT UNIT 1 & 2)	389.00 TN	-	-		514	25,669	8,303	33,972
		STRUCTURAL, GIRT AND GALLERY STEEL	FLY ASH SILO #1 AND STEEL (50% SPLIT UNIT 1 & 2)	46.00 TN	-	-		61	3,035	982	4,017
		STRUCTURAL, GIRT AND GALLERY STEEL	BALANCED DRAFT STEEL	243.00 TN	-	-		321	16,035	5,187	21,222
		STRUCTURAL, GIRT AND GALLERY STEEL	SCR	950.00 TN	-	-		1,255	62,688	20,277	82,965
		DEMO CIRCULATING WATER DISCHARGE STRUCTURE		1.00 LS	500,000	-					500,000
		DUCTWORK AND STEEL SUPPORTS	DUCTWORK REMOVAL	1,535.00 TN	-	-		5,332	225,276	119,650	344,926
		DUCTWORK AND STEEL SUPPORTS	SCR DUCTWORK REMOVAL	764.00 TN	-	-		2,654	112,124	59,552	171,676
		STEEL			500,000			16,187	747,155	311,740	1,558,896
	10.25.00	CONCRETE CHIMNEY & STACK									
		CONCRETE CHIMNEY	50% OF WET STACK COST	0.50 LS	1,725,000	-					1,725,000
		CONCRETE CHIMNEY	50% OF DRY STACK COST	0.50 LS	150,000	-					150,000
		CONCRETE CHIMNEY & STACK			1,875,000						1,875,000
	10.26.00	MISCELLANEOUS STRUCTURAL ITEM									
		PROTECT WFGD ELECTRICAL BUILDING		1.00 LS	125,000	-					125,000
		MISCELLANEOUS STRUCTURAL ITEM			125,000						125,000
	10.31.00	MECHANICAL EQUIPMENT									
		MAIN BOILER AND APPURTENANCES		8,279.00 TN	-	-		21,794	1,088,852	469,235	1,558,086
		STEAM TURBINE GENERATOR		1,392.00 TN	-	-		3,664	154,823	82,230	237,053
		FEEDWATER DEARATING EQUIPMENT		147.00 TN	-	-		387	16,350	8,684	25,034
		BOP EQUIPMENT INCLUDING PUMPS, HEAT EXCHANGERS, COMPRESSORS, TANKS, CHEMICAL FEED, WATER AND OIL SYSTEMS, ETC.		1,043.00 TN	-	-		2,746	116,006	61,613	177,619
		ASH / DUST COLLECTOR EQUIPMENT		183.00 TN	-	-		482	20,354	10,810	31,164
		FGD EQUIPMENT		220.00 TN	-	-		579	24,469	12,996	37,465
		CONDENSER		349.00 TN	-	-		919	38,817	20,617	59,433
		MECHANICAL EQUIPMENT						30,571	1,459,670	666,185	2,125,855
	10.33.00	MATERIAL HANDLING EQUIPMENT									
		COAL HANDLING FACILITIES	50% SPLIT BETWEEN UNITS 1 & 2	1.00 LS	1,600,000	-					1,600,000
		MATERIAL HANDLING EQUIPMENT			1,600,000						1,600,000
	10.35.00	PIPING									
		PIPING, VALVES AND HANGERS	INCLUDES ALL PIPING SYSTEMS WITHIN THE BOILER AND TURBINE AREA SUCH AS: MAIN STEAM, HOT/COLD REHEAT, BOILER FEED, FEEDWATER, CONDENSATE, SERVICE WATER, ETC.	1,832.00 TN	-	-		6,364	268,864	142,800	411,664
		PIPING						6,364	268,864	142,800	411,664
	10.37.00	ASBESTOS REMOVAL									
		ASBESTOS ABATEMENT	COST PROVIDED BY TECO	1.00 LS	3,153,198	-	-		-	-	3,153,198
		ASBESTOS REMOVAL			3,153,198						3,153,198
	10.41.00	ELECTRICAL EQUIPMENT									
		TRANSFORMERS	GSUT, IPBD, SST	40.00 TN	-	-		107	4,516	2,398	6,914
		MISCELLANEOUS ELECTRICAL EQUIPMENT	MCC'S, SWITCHGEAR, BATTERIES, CABINETS, PANELS, MOTORS, ETC.	368.00 TN	-	-		983	41,544	22,065	63,609
		ELECTRICAL EQUIPMENT						1,090	46,060	24,464	70,523
	10.42.00	RACEWAY, CABLE TRAY, & CONDUIT									
		CONDUIT		168.00 TN	-	-		1,092	46,137	24,504	70,641
		CABLE TRAY		200.00 TN	-	-		1,200	50,700	26,928	77,628
		RACEWAY, CABLE TRAY, & CONDUIT						2,292	96,837	51,432	148,269
	10.43.00	CABLE									

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	10.43.00	CABLE									
		CABLE STRIPPABLE		176.00 TN	-	-		1,760	74,360	39,494	113,854
		CABLE						1,760	74,360	39,494	113,854
	10.99.00	DEMOLITION, MISCELLANEOUS									
		DRAIN PROTECTION		1.00 LS	80,000	-					80,000
		DEMOLITION, MISCELLANEOUS			80,000						80,000
		WHOLE PLANT DEMOLITION			7,333,198			60,553	2,818,845	1,285,679	11,437,722
11.00.00		DEMOLITION									
	11.23.00	STEEL									
		STRUCTURAL STEEL	REMOVE TEMPORARY STEEL FOR SCR	77.00 TN	-	-		250	13,694	6,887	20,581
		STRUCTURAL STEEL	REMOVE TEMPORARY STEEL FOR BOILER	38.00 TN	-	-		124	6,758	3,399	10,157
		STEEL						374	20,452	10,286	30,737
		DEMOLITION						374	20,452	10,286	30,737
21.00.00		CIVIL WORK									
	21.21.00	MASS FILL									
		MASS FILL, COMMON EARTH	BACKFILL COAL PILE AREA WITH 2.5 FT OF SOIL	22,250.00 CY	534,000						534,000
		MASS FILL			534,000						534,000
	21.47.00	LANDSCAPING									
		HYDRO SEEDING	COAL PILE AREA	7.50 AC	17,310	-	-		-	-	17,310
		LANDSCAPING			17,310						17,310
	21.52.00	WASTE DISPOSAL									
		WASTE DISPOSAL		4,000.00 CY	44,000	-					44,000
		WASTE DISPOSAL			44,000						44,000
		CIVIL WORK			595,310						595,310
22.00.00		CONCRETE									
	22.13.00	CONCRETE									
		FLOWABLE FILL, 1500 PSI	FILL CIRCULATING WATER TUNNEL	2,169.00 CY	-	-	206,055	1,085	41,254	13,708	261,017
		CONCRETE FLOOD WALL REPAIRS		1.00 LS	40,000	-					40,000
		CONCRETE			40,000		206,055	1,085	41,254	13,708	301,017
		CONCRETE			40,000		206,055	1,085	41,254	13,708	301,017
23.00.00		STEEL									
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, PRIME PAINTED ONLY	TEMPORARY STEEL FOR SCR	77.00 TN	-	-	215,985	1,309	71,628	36,024	323,637
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, PRIME PAINTED ONLY	TEMPORARY STEEL FOR BOILER	38.00 TN	-	-	106,590	646	35,349	17,778	159,717
		ROLLED SHAPE					322,575	1,955	106,978	53,802	483,354
		STEEL					322,575	1,955	106,978	53,802	483,354

TEC
BIG BEND STATION
UNIT 2 POST DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35162A
Cost index	FLTAM

Estimate No.: 35162A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 2 POST DEMOLITION

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00	WHOLE PLANT DEMOLITION	250,000						250,000
21.00.00	CIVIL WORK			145,431	420	20,223	8,678	174,332
23.00.00	STEEL			776,909	5,779	315,023	74,998	1,166,930
24.00.00	ARCHITECTURAL			23,888	729	31,993	4,920	60,801
27.00.00	PAINTING & COATING			103,500	7,970	371,974	44,629	520,103
41.00.00	ELECTRICAL EQUIPMENT	250,000						250,000
	TOTAL DIRECT	500,000		1,049,727	14,899	739,213	133,225	2,422,166

Estimate Totals

Description	Amount	Totals	Hours
Labor	739,213		14,899
Material	1,049,727		
Subcontract	500,000		
Construction Equipment	133,225		
Process Equipment			
	2,422,165	**2,422,165**	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	44,400		
90-2 Show-up Time	14,800		
90-3 Cost Due To OT 5-10's	144,600		
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	160,000		
91-2 Field Office Expenses	98,400		
91-3 Material&Quality Control	24,900		
91-4 Site Services	20,500		
91-5 Safety	15,800		
91-6 Temporary Facilities	12,000		
91-7 Temporary Utilities	13,100		
91-8 Mobilization/Demob.	12,600		
91-9 Legal Expenses/Claims	1,900		
Other Construction Indirects			
92-1 Small Tools & Consumables	24,000		
92-2 Scaffolding	55,900		
92-3 General Liability Insur.	8,000		
92-4 Constr. Equip. Mob/Demob	1,300		
92-5 Freight on Material	52,500		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	183,200		
92-9 Contractors Profit	261,700		
	1,149,600	**3,571,765**	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost	733,370		
93-8 EPC Fee			
	733,370	**4,305,135**	
Contingency			
94-1 Contingency on Const Eq	31,400		
94-3 Contingency on Material	257,900		
94-4 Contingency on Labor	325,000		
94-5 Contingency on Subcontr.	100,000		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	146,700		
	861,000	**5,166,135**	
Escalation			
96-1 Escalation on Const Equip	11,600		
96-3 Escalation on Material	120,000		
96-4 Escalation on Labor	182,500		
96-5 Escalation on Subcontract	57,800		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	94,400		
	466,300	**5,632,435**	
98 Interest During Constr			
		5,632,435	
Total		**5,632,435**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00		WHOLE PLANT DEMOLITION									
	10.99.00	DEMOLITION, MISCELLANEOUS									
		INSPECT, CLEAN OUT AND REPAIR DRAINS		1.00 LS	250,000	-					250,000
		DEMOLITION, MISCELLANEOUS			250,000						250,000
		WHOLE PLANT DEMOLITION			250,000						250,000
21.00.00		CIVIL WORK									
	21.57.00	ROAD, PARKING AREA, & SURFACED AREA									
		BITUMINOUS ASPHALT	ASPHALT TO REPAVE REMOVED BOILER AREA AND TO THE SOUTH	1,469.00 TN	-	-	145,431	420	20,223	8,678	174,332
		ROAD, PARKING AREA, & SURFACED AREA					145,431	420	20,223	8,678	174,332
		CIVIL WORK					145,431	420	20,223	8,678	174,332
23.00.00		STEEL									
	23.17.00	GALLERY									
		GALVANIZED GRATING, 1 1/4" DEEP x 3/16" BEARING BAR WITH HOLD DOWN CLIPS	EGRESS STAIR TOWER LOCATED AT UNIT 2	650.00 SF	-	-	9,750	114	6,198	811	16,759
		GALVANIZED GRATING, 2" DEEP x 3/16" BEARING BAR WITH HOLD DOWN CLIPS	FOR TURBINE DECK GRATING	6,190.00 SF	-	-	173,072	1,362	73,776	9,656	256,505
		DOUBLE PIPE HANDRAIL WITH POSTS AND GUARD PLATES, PAINTED	EGRESS STAIR TOWER LOCATED AT UNIT 2	1,100.00 LF	-	-	58,300	218	11,799	1,544	71,644
		DOUBLE PIPE HANDRAIL WITH POSTS AND GUARD PLATES, PAINTED	FOR TURBINE DECK GRATING	43.00 LF	-	-	2,279	9	461	60	2,801
		METAL GRATING STAIR TREADS 4 FT WIDE, INCLUDING STRINGER, HANDRAIL NOT INCLUDED	EGRESS STAIR TOWER LOCATED AT UNIT 2	320.00 EA	-	-	134,400	528	28,605	3,744	166,749
		GALLERY					377,801	2,231	120,839	15,816	514,457
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	EGRESS STAIR TOWER LOCATED AT UNIT 2	63.00 TN	-	-	198,765	1,767	96,708	29,474	324,947
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	FOR TURBINE DECK GRATING	63.50 TN	-	-	200,343	1,781	97,476	29,708	327,526
		ROLLED SHAPE					399,108	3,549	194,184	59,182	652,473
		STEEL					776,909	5,779	315,023	74,998	1,166,930
24.00.00		ARCHITECTURAL									
	24.37.00	ROOFING									
		METAL, UNINSULATED	REPLACE ROOF AT COOLING TOWER WITH ALLOWANCE FOR OPENINGS AND OTHER LOCATIONS	3,350.00 SF	-	-	10,888	369	14,417	1,889	27,194
		ROOFING					10,888	369	14,417	1,889	27,194
	24.41.00	SIDING									
		METAL, UNINSULATED, 24 GA, GALVANIZED CORRUGATED	CLOSING OPENINGS AND REPLACING SIDING AS REQUIRED	4,000.00 SF	-	-	13,000	361	17,576	3,031	33,607
		SIDING					13,000	361	17,576	3,031	33,607
		ARCHITECTURAL					23,888	729	31,993	4,920	60,801
27.00.00		PAINTING & COATING									
	27.17.00	PAINTING									
		STEEL PAINTING	EXTERIOR PAINTING, POST DISMANTLEMENT	35,500.00 SF	-	-	35,500	2,734	127,585	15,308	178,393
		STEEL PAINTING	INTERIOR PAINTING, TURBINE BUILDING	68,000.00 SF	-	-	68,000	5,237	244,389	29,322	341,710
		PAINTING					103,500	7,970	371,974	44,629	520,103
		PAINTING & COATING					103,500	7,970	371,974	44,629	520,103
41.00.00		ELECTRICAL EQUIPMENT									
	41.35.00	LIGHTNING PROTECTION									
		LIGHTNING PROTECTION	ALLOWANCE	1.00 LS	100,000	-					100,000
		LIGHTNING PROTECTION			100,000						100,000
	41.37.00	LIGHTING ACCESSORY (FIXTURE)									

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	41.37.00	LIGHTING ACCESSORY (FIXTURE)									
		LIGHTING - FIXTURES, ACCESSORY	ALLOWANCE	1.00 LS	150,000	-					150,000
		LIGHTING ACCESSORY (FIXTURE)			150,000						150,000
		ELECTRICAL EQUIPMENT			250,000						250,000

TEC
BIG BEND STATION
UNIT 2 ENGINEERING DEMOLITION SUPPORT

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	35163A
Cost index	FLTAM

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Estimate No.: 35163A
Project No.: A09476-073
Estimate Date: 6/18/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 2 ENGINEERING DEMOLITION SUPPORT

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost

Estimate Totals

Description	Amount	Totals	Hours
Labor			
Material			
Subcontract			
Construction Equipment			
Process Equipment			
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision			
90-2 Show-up Time			
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management			
91-2 Field Office Expenses			
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety			
91-6 Temporary Facilities			
91-7 Temporary Utilities			
91-8 Mobilization/Demob.			
91-9 Legal Expenses/Claims			
Other Construction Indirects			
92-1 Small Tools & Consumables			
92-2 Scaffolding			
92-3 General Liability Insur.			
92-4 Constr. Equip. Mob/Demob			
92-5 Freight on Material			
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A			
92-9 Contractors Profit			
Project Indirect Costs			
93-1 Engineering Services	2,023,050		
93-2 CM Support	1,085,000		
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
	3,108,050	**3,108,050**	
Contingency			
94-1 Contingency on Const Eq			
94-3 Contingency on Material			
94-4 Contingency on Labor			
94-5 Contingency on Subcontr.			
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	621,600		
	621,600	**3,729,650**	
Escalation			
96-1 Escalation on Const Equip			
96-3 Escalation on Material			
96-4 Escalation on Labor			
96-5 Escalation on Subcontract			
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	163,500		
	163,500	**3,893,150**	
98 Interest During Constr			
		3,893,150	
Total		**3,893,150**	

TEC
BIG BEND STATION DEMOLITION
SCRAP VALUE

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-073
Estimate Date	6/18/20
Reviewed By	BA
Approved By	BA
Estimate No.	34565B

Estimate No.: 34565B
Project No.: A09476-073
Estimate Date: 6/18/20
Prep/Rev/App: GA/BA/BA

TEC
BIG BEND STATION DEMOLITION
SCRAP VALUE

Sargent & Lundy

Area	Description	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
UNIT 1	UNIT 1 SCRAP VALUE		(3,548,900)					(3,548,900)
UNIT 2	UNIT 2 SCRAP VALUE		(4,217,943)					(4,217,943)
	TOTAL DIRECT		(7,766,843)					(7,766,843)

TEC
BIG BEND STATION DEMOLITION
SCRAP VALUE

Sargent & Lundy

Estimate Totals

Description	Amount	Totals	Hours
Labor			
Material			
Subcontract			
Construction Equipment			
Process Equipment	(7,766,843)		
	(7,766,843)	(7,766,843)	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision			
90-2 Show-up Time			
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management			
91-2 Field Office Expenses			
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety			
91-6 Temporary Facilities			
91-7 Temporary Utilities			
91-8 Mobilization/Demob.			
91-9 Legal Expenses/Claims			
Other Construction Indirects			
92-1 Small Tools & Consumables			
92-2 Scaffolding			
92-3 General Liability Insur.			
92-4 Constr. Equip. Mob/Demob			
92-5 Freight on Material			
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A			
92-9 Contractors Profit			
		(7,766,843)	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
		(7,766,843)	
Contingency			
94-1 Contingency on Const Eq			
94-3 Contingency on Material			
94-4 Contingency on Labor			
94-5 Contingency on Subcontr.			
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect			
		(7,766,843)	
Escalation			
96-1 Escalation on Const Equip			
96-3 Escalation on Material			
96-4 Escalation on Labor			
96-5 Escalation on Subcontract			
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects			
		(7,766,843)	
98 Interest During Constr			
		(7,766,843)	
Total		**(7,766,843)**	

Estimate No.: 34565B
Project No.: A09476-073
Estimate Date: 6/18/20
Prep/Rev/Appr: GA/BA/BA

TEC
BIG BEND STATION DEMOLITION
SCRAP VALUE

Sargent & Lundy

Area	Group	Phase	Description	Notes	Quantity	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
UNIT 1			UNIT 1 SCRAP VALUE									
	18.00.00		SCRAP VALUE									
		18.10.00	MIXED STEEL									
			CARBON STEEL, FREIGHT INCLUDED	INCLUDES CONTINGENCY	-19,142.00 TN	-	(3,290,510)	-				(3,290,510)
			MIXED STEEL				(3,290,510)					(3,290,510)
		18.30.00	COPPER									
			#1 INSULATED COPPER WIRE 65%, FREIGHT INCLUDED	INCLUDES CONTINGENCY	-132.00 TN	-	(258,390)	-				(258,390)
			COPPER				(258,390)					(258,390)
			SCRAP VALUE				(3,548,900)					(3,548,900)
			UNIT 1 UNIT 1 SCRAP VALUE				(3,548,900)					(3,548,900)
UNIT 2			UNIT 2 SCRAP VALUE									
	18.00.00		SCRAP VALUE									
		18.10.00	MIXED STEEL									
			CARBON STEEL, FREIGHT INCLUDED	INCLUDES CONTINGENCY	-22,458.00 TN	-	(3,860,530)	-				(3,860,530)
			CARBON STEEL, FREIGHT INCLUDED	CIRC WATER DISCHARGE STRUCTURE, INCLUDES CONTINGENCY	-75.00 TN	-	(12,892)	-				(12,892)
			MIXED STEEL				(3,873,423)					(3,873,423)
		18.30.00	COPPER									
			#1 INSULATED COPPER WIRE 65%, FREIGHT INCLUDED	INCLUDES CONTINGENCY	-176.00 TN	-	(344,520)	-				(344,520)
			COPPER				(344,520)					(344,520)
			SCRAP VALUE				(4,217,943)					(4,217,943)
			UNIT 2 UNIT 2 SCRAP VALUE				(4,217,943)					(4,217,943)

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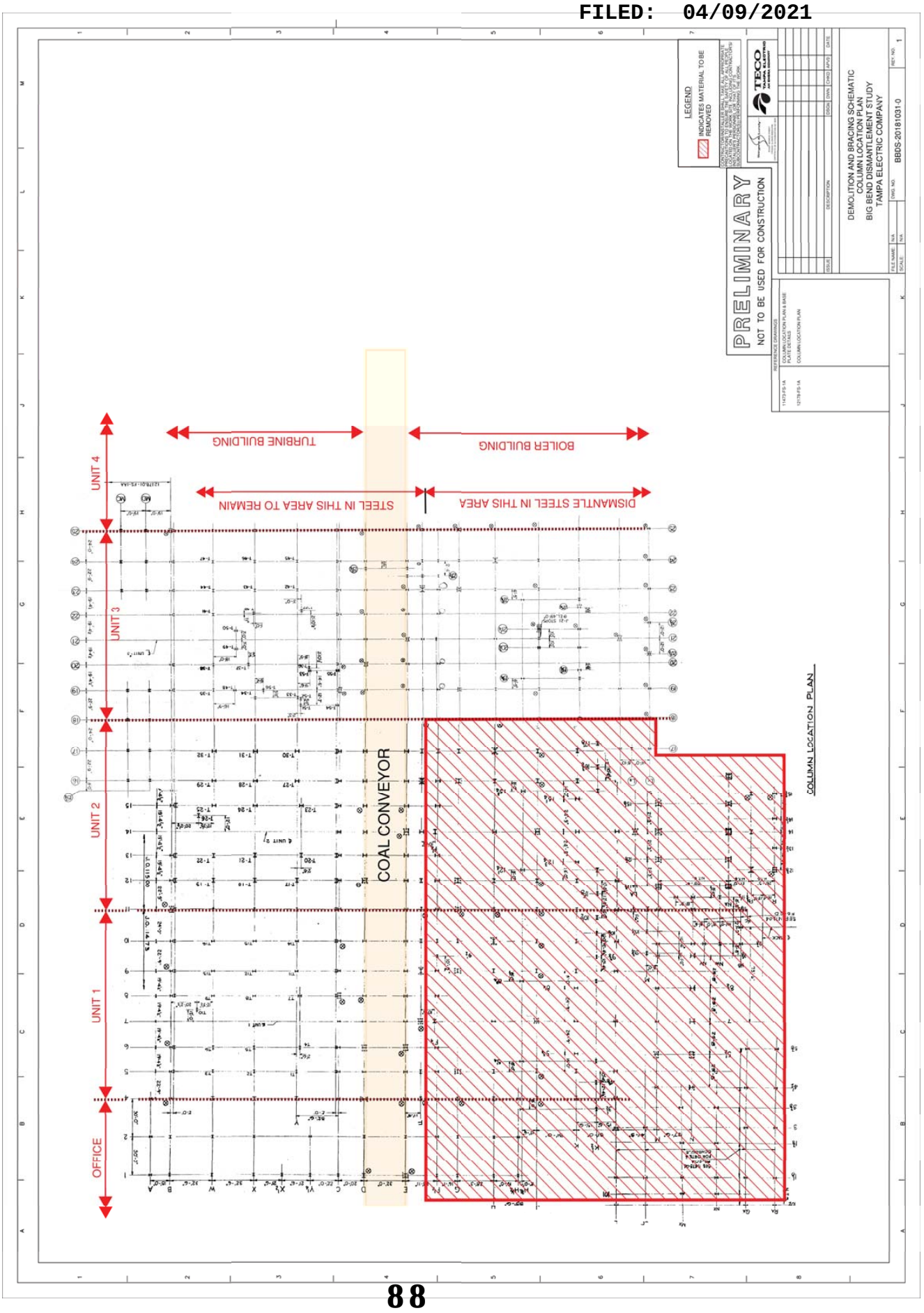
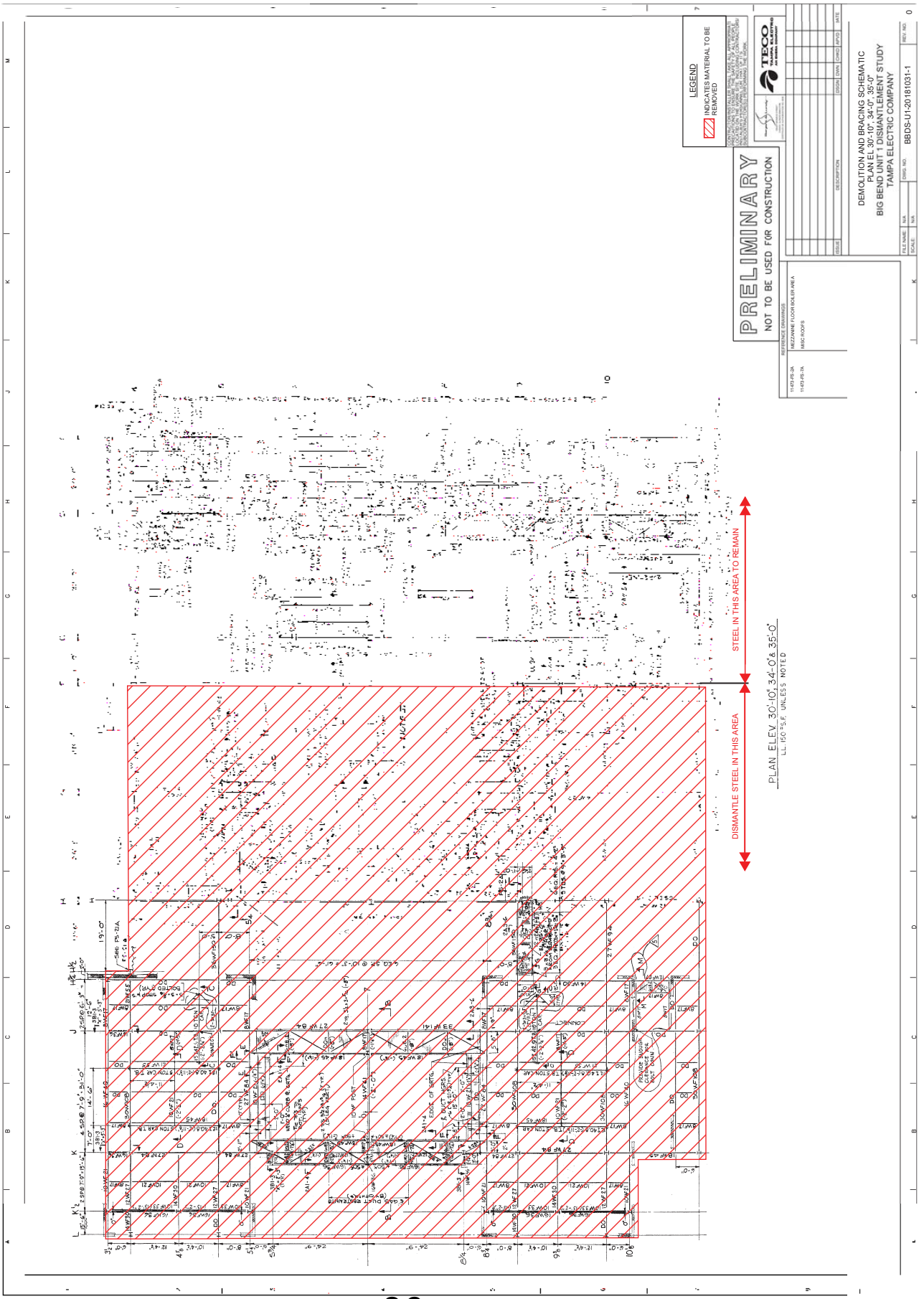
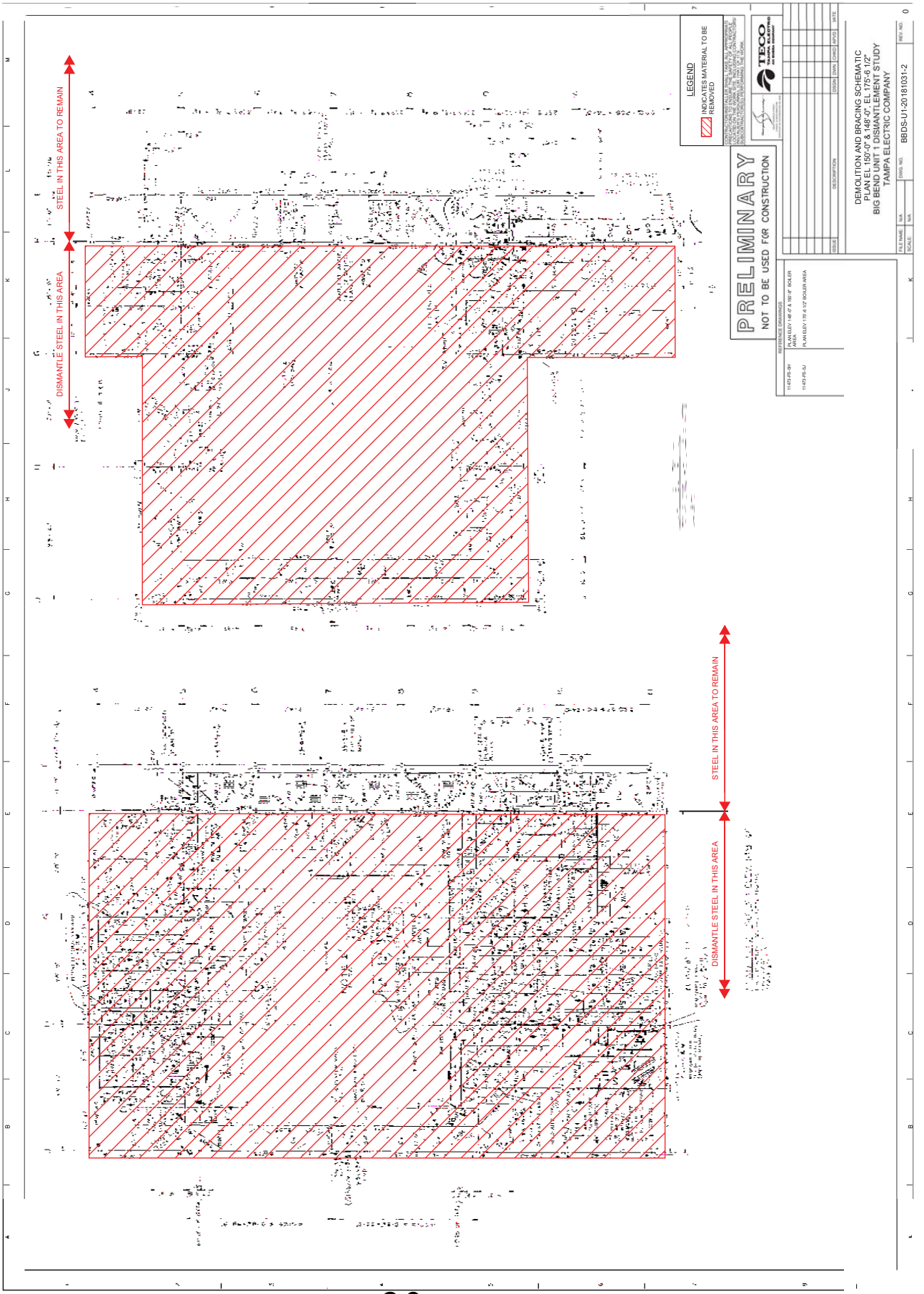
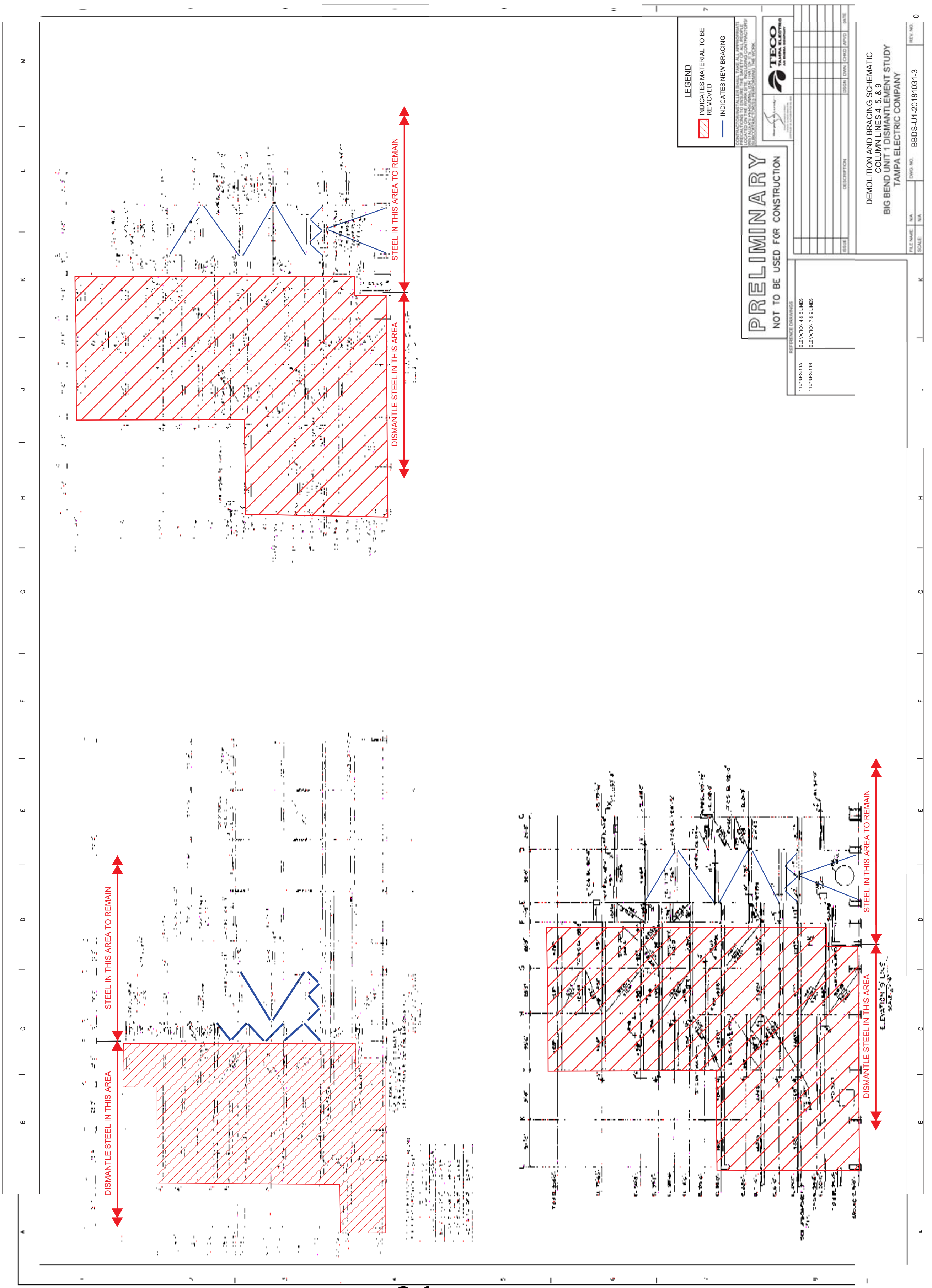
ATTACHMENT 2

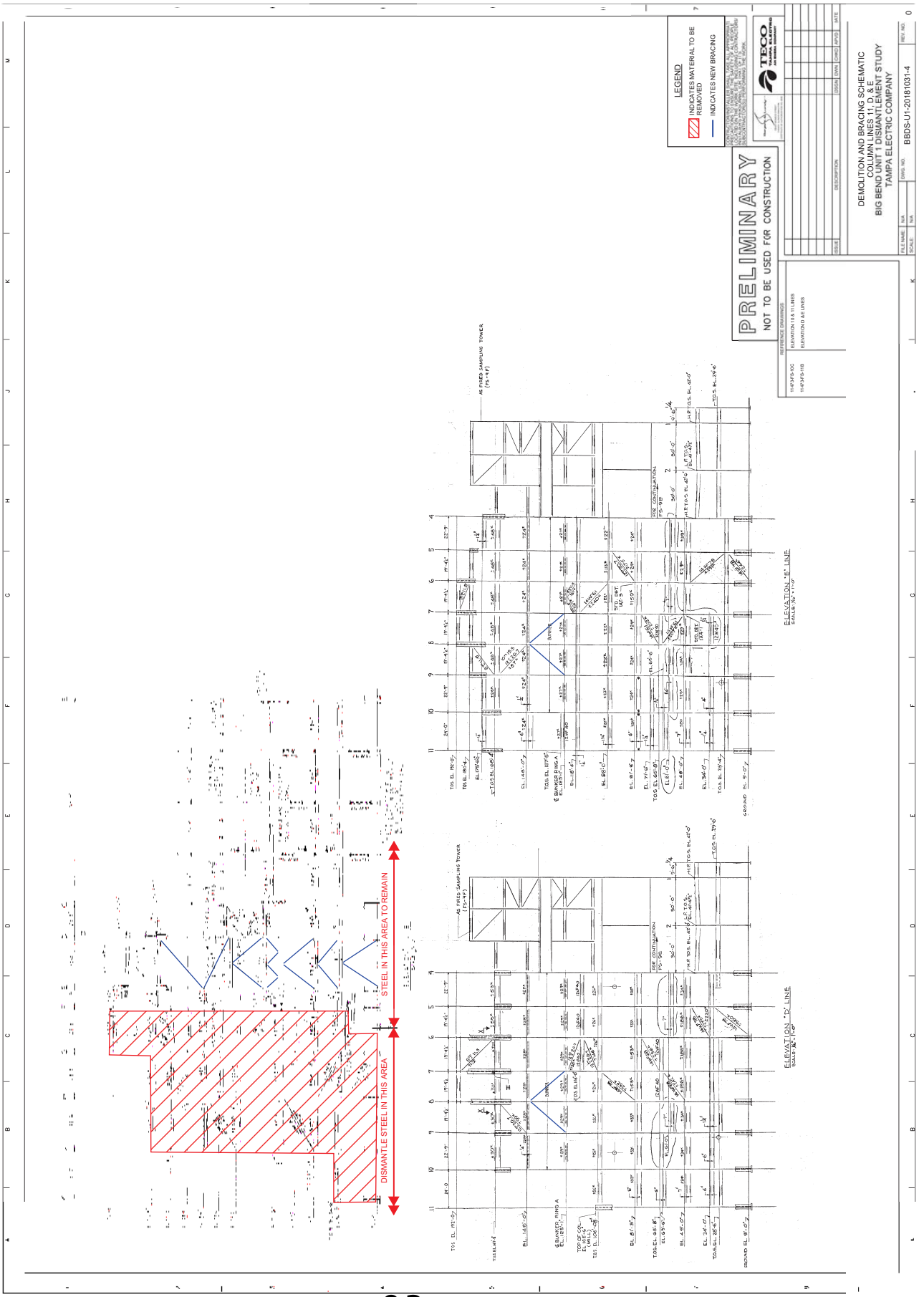
Boiler Building Demolition and Bracing Schematics

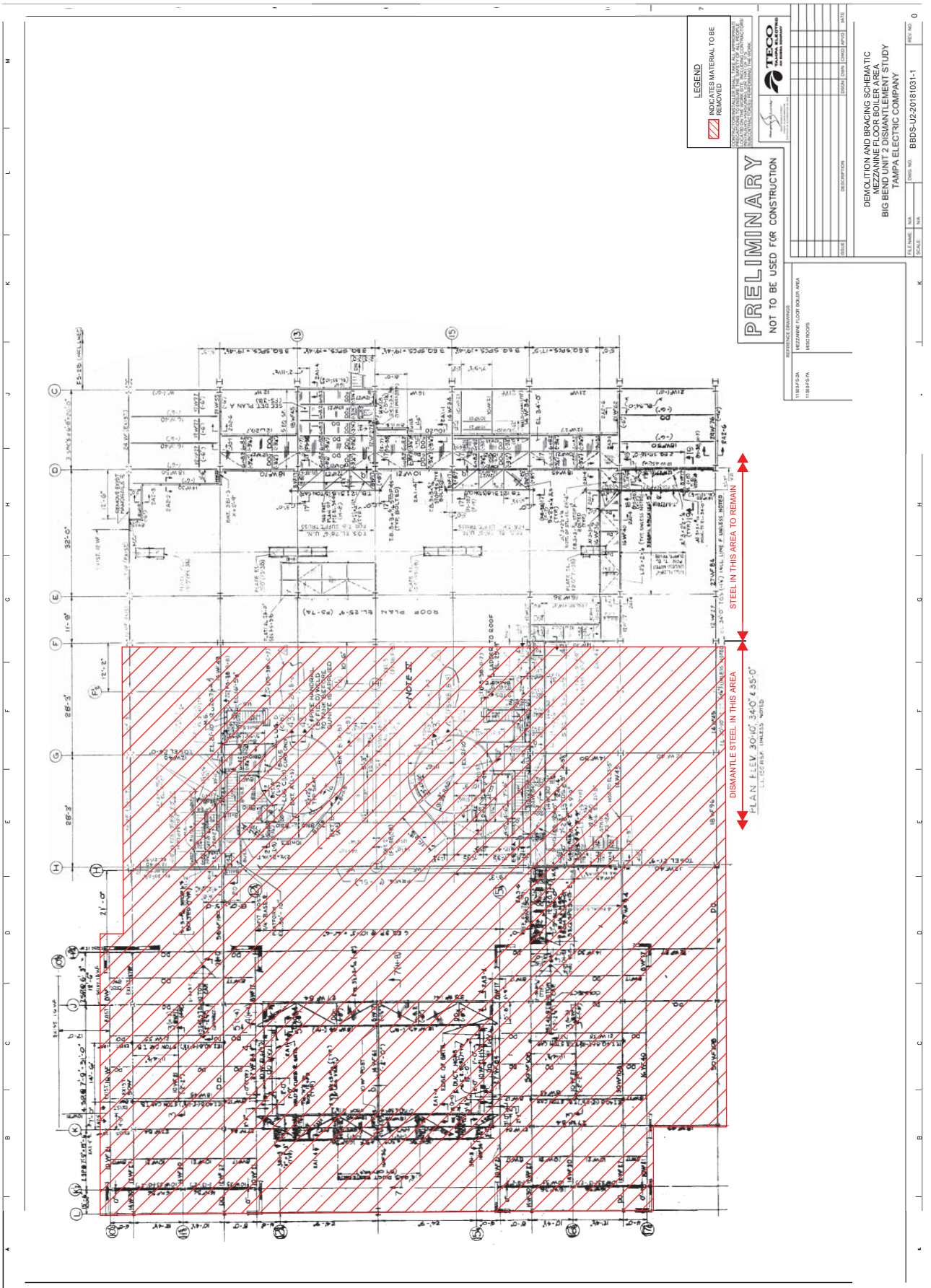

LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
COLUMN LOCATION PLAN
BIG BEND DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-20181031-0
TURBINE BUILDING
BOILER BUILDING
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
UNIT 4
UNIT 3
UNIT 2
UNIT 1
OFFICE
COAL CONVEYOR
COLUMN LOCATION PLAN

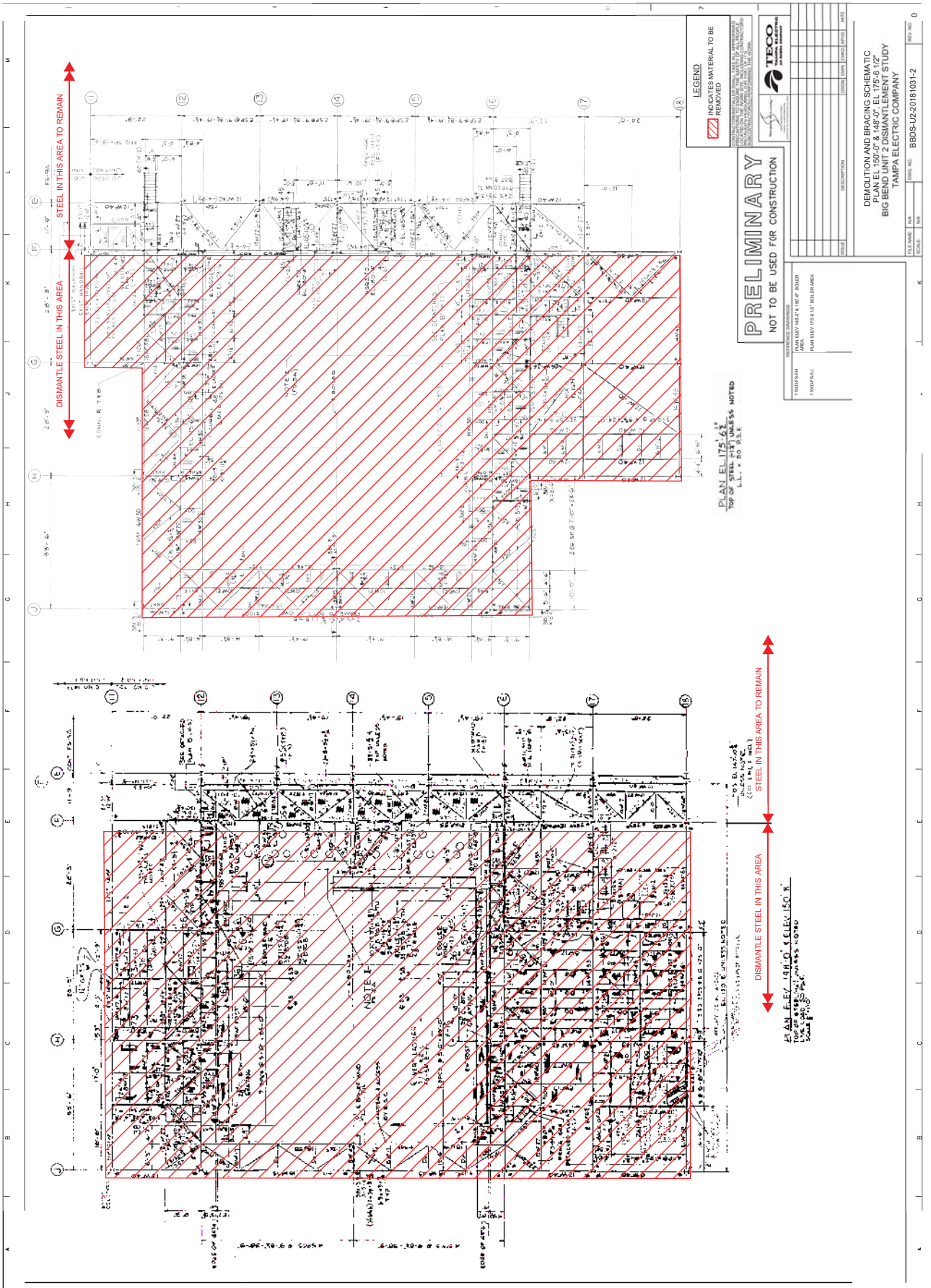

LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
PLAN EL 30'-10", 34'-0", 35'-0"
BIG BEND UNIT 1 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U1-20181031-1
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
PLAN ELEV 30'-10", 34'-0" & 35'-0"
LL 150 PSF UNLESS NOTED

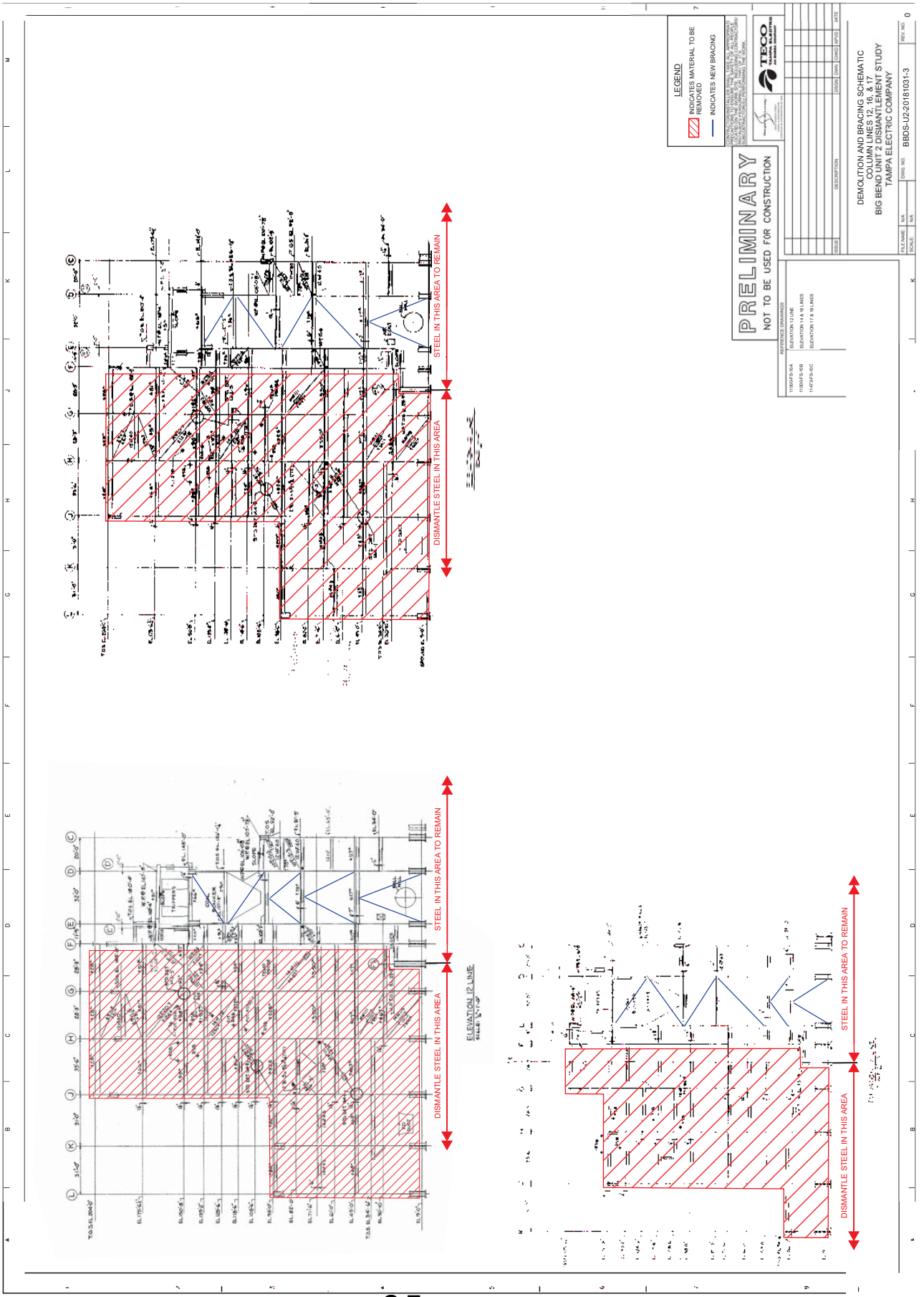

LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
PLAN EL 150'-0" & 148'-0", EL 175'-6 1/2"
BIG BEND UNIT 1 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U1-20181031-2
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA

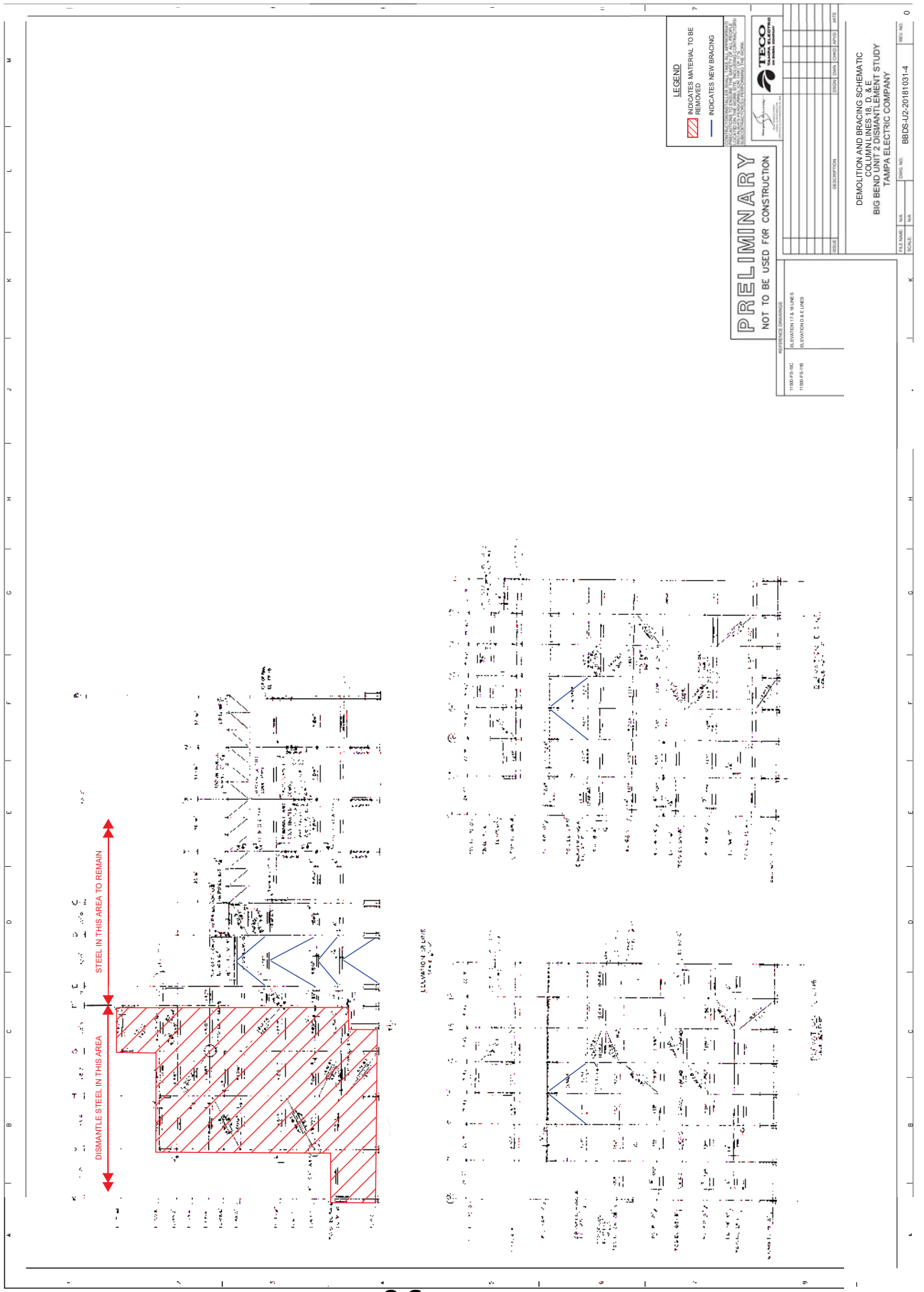

LEGEND
INDICATES MATERIAL TO BE REMOVED
INDICATES NEW BRACING
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
TECO
TAMPA ELECTRIC
DEMOLITION AND BRACING SCHEMATIC
COLUMN LINES 4, 5, & 9
BIG BEND UNIT 1 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U1-20181031-3
REFERENCE DRAWINGS
ELEVATION 4 & 5 LINES
ELEVATION 7 & 9 LINES
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA


PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
LEGEND
INDICATES MATERIAL TO BE REMOVED
INDICATES NEW BRACING
DEMOLITION AND BRACING SCHEMATIC
COLUMN LINES 11 & E
BIG BEND UNIT 1 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U1-20181031-4
ELEVATION "E" LINE
ELEVATION "D" LINE
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA


LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
MEZZANINE FLOOR BOILER AREA
BIG BEND UNIT 2 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U2-20181031-1
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
PLAN ELEV. 30'-0", 34'-0" & 35'-0"
NOTE 11


LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
PLAN EL 150'-0" & 148'-0", EL 175'-6 1/2"
BIG BEND UNIT 2 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U2-20181031-2
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
PLAN EL 175'-6 1/2"
TOP OF STEEL (TYP) UNLESS NOTED
L.L. = 80 PSF
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA


LEGEND
INDICATES MATERIAL TO BE REMOVED
INDICATES NEW BRACING
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
COLUMN LINES 12, 16, & 17
BIG BEND UNIT 2 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U2-20181031-3
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
ELEVATION 12 LINE
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA


LEGEND
INDICATES MATERIAL TO BE REMOVED
INDICATES NEW BRACING
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
COLUMN LINES 18 & E
BIG BEND UNIT 2 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U2-20181031-4
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA

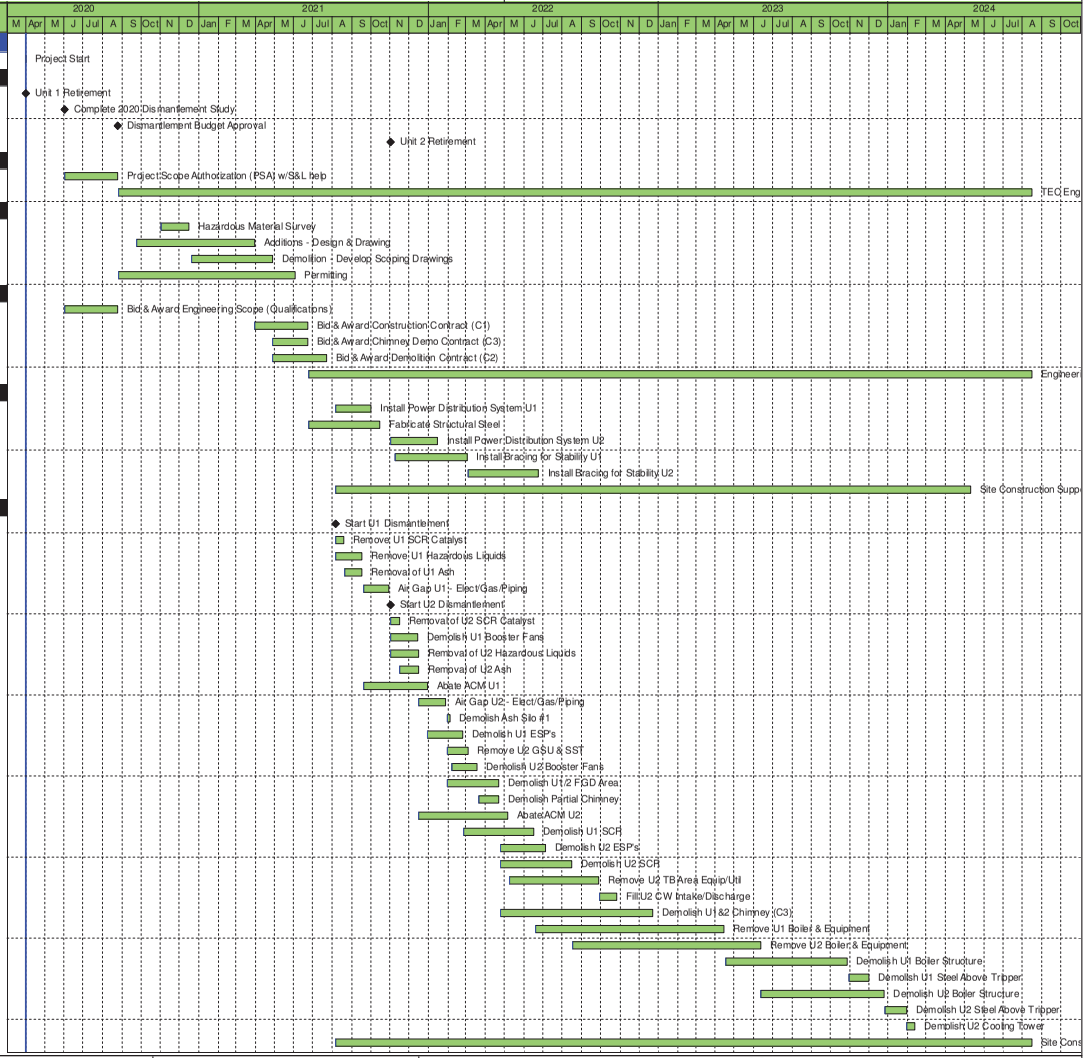
ATTACHMENT 3

Dismantling Sequence Schedule

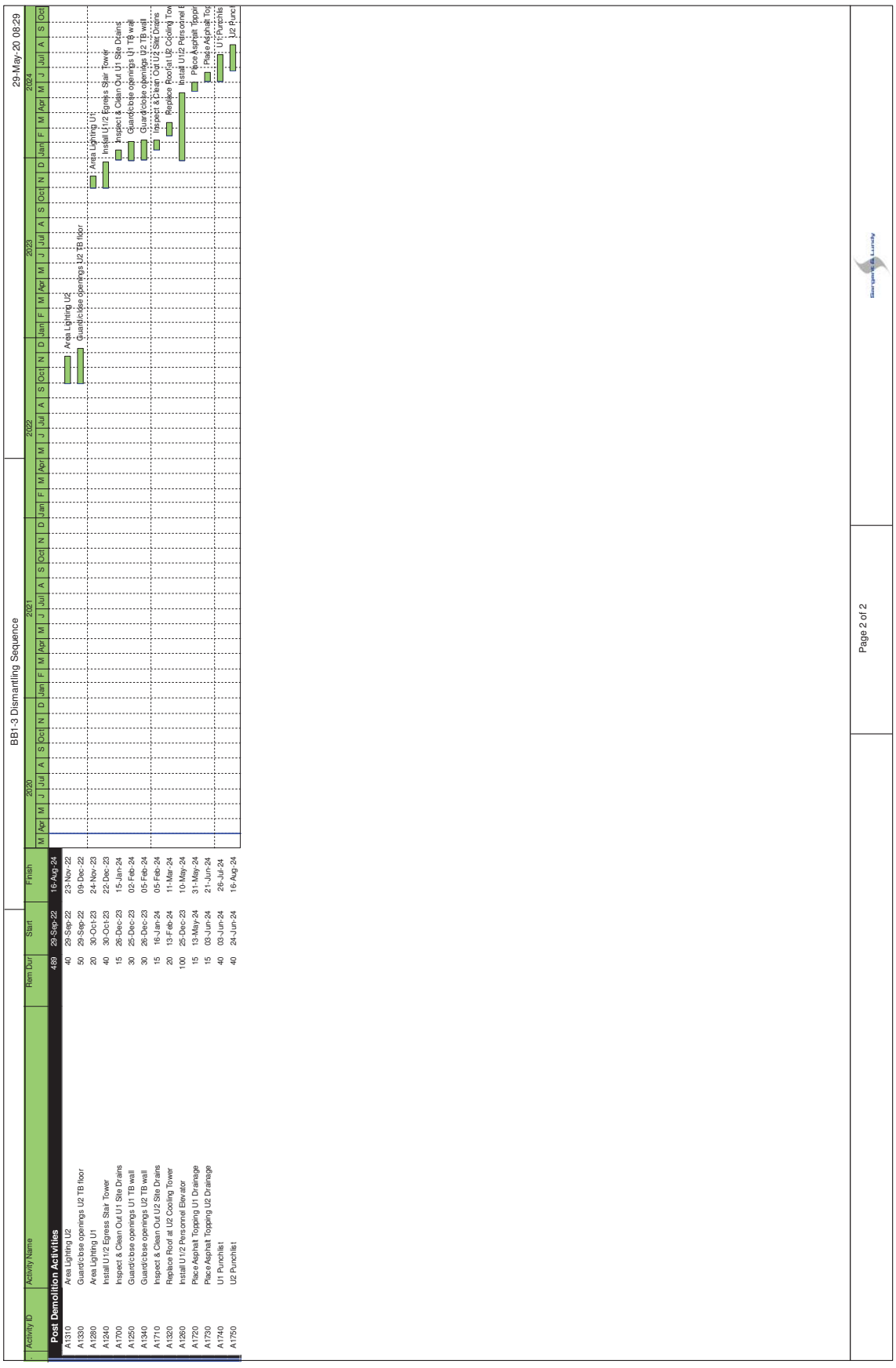
BB1-3 Dismantling Sequence

29-May-20 08:29

Activity ID	Activity Name	Rem Dur	Start	Finish
BB1-3 Dismantling Sequence		1123	01-Apr-20	16-Aug-24
A1000	Project Start	0	01-Apr-20	01-Apr-20
Milestones		404	01-Apr-20	01-Nov-21
A1020	Unit 1 Retirement	0		01-Apr-20
A1030	Complete 2020 Dismantlement Study	0		01-Jun-20*
A1040	Dismantlement Budget Approval	0		25-Aug-20*
A1050	Unit 2 Retirement	0		01-Nov-21*
TEC Activities		1080	02-Jun-20	16-Aug-24
A1070	Project Scope Authorization (PSA) w/S&L help	60	02-Jun-20	25-Aug-20
A1080	TEC Engineering Staff	1020	26-Aug-20	16-Aug-24
Engineering		195	26-Aug-20	02-Jun-21
A1120	Hazardous Material Survey	30	02-Nov-20*	15-Dec-20
A1110	Additions - Design & Drawing	130	24-Sep-20	30-Mar-21
A1130	Demolition - Develop Scoping Drawings	90	21-Dec-20	27-Apr-21
A1100	Permitting	195	26-Aug-20	02-Jun-21
Procurement		1080	02-Jun-20	16-Aug-24
A1150	Bid & Award Engineering Scope (Qualifications)	60	02-Jun-20	25-Aug-20
A1160	Bid & Award Construction Contract (C1)	60	31-Mar-21	23-Jun-21
A1180	Bid & Award Chimney Demo Contract (C3)	40	28-Apr-21	23-Jun-21
A1170	Bid & Award Demolition Contract (C2)	60	28-Apr-21	22-Jul-21
A1190	Engineering Home Office Support	810	24-Jun-21	16-Aug-24
New Construction (Additions) (C1)		740	24-Jun-21	10-May-24
A1270	Install Power Distribution System U1	40	06-Aug-21	01-Oct-21
A1220	Fabricate Structural Steel	80	24-Jun-21	15-Oct-21
A1300	Install Power Distribution System U2	50	02-Nov-21	14-Jan-22
A1230	Install Bracing for Stability U1	80	08-Nov-21	03-Mar-22
A1290	Install Bracing for Stability U2	80	04-Mar-22	24-Jun-22
A1210	Site Construction Support (Additions)	710	06-Aug-21	10-May-24
Dismantling (C2 unless noted)		780	06-Aug-21	16-Aug-24
A1370	Start U1 Dismantlement	0	06-Aug-21	
A1390	Remove U1 SCR Catalyst	10	06-Aug-21	19-Aug-21
A1380	Remove U1 Hazardous Liquids	30	06-Aug-21	17-Sep-21
A1400	Removal of U1 Ash	20	20-Aug-21	17-Sep-21
A1410	Air Gap U1 - Elect/Gas/Piping	30	20-Sep-21	29-Oct-21
A1420	Start U2 Dismantlement	0	02-Nov-21	
A1440	Removal of U2 SCR Catalyst	10	02-Nov-21	15-Nov-21
A1510	Demolish U1 Booster Fans	30	01-Nov-21	14-Dec-21
A1430	Removal of U2 Hazardous Liquids	30	02-Nov-21	15-Dec-21
A1450	Removal of U2 Ash	20	16-Nov-21	15-Dec-21
A1460	Abate ACM U1	70	20-Sep-21	29-Dec-21
A1480	Air Gap U2 - Elect/Gas/Piping	30	16-Dec-21	28-Jan-22
A1550	Demolish Ash Silo #1	5	31-Jan-22	04-Feb-22
A1520	Demolish U1 ESP's	40	30-Dec-21	24-Feb-22
A1530	Remove U2 GSU & SST	25	31-Jan-22	04-Mar-22
A1560	Demolish U2 Booster Fans	30	07-Feb-22	18-Mar-22
A1540	Demolish U1/2 FGD Area	60	31-Jan-22	22-Apr-22
A1570	Demolish Partial Chimney	25	21-Mar-22	22-Apr-22
A1470	Abate ACM U2	100	16-Dec-21	06-May-22
A1590	Demolish U1 SCR	80	25-Feb-22	17-Jun-22
A1580	Demolish U2 ESP's	50	25-Apr-22	05-Jul-22
A1600	Demolish U2 SCR	80	25-Apr-22	16-Aug-22
A1490	Remove U2 TB Area Equip/Util	100	09-May-22	28-Sep-22
A1500	Fill U2 CW Intake/Discharge	20	29-Sep-22	26-Oct-22
A1640	Demolish U1&2 Chimney (C3)	170	25-Apr-22	23-Dec-22
A1610	Remove U1 Boiler & Equipment	210	20-Jun-22	14-Apr-23
A1650	Remove U2 Boiler & Equipment	210	17-Aug-22	12-Jun-23
A1620	Demolish U1 Boiler Structure	140	17-Apr-23	27-Oct-23
A1630	Demolish U1 Steel Above Tripper	25	30-Oct-23	01-Dec-23
A1660	Demolish U2 Boiler Structure	140	13-Jun-23	25-Dec-23
A1670	Demolish U2 Steel Above Tripper	25	26-Dec-23	29-Jan-24
A1680	Demolish U2 Cooling Tower	10	30-Jan-24	12-Feb-24
A1360	Site Construction Support (Demolition)	780	06-Aug-21	16-Aug-24



Sargent & Lundy



Activity ID	Activity Name	Rem Dur	Start	Finish
Post Demolition Activities		489	29-Sep-22	16-Aug-24
A1310	Area Lighting U2	40	29-Sep-22	23-Nov-22
A1330	Guard/close openings U2 TB floor	50	29-Sep-22	09-Dec-22
A1280	Area Lighting U1	20	30-Oct-23	24-Nov-23
A1240	Install U1/2 Egress Stair Tower	40	30-Oct-23	22-Dec-23
A1700	Inspect & Clean Out U1 Site Drains	15	26-Dec-23	15-Jan-24
A1250	Guard/close openings U1 TB wall	30	25-Dec-23	02-Feb-24
A1340	Guard/close openings U2 TB wall	30	26-Dec-23	05-Feb-24
A1710	Inspect & Clean Out U2 Site Drains	15	16-Jan-24	05-Feb-24
A1320	Replace Roof at U2 Cooling Tower	20	13-Feb-24	11-Mar-24
A1260	Install U1/2 Personnel Elevator	100	25-Dec-23	10-May-24
A1720	Place Asphalt Topping U1 Drainage	15	13-May-24	31-May-24
A1730	Place Asphalt Topping U2 Drainage	15	03-Jun-24	21-Jun-24
A1740	U1 Punchlist	40	03-Jun-24	26-Jul-24
A1750	U2 Punchlist	40	24-Jun-24	16-Aug-24

ATTACHMENT 4

Repowering List

4160V SWGR A						
SERVICE	**LOAD**	**TYPE**	**CONNECTED LOAD (KVA)**	**DIVERSITY FACTOR**	**OPERATING LOAD (KVA)**	**REMARKS**
AIR COMPRESSOR #3	700	HP	659.3	50%	329.7	REVISED TO 700 HP
LOAD CENTER TRANSFORMER 1A	3325	KVA	3325.0	80%	2660.0	FEEDER
LOAD CENTER TRANSFORMER 1B	3325	KVA	3325.0	80%	2660.0	FEEDER
CONCEPTUAL TOTAL			7309.3		5649.7	
ADDITIONAL CAPACITY (50%)			3654.7		2824.8	
TOTAL			10964.0		8474.5	
AMPERAGE			1521.7		**1176.1**	

4160V SWGR B						
SERVICE	**LOAD**	**TYPE**	**CONNECTED LOAD (KVA)**	**DIVERSITY FACTOR**	**OPERATING LOAD (KVA)**	**REMARKS**
LOAD CENTER TRANSFORMER 2A	3325	KVA	3325.0	80%	2660.0	FEEDER
LOAD CENTER TRANSFORMER 2B	3325	KVA	3325.0	80%	2660.0	FEEDER
CONCEPTUAL TOTAL			6650.0		5320.0	
ADDITIONAL CAPACITY (50%)			3325.0		2660.0	
TOTAL			9975.0		7980.0	
AMPERAGE			1384.4		**1107.5**	

480V SWGR A						
SERVICE	**LOAD**	**TYPE**	**CONNECTED LOAD (KVA)**	**DIVERSITY FACTOR**	**OPERATING LOAD (KVA)**	**REMARKS**
MCC A	1600	A	1330.2	80%	1064.2	FEEDER
TURBINE SHOP	400	A	332.6	80%	266.0	FEEDER
MCC-0WP1	800	KVA	800.0	50%	400.0	FEEDER
CONCEPTUAL TOTAL			2462.8		1730.2	
ADDITIONAL CAPACITY (50%)			1231.4		865.1	
TOTAL			3694.2		2595.3	
AMPERAGE			4443.4		**3121.7**	

480V SWGR B						
SERVICE	**LOAD**	**TYPE**	**CONNECTED LOAD (KVA)**	**DIVERSITY FACTOR**	**OPERATING LOAD (KVA)**	**REMARKS**
MCC B	1600	A	1330.2	80%	1064.2	FEEDER
CONSTRUCTION TRAILERS	400	A	332.6	80%	266.0	FEEDER
A&B FLYASK SOUTH WALL	400	KVA	400.0	50%	200.0	FEEDER
CONCEPTUAL TOTAL			2062.8		1530.2	
ADDITIONAL CAPACITY (50%)			1031.4		765.1	
TOTAL			3094.2		2295.3	
AMPERAGE			3721.7		**2760.8**	

MCC A					
SERVICE	**LOAD**	**TYPE**	**CONNECTED LOAD (KVA)**	**DIVERSITY FACTOR**	**OPERATING LOAD (KVA)**
"A" EXHAUST FAN PEF-13 NORTH WALL	0.5	HP	0.5	50%	0.2
VIBRATOR MOTOR 1	3	HP	2.8	50%	1.4
TRIPPER ROOM EX FAN 1A	5	HP	4.7	50%	2.4
AUX BAY EXH FAN 2C	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2A	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2C	5	HP	4.7	50%	2.4
AUX BAY EXH FAN 2A	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2D	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2F	5	HP	4.7	50%	2.4
TRIPPER ROOM RXH FAN 2	5	HP	4.7	50%	2.4
MILL AREA EXH FAN 2B	5	HP	4.7	50%	2.4
CONT ROOM VENT FAN 1A	7.5	HP	7.1	50%	3.5
M1 TRIPPER DRIVE	7.5	HP	7.1	50%	3.5
LTG TRANSFORMER 2C1	10	KVA	10.0	50%	5.0
POWER PNL 2P1	10	KVA	10.0	50%	5.0
TRIPPER ROOM UNIT 1 WALL EXH FANS	15	KVA	15.0	50%	7.5
TRIPPER ROOM UNIT 2 WALL EXH FANS	15	KVA	15.0	50%	7.5
LTG TRANS 2B5	15	KVA	15.0	50%	7.5
DEMIN WASTE WATER SUMP PUMP 007A	15	HP	14.1	50%	7.1
#2 NORTH WALL SUPPLY FAN	20	HP	18.8	50%	9.4
FLOOR DRAIN SUMP PP 2A	20	HP	18.8	50%	9.4
LTG TRANS 2B3	25	KVA	25.0	50%	12.5
LIGHTING PANEL SLAG	25	KVA	25.0	50%	12.5
SLAG BIN LOCAL AREA SUMP PUMP A	25	HP	23.5	50%	11.8
NORTH PLANT BB2, 3, AREA MN OFFICE SANITARY LIFT STATION	30	KVA	30.0	50%	15.0
MODULAR BUILDING TURBINE FLOOR	30	KVA	30.0	50%	15.0
JIB CRANE HOIST - SLAG	35	KVA	35.0	50%	17.5
LTG TRANS 2B4	37.5	KVA	37.5	50%	18.8
LIGHTING TRANSFROMER 2B7	37.5	KVA	37.5	50%	18.8
CONVEYOR MOTOR 1	40	HP	37.7	50%	18.8
DEMIN WASTE WATER SUMP PUMP 007C	50	HP	47.1	50%	23.5
STORM WATER SUMP PUMP 8A	50	HP	47.1	50%	23.5
WELDING RECPT	60	KVA	60.0	50%	30.0
HVAC UNIT 1 - SLAG	60	KVA	60.0	50%	30.0
480V FEED FOR SOUTH ROAD LIGHTS	60	KVA	60.0	50%	30.0
FEEDER MOTOR	60	HP	56.5	50%	28.3
SETTLING BASIN SUMP NO 1 PP1A	100	HP	94.2	50%	47.1
#1 SETTLING BASIN SPARGING PP	100	KVA	100.0	50%	50.0
LTG TRANS 2B1	100	KVA	100.0	50%	50.0
2A SETTLING BASIN SUMP PUMP	100	HP	94.2	50%	47.1
CONVEYOR M-1 TRIPPER ROOM	125	HP	117.7	50%	58.9
OVERFLOW PUMP A	150	HP	141.3	50%	70.6
EAST COAL FEED SUMP PUMP 4A	150	HP	141.3	50%	70.6
CONCEPTUAL TOTAL			1577.2		788.6
ADDITIONAL CAPACITY (50%)			788.6		394.3
TOTAL			2365.9		1182.9
AMPERAGE			2845.7		**1422.9**

MCC B					
SERVICE	**LOAD**	**TYPE**	**CONNECTED LOAD (KVA)**	**DIVERSITY FACTOR**	**OPERATING LOAD (KVA)**
MAIN OIL PP AIR COMP NO.3	2	HP	1.9	50%	0.9
VIBRATOR MOTOR 2	3	HP	2.8	50%	1.4
TRIPPER ROOM EX FAN 1B	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2C	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2E	5	HP	4.7	50%	2.4
AUX BAY EXH FAN 2B	5	HP	4.7	50%	2.4
AUX BAY EXH FAN 2D	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2B	5	HP	4.7	50%	2.4
TURBINE RM EXH FAN 2H	5	HP	4.7	50%	2.4
TRANS 5KVA AIR COMP #3 OIL HEATER	5	KVA	5.0	50%	2.5
CONT ROOM VENT FAN 1B	7.5	HP	7.1	50%	3.5
HYDRAULIC UNIT MOTOR	7.5	HP	7.1	50%	3.5
WELDING RECPT	15	KVA	15.0	50%	7.5
LIGHTING TRANSFROMER 2B6	15	KVA	15.0	50%	7.5
FLOOR DRAIN SUMP PP 2B	20	HP	18.8	50%	9.4
LTG TRANSFORMER 2T2	25	KVA	25.0	50%	12.5
#2 INSTRUMENT AIR DRYER	25	KVA	25.0	50%	12.5
LIGHTING TRANSFORMER 2B2	25	KVA	25.0	50%	12.5
LIGHTING TRANSFORMER 2T1	25	KVA	25.0	50%	12.5
SLAG BIN LOCAL AREA SUMP PUMP B	25	HP	23.5	50%	11.8
DISTRIBUTION PANEL	25	KVA	25.0	50%	12.5
HTR LIFTING TOOL	30	KVA	30.0	50%	15.0
POWER PNL 2P2	30	KVA	30.0	50%	15.0
TURBINE HALL CRANE 2	30	HP	28.3	50%	14.1
LTG TRANSFORMER 2T3	37.5	KVA	37.5	50%	18.8
WELDING RECPT OUTSIDE COMPUTER ROOM E	40	KVA	40.0	50%	20.0
BACK FLUSH PUMP	40	HP	37.7	50%	18.8
CONVEYOR MOTOR 2	40	HP	37.7	50%	18.8
DEMIN WASTE WATER SUMP PUMP 007B	50	HP	47.1	50%	23.5
DEMIN WASTE WATER SUMP PUMP 007B	50	HP	47.1	50%	23.5
#2 SETTLING BASIN SPARGING PP	50	HP	47.1	50%	23.5
STORM WATER SUMP PUMP 8B	50	HP	47.1	50%	23.5
HVAC UNIT 2 - SLAG	60	KVA	60.0	50%	30.0
PLASMA ARC MACHINE	80	KVA	80.0	50%	40.0
1B SETTLING BASIN SUMP PP1B	100	HP	94.2	50%	47.1
WELDING RECPT	100	KVA	100.0	50%	50.0
2B SETTLING BASIN SUMP PUMP	100	HP	94.2	50%	47.1
DEMINERALIZER WATER MAKEUP PP B	100	HP	94.2	50%	47.1
OVERFLOW PUMP B	150	HP	141.3	50%	70.6
EAST COAL FEED SUMP PUMP 4B	150	HP	141.3	50%	70.6
EAST COAL FEED SUMP PUMP 4C	150	HP	141.3	50%	70.6
CONCEPTUAL TOTAL			1630.1		815.1
ADDITIONAL CAPACITY (50%)			815.1		407.5
TOTAL			2445.2		1222.6
AMPERAGE			2941.1		**1470.6**

ATTACHMENT 5

Pullman Chimney Demolition Budgetary Quote

PULLMAN

A STRUCTURAL TECHNOLOGIES COMPANY

May 12, 2020

Mr. Gregory Amen
Sargent & Lundy LLC
55 E Monroe St.
Chicago, IL 60603

Subject: TECO Big Bend Power Station – Apollo Beach, FL
Demolition of Two Concrete Chimneys
PULLMAN Budgetary Quote R201835R2

Dear Mr. Amen:

We have performed an initial cost and feasibility evaluation for the removal of the subject chimneys. Based on the provided general information and available images of the chimneys upon which this budgetary quotation is based and are pleased to provide you with this summary evaluation of estimated costs, duration, and methodology for the piece-meal demolition of these two chimneys.

Complete Demolition of Chimney Liner & Concrete Shell

- Pullman would mobilize a crew of experienced chimney demolition technicians to the site along with their specialized rigging and scaffolding equipment to perform the demolition. We would include a full-time site safety supervisor to administer our Front Line Safety and Health Program.

- The work would commence with establishing a safety exclusion zone and protocols for controlling access within the perimeter of the chimney demolition project. The first portion of the work would be enlarging a clean-out opening in the bottom of the concrete shell and fitting the door with a movable closure. We would then install an internal work platform supported from the top of the concrete shell from which to wash down the liner interior to remove surface contaminants. Typically, Owner would provide for vacuum trucks and disposal efforts for this phase of the work.

- The next phase of the work would be removing the existing chimney rainhood and full-height brick or steel chimney liner, which we would accomplish from the same internal work platform. The brick liner would be broken apart with sledge and pneumatic hammers and the brick debris would be allowed to fall down the interior of the liner to be removed through a clean-out opening that we would cut in the bottom of the liner corresponding to the location of the opening in the concrete column. The liner would be cut apart. The debris would be allowed to fall down the interior of the liner to be removed through a clean-out opening that we would cut in the bottom of the liner corresponding to the location of the opening in the concrete column.

- The next phase of the work would be to install our proprietary exterior chimney bracket scaffold around the top of the chimney and enclose it to prevent debris from falling down the exterior of the chimney. Some of the electrical components would also need to be removed during this phase of the work and temporary measures for compliance with FAA aviation obstruction lighting would be put into place.

- Once our exterior bracket scaffolding is set in place and air supply lines would be installed and the breeching opening(s) would be closed off with cables and steel plate to prevent debris from escaping through them.

- From the bracket scaffold, our crew would operate a chimney shell demolition machine (AKA: A Spider) which would be used to cut slots in the concrete wall to create sections of a manageable size that would be directed to fall into the chimney interior. These sections, along with corresponding smaller debris, would then be periodically removed at grade through the existing construction opening and placed in dumpsters for removal from site.

- We do not anticipate that the existing chimneys exterior paint contains enough lead to pose a hazard to our personnel; however, TCLP testing will have to be done on samples of the chimney concrete in order to determine whether or not special disposal measures will be required. We would encourage the taking of core samples from the concrete wall to have this sampling done ahead of mobilization for demolition operations to facilitate appropriate planning. In the meantime, our estimated pricing is based on our being able to handle all the brick and concrete debris without the need to implement special measures to accommodate lead levels above the OSHA action levels.

- For chimneys A and B, the concrete shell would be demolished down to a height of approximately 90ft above grade, at which point our subcontractor would demolish the remaining concrete column using ground-based equipment.

- PULLMAN would move all brick, steel and concrete debris during our phase of the work to a location near the chimney for others to arrange for disposal. No monies are included for any debris disposal of any kind in the budgetary estimate.

Chimney A – 90ft Concrete Shell Only with Cross Over Duct

- We estimate that performing the work described above for chimney A, (no liner to remove) would require about 1 month in the field with our subcontractor having adequate access to operate their ground-based equipment.

- Based on a 1-month schedule, disposal of debris as clean fill, no special measures to cope with lead paint, asbestos, or other hazardous materials, we estimate the cost of this work to be:

Three Hundred Thousand Dollars ($300,000)

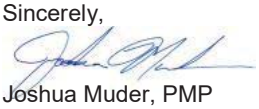
Chimney B – 485ft Tall with Brick Liner (AKA: #1&2 Wet Chimney/Common)

- We estimate that the work described above would require about 8 months in the field.
- Based on an 8-month schedule, disposal of debris as clean fill, no special measures to cope with lead paint, asbestos, or other hazardous materials, we estimate the cost of this work to be:

Three Million Four Hundred Fiftty Thousand Dollars ($3,450,000)

We appreciate the opportunity of assisting Sargent & Lundy with developing a plan for the decommissioning of these chimneys and stand ready to engage the resources necessary to establish a path forward for this project. Please don't hesitate to let us know if you have questions or would like to further discuss our approach to this work.

Sincerely,



Joshua Muder, PMP
Project Director

CC: Lance Lucas – llucas@pullman-services.com
JR Biggs – jbiggs@pullman-services.com

ATTACHMENT 6

Application of Gannon Lessons Learned to Big Bend Dismantling

Tampa Electric Company
Big Bend Power Station - Units 1 & 2
2020 Dismantlement Study

Sargent & Lundy

Attachment 6
Application of Gannon Lessons Learned to Big Bend Dismantling

	Lesson Learned Category and Description	Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
1	**COORDINATION**				
1.1	The plant required constant communication of the status.			X	The execution contracts will include regular status meetings.
1.2	Walk-downs were performed weekly with plant managers, and every single time revealed issues that were added to the scope.	X			The dismantlement study has used these lessons learned to minimize the potential for extra work.
1.3	The duration it took to demolish the last unit boiler was much greater than the contractor had estimated.	X		X	The study schedule uses long durations for demolition. The contractor will be required to maintain a schedule.
2	**DRAWINGS**				
2.1	Most drawings had outdated information.		X		Reference drawings will be reviewed during engineering.
2.2	The drawings were never updated after the dismantlement because Jim Montgomery retired.		X		TEC will need to develop a plan on how to handle the drawing cleanup after demolition.
3	**ARCHITECTURAL / BUILDING ENVELOPE**				
3.1	New roofs had to be put on several structures. Roofs need to be designed to Factory Mutual standards. Installation must be well-documented.				Not applicable; no roofs have been identified as requiring replacement.
3.2	New siding was required where the boiler voids had been. There was significant effort to design, fabricate, and install the girts and wind columns to receive the siding.	X			Closing off of wall opening created by demolition has been included in the estimated quantities.
3.3	When we re-roofed the slab areas over the former boilers, we had to raise the height of the handrail which took engineering and construction effort.				Not applicable; Big Bend is not saving the boiler structures and any roof access is not changing.
3.4	The plant required additional interior and exterior lighting in the older areas of the plant.	X			New lighting has been included in the estimated quantities.
3.5	While areas of roofing and siding were exposed, there were problems controlling rainwater infiltration. We got complaints from operations a number of times.			X	Requirement to be placed on the contractor to provide temporary shielding when large openings are not sealed immediately after an opening is created.
3.6	Lightning protection was added to the entire turbine building.	X			Lightning protection has been included in the estimated quantities.
3.7	After the boilers were demolished, water was blowing in a door, so the plant made us add a canopy.			X	Similar to 3.5 above.
3.8	Many areas of roofing were damaged by the activities of the demolition, falling objects, and water infiltration. Roof deck was found to be rusted out and had to be replaced.	X			Roof replacement areas have been included in the estimate to account for known problems and potential damage during demolition.

Attachment 6

Application of Gannon Lessons Learned to Big Bend Dismantling

Lesson Learned Category and Description		Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
4	**CIVIL (YARD)**				
4.1	Earth crane pads were built for the very large crane that was used. These crane pads were spread around the site when the crane was relocated for the next unit. This resulted in a lot of extra fill that cost money to remove.			X	Contractor will be responsible for the means and methods of their work.
4.2	I had to review multiple lift plans and also evaluate pit walls for crane surcharge.		X	X	Contractor is responsible for lift plans as part of means and methods. Engineering should only be reviewing those plans.
4.3	Underground concrete was frequently in the way of new light pole bases and drains when we re-paved.		X		Addressed through adequate engineering planning of new lights.
4.4	Knowing the location of the circulating water tunnels was vital at all times. It would have paid to paint them on the ground surface at the start.			X	Intake lines are painted at grade. Requirement can be added to specification for contractor to mark discharge locations.
4.5	The plant made us revise the entrance gate with a new guard house, fencing, gates, and card readers.				Not applicable; new entrance is not anticipated for Big Bend.
5	**CONCRETE**				
5.1	At the screenwell structure, we had to design infill framing where the pumps and screens were removed.	X			In fill quantities are included in the estimate.
5.2	We had to infill pits around the old boiler feed pumps. This required engineering and construction.				This was not identified as necessary during the 2018 study.
5.3	Cable cutting was used to demo pedestals. It left some rough surfaces that were not great for walking.	X			The estimate includes asphalt paving to lessen the uneven surfaces created by demolition.

Attachment 6
Application of Gannon Lessons Learned to Big Bend Dismantling

Lesson Learned Category and Description		Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
6	**STEEL**				
6.1	Much grating and handrail had to be replaced.				Not considered in the estimate; no areas of concern were identified during the 2018 study.
6.2	Checkered plate was rusty and had to be replaced in large areas.				Not considered in the estimate; no areas of concern were identified during the 2018 study.
6.3	Corroded pieces of steel were continuously discovered and had to be mitigated on an almost daily basis.				It is understood that this is likely the case at Big Bend; however, it was decided that a value could not be assigned to cover this situation.
6.4	The cost to repaint the steel inside the turbine building was estimated and was prohibitively expensive. We painted the exterior steel only.	X			Painting of both interior and remaining exterior steel is included in the estimate.
6.5	The entire structure had to be modeled to design the supplemental bracing steel and ensure that the turbine building was safely braced.		X		Some modeling was done during the 2018 study and is anticipated for the full design effort.
6.6	I was regularly asked to design field splices because beams could not be flown in between the webs of two columns.		X	X	Engineering should consider this when developing details; the project will need to work with the contractor.
6.7	I was asked to evaluate existing floors for lifts.		X	X	This should be the contractor's responsibility with review by engineering.
6.8	An over-height structure was required to ensure that trucks would not hit the pipe rack.				Not applicable to Big Bend
6.9	I was asked to evaluate beams for rigging loads many times. Rigging was especially difficult for the very heavy steam pipes.			X	This should be the contractor's responsibility.
6.10	The plate girders were hard to demolish. They are too large to lift at once, so we had to demo them in sections. We had the contractor hire a structural engineer to provide a sequencing plan. Even then, one of the pieces folded over while it was being flown.			X	Contractor is responsible for lift plans as part of means and methods. They will be required to hire a structural engineer to facilitate their work.
6.11	Some items that had tied back to the tripper building had to be resupported or replaced. For example, a hydrogen vent and a jib crane serving the cooling tower.	X			These were evaluated during the 2018 study and included in the estimate.
7	**MECHANICAL**				
7.1	Floor drains were filled with debris over time and had to be cleaned at great cost.	X			The estimate includes an allowance for cleaning out and fixing the drains.
7.2	Roof drains were leaking, missing, etc. and had to be refurbished. The scaffold was expensive, because it had to be suspended from the main turbine building roof trusses. This may not be an issue at Big Bend.	X			The estimate includes replacing some of the roof drains.

BIG BEND POWER STATION
Tampa Electric Company

UNIT 3 DISMANTLING STUDY

BASIS OF COST ESTIMATE & SCOPE OF WORK

REV. 0, DECEMBER 28, 2020

USE

Project No.: A09476.301

Prepared by:

Sargent & Lundy

55 East Monroe Street • Chicago, IL 60603 USA • 312-269-2000

Table of Contents

Attachments:

1. Cost Estimate Summary, Cash Flow and Individual Estimates
2. Boiler Building Demolition and Bracing Schematics
3. Dismantling Sequence Schedule
4. Application of Gannon Lessons Learned to Big Bend Dismantling

EXECUTIVE SUMMARY

This report documents the scope and cost associated with partial dismantlement of Big Bend Unit 3. An extensive study was completed during 2018 and included Units 1 through 3. This 2020 version is an update to reflect 1) changes in the retirement schedule, 2) segregate Unit 3 from Units 1 and 2, 3) address recent 2020 TEC comments and 4) incorporating additional lessons learned from Gannon dismantling. In addition, modifications to the cost estimate categorizes the costs into the project phases. Cash flows have also been broken down into quarters rather than a monthly basis.

Detail of the six significant changes are:

1 - The schedule used in developing the cash flow initially utilized an April 2024 retirement date for Unit 3. This retirement date has been pushed back approximately nine months from the 2018 study. TEC recently determined the Unit 3 retirement date to be April 2023. This does not significantly impact the report cash flow as other factors such as available budget and dismantlement activities for Units 1 and 2 drive the Unit 3 schedule.

2 - The 2018 Dismantlement Study included Units 1 through 3. A separate study completed earlier this year covers the dismantlement of Units 1 and 2. This study is only for Unit 3 and assumes that the dismantlement of Units 1 and 2 precedes Unit 3. As such, cost for removing the slag dewatering facility that serves Units 1 through 3 has been allocated to the Unit 3 demolition estimate.

3 - The dismantlement effort has changed hands internally with TEC and that has led to new comments to the 2018 Dismantlement Study as well as a request for increased maintenance areas on the Unit 3 turbine deck. Turbine deck openings where the turbine-generator and other areas can be filled in with beams and grating, which will reclaim approximately 3,100 square feet of usable maintenance space during outages.

4 - Gannon lessons learned were passed on to the project during the 2018 Dismantlement Study. Attachment 4 has been added to identify whether each of Gannon's lesson learned has been accounted for in the estimate, will require consideration during detailed engineering, or should be required as contractor scope.

5 - The cost for demolishing the Unit 3 wet FGD chimney is based on an updated 2020 budget quote from Pullman for the Unit 1 and 2 Chimney. They identified improved methods and equipment for removing concrete chimneys that allows for a 25% cost reduction.

6 - TEC requested that the contingency be decreased from 20% to 15% and inclusion of an allowance to refurbish the Turbine Building ventilation system and repurpose the turbine area offices and warehouse space. The 5% reduction to contingency and requested modifications with escalation account for an additional $3.24 million.

New estimating categories are established to segregate each unit costs into the suggested project four phases: engineering, pre-demolition, demolition, and post-demolition. The previous cost estimate only segregated each unit into either demolition or addition activities.

Coal yard partial dismantlement was a late addition to the 2020 Units 1 and 2 estimates. All the costs associated with the changes to the coal yard have been allocated to Units 1 and 2.

A summary of the costs associated with Unit 3 for the four categories:

	Unit 3
Engineering	$4,348,050
Pre-Demolition	$8,366,867
Demolition	$28,978,073
Post-Demolition	$5,637,055
Unit 3 Sub-Total	$47,330,045
Additional Cost[4,5]	$3,238,198
Unit 3 Total	**$50,568,243**

Notes on cost summary:

1. The above totals do not include scrap value for the demolition materials. Scrap pricing is volatile and should not be relied upon to reduce the cost of the project during the planning phase.
2. The total cost for dismantlement of Unit 3 has increased by 11.4% ($5.2 million) from the 2018 estimate.
3. The two main additions to the estimate are Turbine operating floor opening in-fill with grating and removal of the discharge flume. However, the savings related to an improved method of chimney demolition offset the increases such that direct costs increased less than 2 percent.
4. The cost estimates included in Attachment 1 initially included a 20% contingency, consistent with the 2018 estimate. During early 2020 TEC had site meetings with potential demolition contractors on the scope and economic feasibility of the dismantlement effort. Based on these meetings and the contractor's similar project experience, it was recommended to reduce the contingency to 15%. The 5% reduction to contingency is not included in the detailed cost estimates but has been added to the "Additional Cost" line in the table above and in the Attachment 1 cost summary page. See Attachment 1 for a further breakout of contingency, escalation, general conditions, direct and indirect costs.
5. Three additional cost items were added during the TEC comment cycle that were not captured during the 2018 estimate. TEC requested that allowances be included to account for Turbine Building ventilation improvements required after unit retirements, costs to renovate the warehouse and office areas adjacent to the Turbine Building, and water usage for dust control during dismantlement activities. The "Additional Cost" line in the table above includes the requested additions with contingency and escalation.

Schedule

The schedule of the dismantlement end date was reviewed with TEC in October and this estimate assumes a completion date of January 2027 and project start in January 2023. It is recommended to have engineering for the structural bracing be started in the early 2023. This is part of the "Pre-demolition" scope that is required to be installed prior to dismantlement of these key structures and systems. Performing the engineering during 2023 allows time to bid and award the construction package with issued for construction drawings sufficiently early to support mid-year 2024 installation.

Basis of Estimate – Big Bend Dismantling Units 1-2

Estimates:

Cost estimates associated with this study are as follows.

35256A – Unit 3 Pre-Demolition Modifications
35257A – Unit 3 Demolition
35258A – Unit 3 Post Demolition
35259A – Unit 3 Engineering Demolition Support
35225A – Unit 3 Scrap Value

A summary of the estimated costs, cash flow and the estimates are included as Attachment 1. Given that the basis of this project consists of a "decoupling" followed by "demolition", the costs are substantially higher than would be the case for pure demolition. Total rounded off cost for Unit 3 without scrap value:

Unit 3 $50,570,000

This value is considered appropriate for project planning purposes. **Opportunities for savings during the course of demolition project execution do exist, and include but are not limited to the following:**

- Optimization of the project execution plan in the early phase of the project. This includes detailed scope development, refinement of the schedule as well as the contracting plan through a well-conceived division of responsibility.
- Use of competitively bid, firm price construction work packages, based on "issued for construction (IFC)" level engineering deliverables, rather than vague references to perceived scope or material takeoffs that create opportunities for contractor change orders.
- Developing a collaborative, value-based working relationship with the successful construction teams, via immediately responsive and capable engineering and construction management staff from both of our organizations. TEC and S&L have a long history of doing this and this project should be no exception.
- Identification of the high value scrap commodities and the means to maximize payback to TEC, at the appropriate time during execution.

We are fully prepared to facilitate the development of these and other cost savings opportunities during project execution.

A. General Information

Big Bend Station is located in Hillsborough County Florida, just north of Apollo Beach. There are four coal-fired boiler units. Units 1 and 2 are being modernized to a single two-on-one combined cycle configuration utilizing Heat Recovery Steam Generators (HRSG) and a single Steam Turbine Generator (STG) located in the current Unit 1 STG location (Modernization Project).

Unit 3 is a 450 MW Riley Power Pulverized Coal Fueled Boiler commissioned in 1976, which also has the capability to run on natural gas. The unit has an Electrostatic Precipitator and Selective Catalytic Reduction system with associated ductwork and support structures. Units 3 and 4 have an integrated Flue Gas Desulfurization system with each having an individual stack.

Project location – 13031 Wyandotte Road, Apollo Beach, FL 33572
Contracting strategy – Multiple lump sum

Decommissioning and Dismantlement Plan (D&D Plan)

Unit 3 shutdown is planned for April 2023[1]. The Dismantling Project's scope for Unit 3 is to remove equipment and structure down to the top of foundation to the greatest extent possible while maintaining full function of the turbine building and coal feed conveyor in support of Unit 4. The goal is to remove equipment and structure south of column row F½.

Modifications are not required to common systems such as coal delivery, storage and feed limestone preparation, gypsum dewatering, workshops, warehouses or ponds. However, such systems must be maintained, and many are powered from other units. For example, the coal handling and storage is electrically fed from Unit 1 and that power feed will need to be maintained by the Modernization Project.

The objective of the Decommissioning and Dismantlement (D&D) Plan is to provide information for planning, cost estimating and execution of the Dismantlement of the Big Bend Unit 3. The dismantlement activities will be performed on an operating power plant site so methods will be restricted so as not to interfere with generating operations or damage infrastructure and systems that are to remain in service.

Given the precise nature of this demolition, it is important that contractors be pre-qualified to ensure that only capable contractors with a good safety record and similar experience be allowed to bid the work. Contractors will be required to consider:

- Effects of ground bearing from demolition equipment on underground utilities, sumps, and the seawall
- Prevention of iron dust in wastewater and storm water drains with regular housekeeping
- Productivity due to LOTO constraints
- Limit vibrations of the demolition due to operating equipment for the remaining unit(s)
- Structural stability during removal of equipment and structures
- Impact of demolition equipment on underground pipes and sumps
- Maintain function of floodwalls and site drainage, being careful not to damage the wall or plug up the drains with debris

TEC is evaluating closure of the northern third of the coal yard operation. Costs associated with coal yard modifications have been included in the Units 1 and 2 dismantlement cost estimates and are not part of this study.

[1] See Section N for discussion of schedule used in the report verses current planned retirement date.

The execution of the dismantling project is broken into four phases.

1. Engineering
   This first phase will develop the scope of work, perform detailed engineering for modifications, develop the specifications, bid out the contracts and evaluate proposals. Work is split between TEC internal staff and an outside engineering firm.

2. Pre-Demolition Construction
   This phase begins preparation for the demolition process with activities to remove consumables, remediate asbestos containing material (ACM), add bracing, and relocate utilities.

3. Demolition
   Physical removal of equipment and structures.

4. Post-Demolition
   Activities required to leave the site in safe, usable state that allows for proper drainage and access.

A level 2 schedule has been developed to illustrate a logical progression and duration of activities. This schedule is included as Attachment 3. **Figures 1 and 2** provide a visual of the general demolition sequence for the major Unit 3 structures. Sequenced areas are numbered 1 through 8.

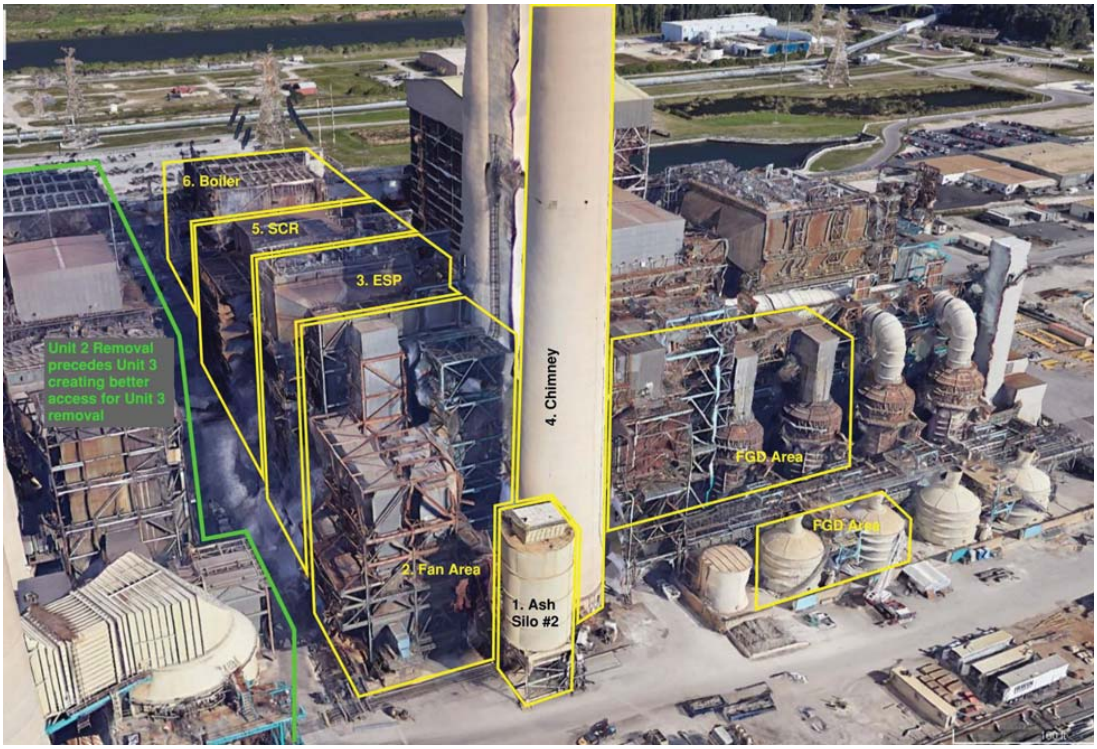


Figure 1 – Demolition Sequence of Unit 3 Backend Major Structures

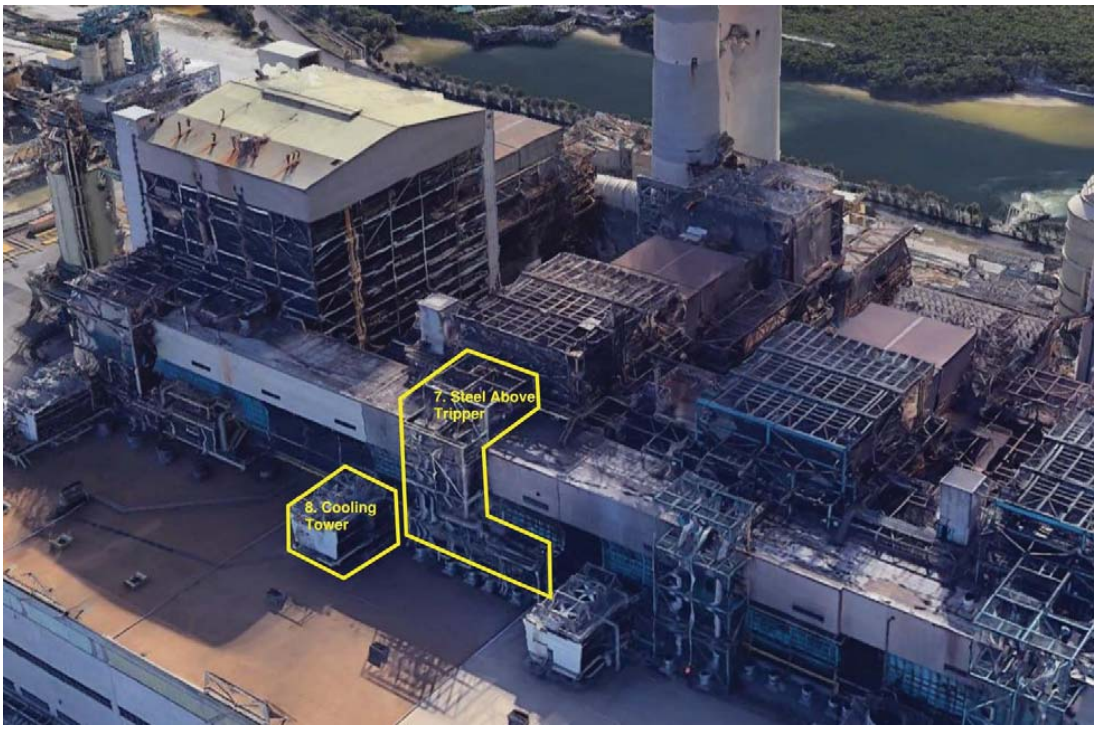


Figure 2 – Demolition Sequence of Unit 3 Tripper and Turbine Area Structures

Phase 1 – Engineering activities

- Secure all necessary permits and authorizations.
- Perform Environmentally Regulated Material Survey
- Conduct a detailed study to determine the method by which the existing equipment and systems will be repowered when the existing unit power distribution system is removed from service.
- Conduct a detailed study of the fire protection system to identify those portions of the existing system that will need to be preserved.
- Conduct a detailed study of all high energy systems and utilities to identify “air gap” points that the owner will be responsible to isolate services suppling the equipment and facilities to be dismantled. Systems should include electrical power, steam, compressed gases and air, water including fire protection and any other utilities present in the impacted area.
- Design new power distribution system to equipment that remains in service.
- Develop a list of services and material that TEC will provide to the contractor.
- Develop a list of materials, equipment and services that the contractor is responsible to provide as part of the scope.
- Hazardous material mitigation plan for pre-demolition activities and development of mitigation procedure to support dismantlement activities

- Design vertical bracing additions to ensure stabilization of structures after removal of the boiler building structure (See "blue" braces in **Figure 3** as a typical braced row).

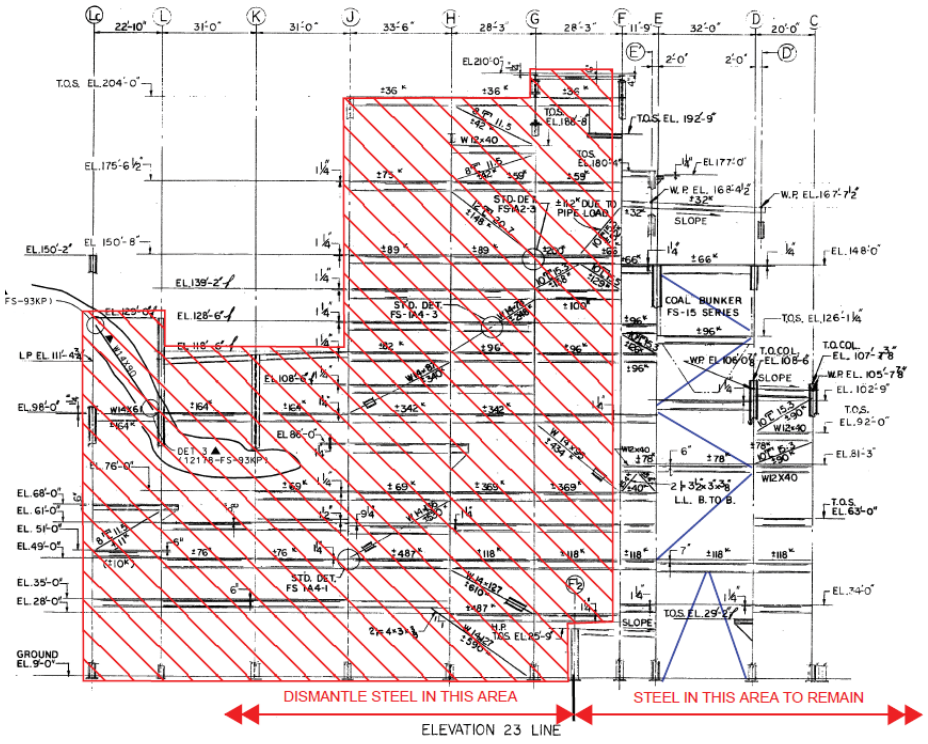


Figure 3 – New Vertical Bracing and Boiler Steel Demolition

- Develop a procurement package for supply and installation of new elements necessary to complete the dismantlement (vertical bracing, power distribution, piping, etc.).
- Develop a procurement package for the dismantlement.

Phase 2 – Pre-dismantlement activities

- Removal of hazardous materials such as ash and SCR catalyst. Drain and decontaminate all equipment and piping, which includes removal of all liquids, gas and solids.
- Abatement of ACM once removal of all the other waste materials is complete.
- Install new vertical bracing to stabilize the Turbine Building prior to removing the boiler area steel (**Figure 3**) in several braced rows.
- "Air Gap" all energy systems.
- Install new power distribution necessary to maintain essential services.
- Mark dismantlement area and contractor access routes. Mark plant personnel access requirement in the impacted area.

Phase 3 – Demolition activities

- Sequencing of the dismantlement will allow for use of the same scrap processing area used by the Unit 1 and 2 dismantlement effort. This are is used for material sorting and placing in bins for recycling. **Figure 4** provides a plan view of the planned scrap processing area.

Figure 4 – Demolition Scrap Processing Area (Outage Laydown Area)

- After ACM abatement is complete, begin removal of Unit 3 back end equipment and steel starting from the south and working north.
- Removal of Ash Silo #2 and booster fan area.
- Removal of ESP's and SCR.
- Removal of Boiler and associated equipment.
- Removal of boiler area structural steel.
- Removal of pipe support steel above tripper and cooling tower.
- Removal of concrete chimney
- Removal of structure and equipment associated with Unit 3 FGD system, except the oxidation air blowers that are to remain in service as spares for Unit 4.
- Removal of Turbine area equipment.
- Removal of transformers and intake equipment as well as fill circulating water intake and discharge.
- Demolish discharge flume (**Figure 5**)
- Demolish slag dewatering area

Figure 5 – Unit 3 and 4 Circulation Water Discharge Area

Phase 4 – Post-Demolition activities

- Install new freight elevator.
- In fill of Turbine building floor openings, which needs to occur immediately after equipment removal. The operating floor of the Unit 3 Turbine Building has large areas that will be filled in with grating to promote storage area and space for outage maintenance, about 3,100 square feet. See **Figure 6** for operating floor areas to be filled in with grating.
- Perform Unit 3 Boiler area paving to promote area drainage.
- Repair any flood wall damage.
- Inspect and clean out site drains.
- Repaint remaining indoor and outdoor structural steel.
- Close wall openings created in the south wall of the Turbine building after removing equipment.
- Install new area lighting.
- Perform roof repairs.
- Refurbish the Turbine building roof ventilation (**Figure 7**)
- Refurbish the Turbine area offices and warehouse area

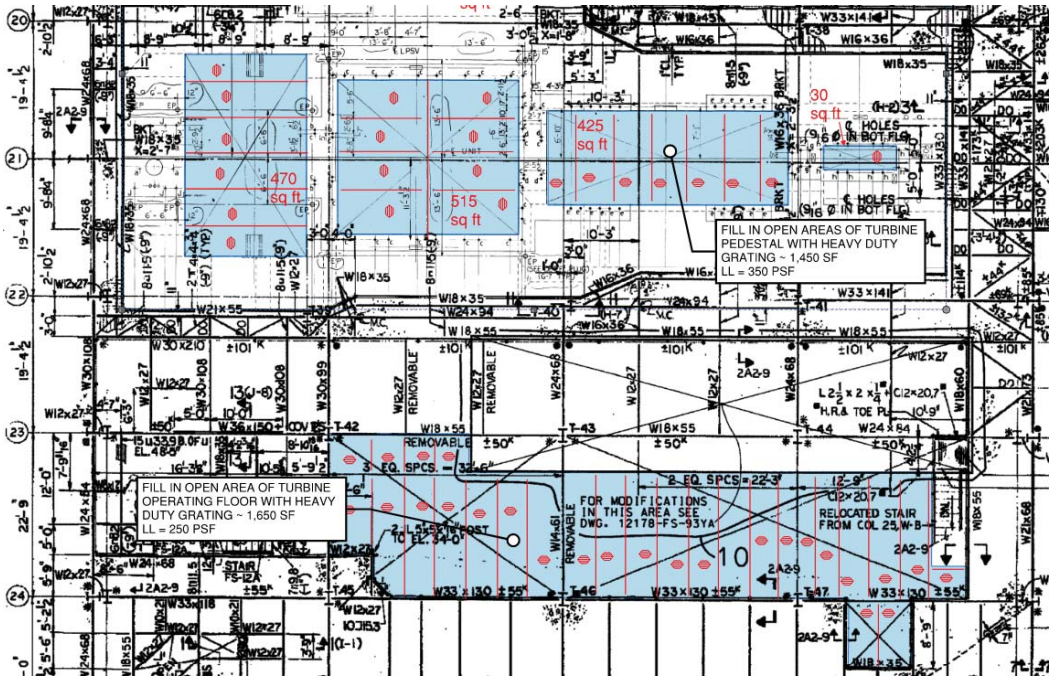


Figure 6 – Turbine Building Operating Floor In-Fill Areas

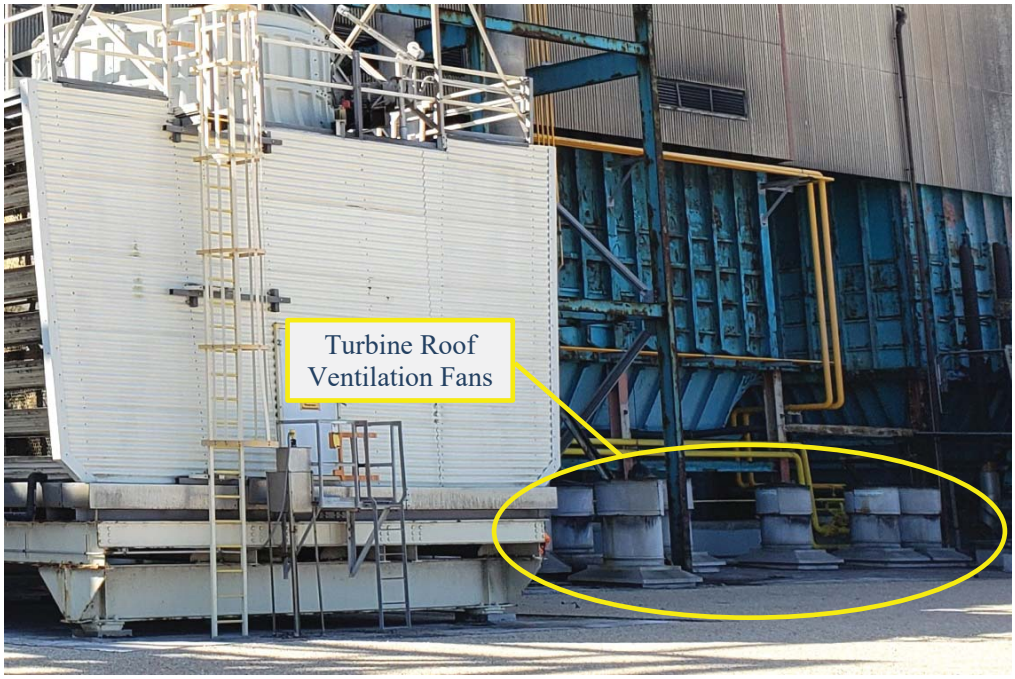


Figure 7 – Turbine Building Ventilation Fans

B. Estimate Approach

The cost estimate is based largely on Sargent & Lundy's experience on similar projects as well as our past project experience at the Big Bend station. This study is not a detailed engineering document, but a cost estimate prepared in advance of the detailed engineering preparations that will be necessary to carry out the full dismantling activities.

Some preliminary engineering was utilized to develop the conceptual modification to lateral load resisting system for the remaining structures and the power distribution system for remaining Unit 3 equipment that must be repowered. S&L assigned allowances where necessary to cover issues that lack full development at this time. TEC supplied the costs for ACM abatement, removal of hazardous liquids and waste in 2018.

Dismantlement estimates normally achieve a Class 4 level by applying scaling factors to account for size of unit in comparison to demolition costs developed from a past reference project. This estimate uses better-defined quantities to account for known aspects of the equipment and structure slated for removal. The goal is to estimate a level of detail necessary to achieve an estimate in line with Class 3 accuracy.

Project methods to attain this accuracy are:

Electrical:

- The demolition is covered by concentrating on large equipment (large transformers and isophase bus duct systems) using drawings and data.
- Remaining electrical equipment and commodities are included in the demolition quantities used in the estimating group's base estimate, which is used to ratio demolition costs.
- The approach accounts for relighting areas that remain in use or are repurposed after the dismantling. The estimate will include new fixtures and equipment as necessary. The extent of the scope and quantities will be developed based on conceptual engineering.
- The approach to repower any loads that will need to remain in use after the dismantling will be using new cable, raceway, and electrical equipment as necessary. The extent of the scope and quantities will be developed based on conceptual engineering from 2018.
- Items that are not quantifiable at this time will be assigned allowances. Such items include lightning protection, DCS modifications, electrical equipment reconfiguration, etc.

Mechanical:

- The demolition estimate includes mechanical equipment that will be left in service (air compressors, sump pumps, building ventilation, etc.).
- Critical pipe quantities and major equipment tonnages are used to supplement and validate the estimate quantities.
- TEC is managing the SCR catalyst for end of life to coincide with dismantlement, thereby resulting in no salvage value of the catalyst.
- The estimate will not include the design for relocation or re-piping of any mechanical equipment.
- Items that are not quantifiable at this time will be assigned allowances. Such items include new sumps, ventilation equipment, disintegration of Units 3 & 4, etc.

Structural:

- Steel tonnage for the boiler buildings and ESP structures will be estimated based upon the volume of the structure and typical densities of such structures determined from S&L's extensive experience designing these structures.
- Steel & ductwork tonnages for the SCRs were taken from S&L's historical records based upon quantities determined during the design/construction of these structures.
- Steel & ductwork tonnages for the FGD system are determined using a scaling factor applied to known quantities based upon the power generation rating of each unit.
- Demolition estimate for the U3 chimney is based on the 2020 Unit 1 and 2 Pullman estimate.
- Quantities for the demolition of miscellaneous concrete for all units/structures are determined based upon items identified for removal during the site walk down.

Lessons Learned from Gannon:

A listing of lessons learned from the demolition effort of the Gannon Power Plant is included as Attachment 4. The approach that the study has taken to address each of the items is categorized as being addressed by estimate, engineering, or contractor. The intent of each category is the following.

Estimate – indicates that quantities have been included in the estimate to account for that item.

Engineering – indicates an item that will require engineering assessment and direction to the contractor.

Contractor – indicates which items should be specifically included in the contract documentation as part of the contractor's scope.

C. Estimate Scope of Work

In general, all mechanical equipment and facilities used to generate electricity by firing coal will be dismantled for Unit 3. Continued operation of Unit 4 requires both a careful demolition approach and the need to keep essential systems in operation at the Big Bend station. The turbine building will not be demolished, and the part of the boiler steel required to support the coal conveyors and the turbine building south wall will not be demolished.

The Unit 1 and 2 dismantlement of the boiler and backend structures is assumed to be completed to allow construction access to Unit 3. If Unit 3 is rescheduled to be before Unit 1 and 2, additional costs due to limited construction access and distant dismantlement stockpile areas would need further review.

The extent of demolition for the units follows these guidelines:

- Removal of hazardous materials, liquids, ash, catalyst and waste materials takes place prior to demolition.
- Demolition will remove as much of the structure as possible up to the tripper support steel. In order to accomplish this, installation of new vertical bracing and a new stair tower is planned. Painting of remaining steel is also included.
- Structures and equipment pedestals will be removed down to the top of foundation.

- Select equipment must remain in service after the demolition. The equipment that serves a common function or is required to stay operational after the dismantlement will be repowered from a new distribution system with new cable routing. The 2018 basis for items for electrical repowering is conservatively used.
- The scope considers removal of the Unit 3 circulating water intake equipment and discharge flume. Filling of the intake and discharge lines with flowable fill is included.
- Demolished equipment and material to be stockpiled by the contractor and disposed by TEC. A one acre scrap processing area at the southeast corner of the coal pile area will be used for this purpose.
- The Unit 3 branch off the existing ammonia loop will be capped. Existing valves on the ammonia loop are to be replaced due to their tendency to leak.
- The natural gas header will be capped downstream of Unit 4.
- One personnel elevator will be removed. A new freight elevator is included near Unit 3.
- LED fixtures are utilized for any areas requiring new lighting.
- Large floor openings created by equipment removal at the Turbine Operating level will be filled in by grating to provide future storage and outage laydown area.
- The existing flood walls that protect the remaining facilities and area drainage must remain in service after the demolition. The contractor will need to protect both the wall and drainage system from damage during the demolition. Portions of the flood wall that are not required will be removed.
- Removal scope for Unit 3 GSU and SST transformers only extends to the bushings. The high voltage line work will be handled by TEC.
- The slag dewatering system is not required for the operation of Unit 4 and can be removed.
- Unit 3 oxidation air blowers remain in service as additional redundancy for Unit 4.

Listed below is a summary level scope (not all inclusive) of facilities included in the estimate:

1. Major Systems Identified for Demolition by Disciplines
   a. Mechanical:
      i. Unit 3
         - Environmentally Regulated Materials removal - All disciplines
            - Survey
            - Pre demolition removal activities
            - On-going removal activities to support dismantlement
         - Ash Handling system
         - Boiler Feed pumps and Auxiliaries
         - Boiler Pressure Systems (steam and water Circuits)
         - Circulating water System
         - Chemical Additive Systems
         - Chemical Feed and water sampling system
         - Combustion air and Gas System (Fans/soot blowers etc.)
         - Controls, Ovation (All systems BBC001)

- Feedwater System
- Fuel Burning system (Natural Gas Systems): 12” NG pipeline will be capped downstream of Unit 4
- SCR System
  - Ammonia pipeline to Unit 3 SCR
- Slag Handling System and dewatering

ii. Unit 3 FGD Mechanical Items

- Environmentally Regulated Materials removal - All disciplines
  - Survey
  - Pre demolition removal activities
  - On-going removal activities to support dismantlement
- Absorber Tower and Feed Tank
- Absorber Agitators
- Absorber Bleed Pumps
- Absorber Ductwork
- Absorber recycle pumps
- Absorber instrument and controls
- Make up water header
- Mist eliminator wash system
- Oxidation air sparger system
- Quenching nozzle spray system
- Reagent Feed Loops
- Continuous emissions monitoring system
- Defoamer Storage tank and pumps
- Forced oxidation blowers (save as backup for Unit 4)
- Organic acid system
- Primary Dewater system
- Wet chimney
- FGD Common systems
  - Limestone Slurry prep system is not included in SOW
  - Common Gypsum dewatering system is not included in SOW

b. Electrical:

i. Unit 3

- Generator 3
- Generator Step up Transformer – MTX3
- Station Service Transformer A – SST3A
- Station Service Transformer B – SST3B

- 4160V Switchgear West Bus – 3NNS-SWG-1W
- 4160V Switchgear East Bus – 3NNS-SWG-1E
- 13.8kV Switchgear Bus A – 3NPS-SWG-301A
- 13.8kV Switchgear Bus B – 3NPS-SWG-301B
- Low voltage switchgears and motor control centers.
- Electrical and control systems associated with the mechanical systems identified in item 1.a.

ii. Reserve Auxiliary System
- Reconfigure to keep in service.

iii. Instrumentation and Controls
- Instruments for all units associated with systems being removed.

c. Structural:

i. Unit 3
- FGD stack
- FGD vessels, ductwork, and structural steel
- SCR reactors, ductwork and structural steel
- ESP box, ductwork and structural steel
- Cap and fill circulating water tunnels
- Structural demolition extent
  a. Steel removal shall be maximized to decrease future steel maintenance
     - Existing lateral bracing shall be modified, and additional steel shall be added to provide an adequate load path for the new configuration
     - Painting of existing steel
  b. Identify and maintain required means of egress per building code including the removal of many existing plat forms and eliminating walkways and platforms that will no longer be required
     - Stairways should be modified in order to streamline travel paths and eliminate confusing evacuation routes
     - Elevators should only provide access to areas required for operations.
  c. Coal bunker walls and hoppers
- Boiler building to be removed to column row F½
  a. Coal Conveyor remains in service for Unit 4.
  b. Current truck path to remain open.
- Current plan is for existing steel to be painted, there will be no siding added to the buildings for this scope of work.

2. Major installations and replacements required due to dismantlement

a. Mechanical

i. Separation of the following systems:

- Unit 3 and 4 Fish Return System
- FGD Unit 3 and 4 common systems
- Common steam line for each units' main steam attemperator

ii. Natural gas system to be capped downstream of Unit 4.
iii. Hydrogen and Ammonia System branched to Unit 3 to be capped
iv. Fill the circulating water intake and discharge tunnels for Unit 3
v. Turbine roof ventilation refurbishment

b. Structural
   i. Turbine roofing to be replaced
      - Replace roofing at the Unit 3 cooling tower after removal
      - Replace any dismantlement related damaged areas along south edge of roof
      - Roof drains to be replaced
   ii. Entry way canopies where applicable
   iii. Turbine building siding
      - South side of turbine building to close in the remaining structure
   iv. Structural steel bracing to support the structural demolition extent
   v. Provide floor framing and grating to fill in large openings created by equipment removal in Unit 3. Small opening will also by filled in with grating.
      - Examples:
         a. Turbine & Generator voids
         b. Coal Handling equipment voids
         c. Large open area east of the Turbine at the operating level
   vi. Grating and handrails as required to access Unit 1 and 4 operations. (cooling tower, turbine deck, turbine mezzanine, and ground floor)
   vii. Removal of checkered plating and replaced with grating
   viii. Paving of dismantled area to promote drainage and provide a smooth walking surface
   ix. Painting of existing interior and exterior steel

c. Electrical/I&C
   i. Reconfiguration of the DCS system (Emerson) to move remaining equipment controls to common highway
   ii. Lightning protection for unprotected structures subsequent to demolition
   iii. Lighting
      - Lighting to account for areas still being utilized by operations. (cooling tower, turbine deck, turbine mezzanine, and ground floor)
   iv. Equipment that will need to be repowered
      - Unit 3 Floor Drain sump equipment
      - Unit 3 Settling Basin sump equipment

- #3 Transfer sump equipment
- Unit 3 and 4 Polisher equipment
- Unit 3 FGD Oxidation Air Compressors
- Unit 4 Chimney and CEMS shelter
- Stormwater sumps within the unit boundaries
- Air Compressor #5 and #6
- Turbine Building vent fans
- Unit 4 Clean & Dirty oil tank equipment
- Turbine Hall crane
- Unit 3 Fire Protection Panel

D. Pricing and Quantities

- Costs for bulk materials were derived from S&L database
- Asbestos abatement costs provided by TEC
- Decommissioning (removal and disposal of regulated waste) costs provided by TEC
- TEC's project staffing and security costs provided by TEC
- Permit costs provided by TEC

Bulk quantities and weights of equipment and material commodities used in this cost estimate are intended to be reasonable and representative of projects of this type. Quantities were estimated from Sargent & Lundy in-house database and numerous assumptions. See "Estimate Approach" for further discussion on quantity development.

TEC cost estimate input and assumptions:

Decommissioning – Decommissioning includes boiler draining, contaminate removal (fly ash, coal, slag, lead paint, oil, mercury, radiation, natural gas, hydrogen, and ammonia), elevators repairs as required by an outage, FGD tanks and ducts to be washed out, and condenser and ZBL system cleaning. Estimated are based off previous work orders found in TEC's Work Management System (Workman).

Asbestos Abatement – Asbestos abatement includes abating known areas of asbestos (turbine building and elevators siding, piping insulation, cable trays, etc.) as well as an allowance for unknown areas that may be discovered. Cost includes an allowance for scaffolding and half of an asbestos supervisor's time during the length of the dismantlement. Estimated are based off previous work orders found in TEC's Work Management System (Workman).

Payroll – Payroll was estimated by accounting for all the TEC team members assumed to work on the project. A total cost was calculated by using their hourly rate and amount of time assumed to be spent on the project.

Security – During dismantlement, the number of contractors onsite will increase resulting in some additional security measures.

Permitting & Compliance – Includes an allowance for environmental studies, environmental compliance fees, legal fees, FAA permits, and Asbestos notifications.

E. Labor Wage Rates

Craft labor rates were developed for TEC as part of the Modernization project through a labor study conducted by S&L. The labor study based rates used in the 2018 study and cost estimates have been escalated for 2020. Costs have been added to cover social security, workmen's compensation, federal and state unemployment insurance. The resulting burdened craft rates were then used to develop typical crew rates applicable to the task being performed. No adjustments to labor rates or productivity have been accounted for in the estimate for long term COVID-19 impacts.

Demolition Estimates:
Labor Work Schedule and Incentives – Assumed 5 days x 8 hour day work week.

Pre and Post Demolition Estimates:
Labor Work Schedule and Incentives – Assumed 5 days x 10 hour day work week.

Per diem is not required.

For addition estimates only, a regional labor productivity multiplier of 1.1 is included based on Compass International Global Construction Yearbook. The use of this productivity factor is an approach to compare construction productivity in various locations in the USA to a known basis or benchmark of 1.00 for Texas, Gulf Coast productivity. Productivity multiplier does not include weather related delays.

F. Construction Equipment

Construction equipment cost is included on each estimate line as needed based on the type of activity and construction equipment requirements to perform the work.

G. Construction Direct/Indirect Costs and General Conditions

The estimate is constructed in such a manner where most of the direct construction costs are determined directly and several direct construction cost accounts are determined indirectly by taking a percentage of the directly determined costs. These percentages are based on our experience with similar type and size projects. Listed below are the additional costs included, unless noted as not included.

- Additional Labor Costs:
  - Labor Supervision
  - Show-up time
  - Cost of overtime
  - Per diem – not included
- Site Overheads:
  - Construction Management
  - Field Office Expenses
  - Material & Quality Control
  - Site Services
  - Safety
  - Temporary Facilities

- Temporary Utilities
- Mobilization/Demobilization
- Legal Expenses/Claims

➢ Other Construction Indirect costs:

- Small Tools and Consumables
- Scaffolding
- General Liability Insurance
- Construction Equipment Mobilization/Demobilization
- Freight on Material
- Freight on Process Equipment – included with equipment cost
- Sales Tax – not included
- Contractors General &Administration (G&A) Expense
- Contractors Profit

➢ Project Indirect Costs:

- A/E Engineering Services
- A/E Construction Management
- A/E Start-up and Commissioning support
- Start-Up Spare Parts
- Owner's cost
- EPC Fee – not included
- AFUDC - not included

H. Scrap Value

The scrap values used are the credit to the utility based on current industry data.

- Mixed Steel value @ $207/Ton
- #2 Copper @ $5090/Ton
- #1 Insulated copper wire 65% @ $2684/Ton

Note: 1 ton = 2000 Lbs.

Scrap values have changed since the 2018 cost estimates. The mixed steel value is down 17% and the copper values are up 12%. Scrap values can fluctuate month-to-month and should not be relied upon to reduce the cost of demolition during the planning stage.

I. Contingency

A 20% contingency was initially used for all costs in the Unit 3 estimates included with Attachment 1. We consider this to be appropriate and consistent with AACE guidelines, given our experience with fossil plant demolition as well as the level of project definition that has been achieved to date. However, TEC requested that the contingency be modified to 15%. Since this request occurred after completion of the estimates, an adjustment to the total project cost has been included.

Contingency is applied at 10% to scrap value since this decreases the credit from scrap material in the cost estimate.

J. Escalation

Escalation cost is included and calculated based on the following rates, project schedule and cash flow expenditures as reflected in the cash flow curves for each cost category.

Escalation is included considering Unit 3 dismantling beginning in the second quarter of 2024.

2.5% / year for materials
3% / year for subcontract costs
3% / year for labor
2.5% / year for construction equipment
3% / year for project indirect costs
0% / year for scrap metal

K. Costs Excluded

All known scope of required physical facilities as provided by the project team to encompass a complete project has been included in the estimate. There are no known intentional omissions.

The cost estimate represents only the costs listed in the estimate. The estimate does not include allowances for any other costs not listed and incurred by the owner. Excluded costs (and some of which are also listed in "Assumptions/Clarifications") are any that are not listed in the estimate.

There may be additional costs that the Owner should consider such as (the list below is not all inclusive):

- Legal costs
- Owner's Bond Fees
- Taxes
- Station insurance costs and taxes are not included
- Performance Bonds

L. Scope Assumptions/Clarifications/Exclusions

Electrical

- All plant systems will be drained, electrical equipment and wiring is de-energized and tagged out by the client prior to demolition activities.
- Switchyards within the plant boundaries are not part of the scope; neither are access roads and rail lines to these facilities
- Overhead transmission towers are not included in this study.
- U4 intake structure loads are already fed from Unit 4. No repowering is necessary.
- Loads are based on expected loading of equipment of this nature.
- New raceway (1,500 feet of cable tray and over 40,000 feet of conduit) is conservatively included for repowering of the existing Unit 3 loads.
- New raceway is supported from existing steel members.
- Cabling between the Modernization Unit 1 switchgear connects to the reserve 3 current limiting reactor. An allowance of over 10,000 feet of 5kV cable to be replaced is included in the estimate.

- Unit 4 reserve switchgear has available capacity and spare feeder breaker to feed the new repowering medium voltage switchgear.
- An allowance is included for lightning protection.
- Allowances are included for new access lighting for areas that will remain in use after the dismantling.
- An allowance is included for any DCS reconfiguration and control modifications are required after dismantling.
- Estimate excludes TEC Energy Delivery costs for removal of high voltage lines to the switchyard.

Decommissioning

- All chemicals and oils will be removed by TEC prior to demolition.
- Cleaning and flushing of chemical and oil storage pipes and tanks are by TEC.
- All storage tanks will be emptied by TEC.
- No remediation or removal of contaminated spills is required (no known spills exist).
- Coal bunkers and ash silos will be emptied by TEC.

Structural

- All items that extend more than 1’-0” above top of foundation will be demolished to grade level. Any other items will remain in place.
- A 6” asphalt layer (average thickness) shall be laid in areas where overhead steel will be removed to create a better walking surface, provide adequate drainage and prevent pooling.
- All borrow and backfill soil material is assumed to be purchased from offsite sources.
- Coating system for new steel is galvanized.

Mechanical

- Large diameter cooling water pipes/tunnels will be abandoned in place and filled to prevent ingress of water or collapse.
- The Station Air compressors for Unit 3 (Compressors #5 & #6) must be kept in service. Repowering and controls modifications are required. A source of cooling water will be required.
- The Unit 3 Settling Basin must stay in service.
- The Unit 3 Floor Drain Sumps must stay in operation, which will require repowering and controls modification. The Floor and Equipment Drain system in the Boiler and Turbine area must stay in operation, with modifications at equipment drains.
- Auxiliary steam will be routed from Unit 1 to Unit 4 by the Modernization project.
- Close Coal chutes in the tripper room for Unit 3 bunkers.
- Unit 3 Gypsum pipes to dewatering are to be demolished.
- Repower Unit 4 Clean and Dirty Oil tank system from Unit 4
- The Unit 3-4 Polisher must stay in service and be repowered from Unit 4 and requires controls modification.
- Fire protection panel for Unit 3 must be interfaced with the DCS.
- Ammonia loop branch to Unit 3 SCR will be capped.
- Detailed design phase required to further investigate assumptions.

General

- All demolished non-metal materials except concrete are considered debris and shall be transported to a licensed landfill.
- It is assumed that concrete will be processed for recycling onsite and removed offsite by a concrete recycling company at no cost or credit to the Utility.
- Scrap value for recoverable metals is included in the estimate as a credit. No resale of equipment or material is included.
- The estimate assumes that all structural steel, miscellaneous building steel, decking grating, piping, and equipment will be removed to drop-off containers as provided by the scrap metal recycling company. The recycling company will assume all responsibility for the safe removal/disposal of lead paint and processing of the steel, which is reflected in the value of scrap metal.
- Cost of removing mobile equipment and machinery is by TEC.
- Site Construction Management costs assume one CM per unit for the duration of pre-demolition and demolition.

M. Cost Comparison to 2018 Estimate

The organization of the estimates into new categories does not allow for direct comparison of the individual estimates created for this study; however, the total cost by unit can be compared.

	2018	2020	Change
Unit 3	$45,378,044	$50,568,243	$5,190,199 (11.4%)
Scrap Value Unit 3	$(6,154,126)	$(5,226,829)	

The total 2020 cost for dismantlement of Unit 3 has increased by 11.4% from the 2018 estimate. The increase can be attributed to several factors.

While labor rates have increased from those used in the 2018 study, the chimney demolition has decreased. The cost for demolishing the Unit 3 wet FGD chimney is based on the updated 2020 budget quote from Pullman for the Unit 1 and 2 Chimney. Their updated 2020 quote for the Unit 1 and 2 Chimney identified a 25% cost reduction based on having obtained new equipment that allows for a more efficient means of chimney demolition. This reduced their cost from 2018 by $1,300,000.

TEC requested some major additions after completion of the cost estimates contained in Attachment 1. These additions include:

- Allowance to refurbish the Turbine Building ventilation based on Gannon lessons learned. The ventilation will require rework once the structures and equipment are removed south of the tripper bay. Due to the open Turbine Building between all the units, a cost of $2,500,000 has been included to address the ventilation for Units 3 and 4. This value becomes $3.45 million with 15% contingency and escalation.
- Allowance to renovate the office, warehouse and shop space adjacent to the Turbine Building. These renovations are estimated at $1,000,000. This value becomes $1.38 million with 30% contingency and escalation.

- Allowance for water usage for dust control during dismantlement activity has been added in at $120,000.
- Decrease of the contingency of the base estimates from 20% to 15%, which results in a decrease of approximately $1.71 million.

See Attachment 1 for further breakdown of the additional allowances.

N. Schedule

A level 2 schedule has been developed to reflect the latest retirement date for Unit 3. The schedule in Attachment 3 uses April 2024 for the retirement date of Unit 3; however, TEC recently confirmed that retirement of Unit 3 will be one year earlier. The earlier retirement date has very little impact to the finish date since the main schedule drivers are budgetary constraints and the Units 1 and 2 dismantlement schedules. The dismantlement budget allocations do not allow for any significant construction spending until 2024 and removal of the Unit 2 boiler structure is essential to allowing adequate operating space for Unit 3 dismantlement activities. The schedule can only be improved by two months with the earlier retirement date due to these schedule limitations. This small gain has not been incorporated into the report.

Planning and engineering can start at any time. The schedule basis is beginning activities in the second quarter of 2023, which provides a completion date four years after project start.

Activities that should begin in 2023:

Task	Responsibility
Project Scope Authorization (PSA)	TEC
Assign internal staff responsibilities	TEC
Hazardous Material Survey	TEC/AE
Pre-demolition design activities – Electrical feed modifications	AE
Pre-demolition design activities – Structural stability bracing	AE
Demolition – Develop Scoping	AE
Permitting	TEC/AE

This schedule was reviewed with TEC in October and is used to develop the cost estimate escalation values and as the cash flow basis. Key engineering activities should start soon after project authorization in order to ensure adequate time is allotted to install essential “Pre-demolition” scope modifications prior to demolition start.

ATTACHMENT 1

Cost Estimate Summary, Cash Flow and Individual Estimates

Tampa Electric Company
Big Bend Station Unit 3
Dismantling Study

Sargent & Lundy

Project No.: A09476.301
Date: December 28, 2020
Rev. 0, Use

INITIAL ESTIMATE SUMMARY						
	Direct Cost	General Conditions	Project Indirect Costs	Contingency	Escalation	Total
Unit 3						
Pre Demolition Modifications	$3,869,185	$1,959,403	$116,572	$1,189,032	$1,232,675	$8,366,867
Demolition	$13,372,055	$2,816,507	$4,932,320	$4,224,176	$3,633,015	$28,978,073
Post Demolition	$2,787,735	$733,100	$436,020	$791,300	$888,900	$5,637,055
Engineering Demolition Support	$0	$0	$3,213,250	$642,700	$492,100	$4,348,050
Total	$20,028,975	$5,509,010	$8,698,162	$6,847,208	$6,246,690	**$47,330,045**
Unit 3 Scrap Value	$5,226,829					SEE BELOW FOR ADJUSTED TOTALS

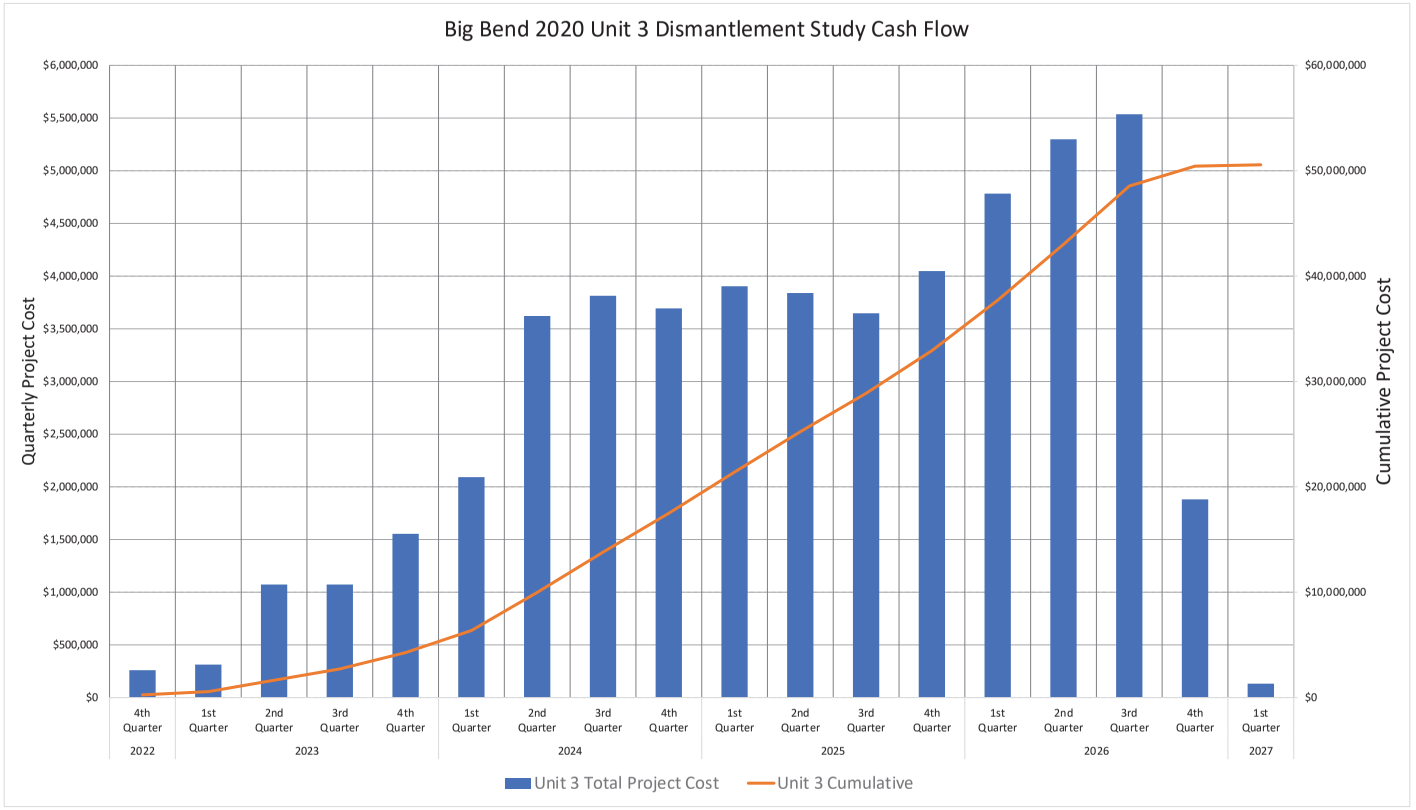
ADJUSTMENTS TO UNIT 3 COST ESTIMATES						
	Direct Cost	General Conditions	Project Indirect Costs	Contingency	Escalation	Total
Unit 3						
Change in Contingency from 20% to 15%	$0	$0	$0	$(1,711,802)	$0	$(1,711,802)
Turbine Building Allowance for Ventilation	$2,500,000	$0	$0	$375,000	$575,000	$3,450,000
Offices & Warehouse Renovation Allowance	$1,000,000	$0	$0	$150,000	$230,000	$1,380,000
Water Usage During Dismantlement for Dust Control	$0	$120,000	$0	$0	$0	$120,000
Additional Cost Total	$3,500,000	$120,000	$0	$(1,186,802)	$805,000	**$3,238,198**

ADJUSTED TOTAL FOR UNIT 3 COST ESTIMATES						
	Direct Cost	General Conditions	Project Indirect Costs	Contingency	Escalation	Total
Unit 3 – Adjusted Total						
Estimate Total	$20,028,975	$5,509,010	$8,698,162	$6,847,208	$6,246,690	**$47,330,045**
Adjustments	$3,500,000	$120,000	$0	$(1,186,802)	$805,000	**$3,238,198**
Adjusted Total	$23,528,975	$5,629,010	$8,698,162	$5,660,406	$7,051,690	**$50,568,243**

Tampa Electric Company
Big Bend Station Unit 3
Dismantlement Study

Project No.: A09476.301
Date: December 28, 2020
Rev. 0, Use

	Total ($000s)	2022 4th Quarter	2023 1st Quarter	2023 2nd Quarter	2023 3rd Quarter	2023 4th Quarter	2024 1st Quarter	2024 2nd Quarter	2024 3rd Quarter	2024 4th Quarter	2025 1st Quarter	2025 2nd Quarter	2025 3rd Quarter	2025 4th Quarter	2026 1st Quarter	2026 2nd Quarter	2026 3rd Quarter	2026 4th Quarter	2027 1st Quarter
Unit 3 Total Project Cost	50,568	260	314	1,074	1,074	1,555	2,092	3,622	3,814	3,694	3,904	3,840	3,647	4,048	4,783	5,298	5,536	1,881	132
Cumulative		260	574	1,647	2,721	4,276	6,368	9,990	13,804	17,498	21,402	25,242	28,889	32,937	37,720	43,018	48,555	50,436	50,568



TEC
BIG BEND STATION
UNIT 3 PRE DEMOLITION MODIFICATIONS

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-301
Estimate Date	10/23/20
Reviewed By	BA
Approved By	BA
Estimate No.	35256A
Cost index	FLTAM

Estimate No.: 35256A
Project No.: A09476-301
Estimate Date: 10/23/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 3 PRE DEMOLITION MODIFICATIONS

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
21.00.00	CIVIL WORK			13,826	166	9,639	2,589	26,054
22.00.00	CONCRETE			19,804	857	38,883	6,695	65,381
23.00.00	STEEL			245,990	4,194	229,475	96,485	571,950
35.00.00	PIPING	350,000						350,000
41.00.00	ELECTRICAL EQUIPMENT	100,000	205,000		352	18,728	4,995	328,723
42.00.00	RACEWAY, CABLE TRAY & CONDUIT	400,000		235,015	16,251	950,699	19,943	1,605,657
43.00.00	CABLE	200,000		256,333	3,599	213,394	51,692	721,420
44.00.00	CONTROL & INSTRUMENTATION	200,000						200,000
	TOTAL DIRECT	1,250,000	205,000	770,968	25,419	1,460,818	182,399	3,869,185

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Estimate Totals

Description	Amount	Totals	Hours
Labor	1,460,818		25,419
Material	770,968		
Subcontract	1,250,000		
Construction Equipment	182,399		
Process Equipment	205,000		
	3,869,185	**3,869,185**	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	87,649		
90-2 Show-up Time	29,216		
90-3 Cost Due To OT 5-10's	285,813		
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	316,215		
91-2 Field Office Expenses	194,386		
91-3 Material&Quality Control	49,271		
91-4 Site Services	40,468		
91-5 Safety	31,167		
91-6 Temporary Facilities	23,713		
91-7 Temporary Utilities	25,984		
91-8 Mobilization/Demob.	24,990		
91-9 Legal Expenses/Claims	3,692		
Other Construction Indirects			
92-1 Small Tools & Consumables	47,330		
92-2 Scaffolding	110,438		
92-3 General Liability Insur.	15,777		
92-4 Constr. Equip. Mob/Demob	1,824		
92-5 Freight on Material	38,548		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	260,615		
92-9 Contractors Profit	372,307		
	1,959,403	**5,828,588**	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning	116,572		
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
	116,572	**5,945,160**	
Contingency			
94-1 Contingency on Const Eq	43,046		
94-3 Contingency on Material	189,427		
94-4 Contingency on Labor	642,245		
94-5 Contingency on Subcontr.	250,000		
94-6 Contingency on Process Eq	41,000		
94-7 Contingency on Indirect	23,314		
	1,189,032	**7,134,192**	
Escalation			
96-1 Escalation on Const Equip	27,462		
96-3 Escalation on Material	158,784		
96-4 Escalation on Labor	724,532		
96-5 Escalation on Subcontract	293,489		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	28,408		
	1,232,675	**8,366,867**	
98 Interest During Constr			
		8,366,867	
Total		**8,366,867**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
21.00.00		CIVIL WORK									
	21.17.00	EXCAVATION									
		FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE	FOUNDATION FOR CABLE RACK	335.11 CY	-	-		55	3,213	863	4,076
		FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	74.37 CY	-	-		12	713	192	905
		EXCAVATION						68	3,926	1,055	4,980
	21.19.00	DISPOSAL									
		DISPOSAL OF EXCESS MATERIAL USING DUMP TRUCK, 4 MI ROUND TRIP	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	74.37 CY	-	-		5	285	77	362
		DISPOSAL OF EXCESS MATERIAL USING DUMP TRUCK, 4 MI ROUND TRIP	FOUNDATION FOR CABLE RACK	335.11 CY	-	-		22	1,285	345	1,630
		DISPOSAL						27	1,570	422	1,992
	21.20.00	BACKFILL									
		FOUNDATION BACKFILL, SELECT STRUCTURAL FILL	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	70.19 CY	-	-	2,246	12	673	181	3,100
		FOUNDATION BACKFILL, SELECT STRUCTURAL FILL	FOUNDATION FOR CABLE RACK	361.87 CY	-	-	11,580	60	3,469	932	15,981
		BACKFILL					13,826	71	4,142	1,113	19,081
		CIVIL WORK					13,826	166	9,639	2,589	26,054
22.00.00		CONCRETE									
	22.13.00	CONCRETE									
		MAT FOUNDATION LESS THAN 5 FT THICK, 4500 PSI	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	16.94 CY	-	-	2,118	23	886	268	3,272
		MAT FOUNDATION LESS THAN 5 FT THICK, 4500 PSI	FOUNDATION FOR CABLE RACK	27.70 CY	-	-	3,463	38	1,449	438	5,350
		CONCRETE WALL, 4500 PSI	TRANSFORMER FIRE WALL	9.00 CY	-	-	1,125	20	753	228	2,106
		CONCRETE					6,706	81	3,089	933	10,728
	22.15.00	EMBEDMENT									
		EMBEDMENTS, CARBON STEEL	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	84.72 LB	-	-	254	5	202	8	463
		EMBEDMENTS, CARBON STEEL	FOUNDATION FOR CABLE RACK	277.04 LB	-	-	831	15	659	25	1,515
		EMBEDMENT					1,085	20	860	33	1,979
	22.17.00	FORMWORK									
		BUILT UP INSTALL & STRIP	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	315.02 SF	-	-	788	69	3,163	504	4,454
		BUILT UP INSTALL & STRIP	FOUNDATION FOR CABLE RACK	1,712.00 SF	-	-	4,280	377	17,188	2,739	24,207
		BUILT UP INSTALL & STRIP	TRANSFORMER FIRE WALL	1,024.00 SF	-	-	2,560	225	10,281	1,638	14,479
		FORMWORK					7,628	671	30,631	4,882	43,140
	22.25.00	REINFORCING									
		UNCOATED A615 GR60	15FT L. x 12FT W. x 3FT D. FOR 8MVA TRANSFORMER	1.50 TN	-	-	1,538	30	1,509	297	3,343
		UNCOATED A615 GR60	FOUNDATION FOR CABLE RACK	2.08 TN	-	-	2,130	41	2,090	411	4,631
		UNCOATED A615 GR60	TRANSFORMER FIRE WALL	0.70 TN	-	-	718	14	704	139	1,560
		REINFORCING					4,385	85	4,303	847	9,535
		CONCRETE					19,804	857	38,883	6,695	65,381
23.00.00		STEEL									
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	CABLE RACK	22.00 TN	-	-	69,410	411	22,514	10,292	102,217
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	BRACING FOR ADDITIONS	36.00 TN	-	-	113,580	1,010	55,262	16,842	185,684
		REINFORCING EXISTING STRUCTURAL STEEL WITH COVER PLATES	STABILITY BRACING FOR TURBINE BUILDING	18.00 TN	-	-	63,000	2,772	151,699	69,350	284,049
		ROLLED SHAPE					245,990	4,194	229,475	96,485	571,950
		STEEL					245,990	4,194	229,475	96,485	571,950
35.00.00		PIPING									
	35.13.45	MISC. ABOVE GROUND, PROCESS AREA									

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	35.13.45	MISC. ABOVE GROUND, PROCESS AREA									
		MODIFICATIONS TO EXISTING PIPE SYSTEMS: NATURAL GAS HEADER, AMMONIA SUPPLY HEADER, FIRE PROTECTION, SERVICE WATER, COMPRESS AIR AND GASES PIPING		1.00 LS	350,000	-					350,000
		MISC. ABOVE GROUND, PROCESS AREA			350,000						350,000
		PIPING			350,000						350,000
41.00.00		ELECTRICAL EQUIPMENT									
	41.47.00	PANEL: CONTROL, DISTRIBUTION, & RELAY									
		STATION RESERVE SYSTEM RECONFIGURATION	ALLOWANCE	1.00 LS	100,000	-					100,000
		PANEL: CONTROL, DISTRIBUTION, & RELAY			100,000						100,000
	41.51.00	POWER TRANSFORMER									
		8MVA, 13.8KV-4160V TRANSFORMER, INCLUDING OIL	INCLUDING OIL, PAD MOUNTED TRANSFORMER (ALLOWANCE)	1.00 LS	-	205,000		352	18,728	4,995	228,723
		POWER TRANSFORMER				205,000		352	18,728	4,995	228,723
		ELECTRICAL EQUIPMENT			100,000	205,000		352	18,728	4,995	328,723
42.00.00		RACEWAY, CABLE TRAY & CONDUIT									
	42.13.02	CABLE TRAY COVER, ALUMINUM									
		24 IN WIDE INCLUDING FITTINGS		1,500.00 LF	-	-	4,320	114	6,661	140	11,121
		CABLE TRAY COVER, ALUMINUM					4,320	114	6,661	140	11,121
	42.13.37	CABLE TRAY, ALUMINUM									
		24 IN WIDE LADDER TYPE INCLUDING SUPPORTS AND FITTINGS	SUPPORTED FROM EXISTING STEEL STRUCTURE	1,500.00 LF	-	-	38,445	2,886	168,839	3,542	210,826
		CABLE TRAY, ALUMINUM					38,445	2,886	168,839	3,542	210,826
	42.15.13	CONDUIT, ALUMINUM									
		1 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		37,000.00 LF	-	-	104,340	8,751	511,955	10,739	627,035
		1-1/2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		2,000.00 LF	-	-	9,400	563	32,951	691	43,042
		2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		2,000.00 LF	-	-	12,800	697	40,802	856	54,458
		2-1/2 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE		2,000.00 LF	-	-	18,500	906	53,030	1,112	72,642
		3 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE	FOR OXIDATION BLOWER:1, 2, 3 & 4 (4 CONDUITS x 500FT) ON EXISTING STEEL SUPPORT	2,000.00 LF	-	-	24,300	1,278	74,782	1,569	100,651
		3 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE	ON EXISTING STEEL SUPPORT	400.00 LF	-	-	4,860	256	14,956	314	20,130
		4 IN DIA INCLUDING ELBOWS, UNISTRUT SUPPORTS, AND MISC HARDWARE	ON EXISTING STEEL MEMBERS	1,000.00 LF	-	-	18,050	799	46,723	980	65,753
		MISCELLANEOUS SIZE CONDUITS	ALLOWANCE	1.00 LS	400,000	-					400,000
		CONDUIT, ALUMINUM			400,000		192,250	13,251	775,199	16,261	1,383,710
		RACEWAY, CABLE TRAY & CONDUIT			400,000		235,015	16,251	950,699	19,943	1,605,657
43.00.00		CABLE									
	43.10.00	CONTROL/INSTRUMENTATION/COMMUNICATION CABLE & TERMINATION									
		CONTROL/INSTRUMENTATION/COMMUNICATION CABLES + TERMINATION	ALLOWANCE	1.00 LS	200,000	-		0	0		200,000
		CONTROL/INSTRUMENTATION/COMMUNICATION CABLE & TERMINATION			200,000			0	0		200,000
	43.20.00	600V CABLE & TERMINATION									
		600V #10 3/C CU XLPE LSZH	22 CABLES x 1000FT=	22,000.00 LF	-	-	31,680	678	40,179	9,733	81,592
		600V #8 4/C CU EPR TS-CPE	15 CABLES x 1000FT=	15,000.00 LF	-	-	33,600	743	44,027	10,665	88,292
		600V #4 3/C CU EPR TS-CPE	2 CABLES x 1000FT=	2,000.00 LF	-	-	6,140	119	7,044	1,706	14,891
		600V #1/0 3/C W/G CU EPR TS-CPE	2 CABLES x 1000FT=	2,000.00 LF	-	-	11,700	172	10,175	2,465	24,340
		600V #4/0 3/C CU	2 CABLES x 1000FT=	2,000.00 LF	-	-	23,640	213	12,654	3,065	39,359
		600V #250 KCMIL 3-1/C CU TRIPLEXED EPR TS-CPE	FOR CEMES SHELTER FEEDER	400.00 LF	-	-	4,608	45	2,661	645	7,914
		600V #750 MCM 3/C CU	FOR CONSTRUCTION TRAILER FEEDER	1,000.00 LF	-	-	29,350	274	16,241	3,934	49,525

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
	43.20.00	600V CABLE & TERMINATION									
		TERMINATION - COMPRESSION LUG, #10, 1 HOLE, COPPER	22 CABLES x 3 x 2=	132.00 EA	-	-	290	36	2,152	521	2,964
		TERMINATION - COMPRESSION LUG, #8, 2 HOLE, COPPER	15 CABLES x 3 x 2=	90.00 EA	-	-	585	30	1,761	427	2,773
		TERMINATION - COMPRESSION LUG, #4, 2 HOLE, COPPER	2 CABLES x 3 x 2=	12.00 EA	-	-	111	7	391	95	597
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	2 CABLES x 3 x 2=	12.00 EA	-	-	165	10	564	137	865
		TERMINATION - COMPRESSION LUG, #4/0, 2 HOLE, COPPER	2 CABLES x 3 x 2=	12.00 EA	-	-	216	15	861	209	1,286
		TERMINATION - COMPRESSION LUG, #250, 2 HOLE, COPPER	FOR CEMES SHELTER FEEDER TERMINATION (3 x 2)	6.00 EA	-	-	126	9	540	131	797
		TERMINATION - COMPRESSION LUG, #750, 2 HOLE, COPPER	FOR CONSTRUCTION TRAILER FEEDER TERMINATIONS	6.00 EA	-	-	372	20	1,186	287	1,845
		600V CABLE & TERMINATION					142,583	2,369	140,437	34,019	317,039
	43.40.00	5/8KV CABLE & TERMINATION									
		5KV #1/0 3/C CU EPR TS-CPE	FOR OXIDATION BLOWER:1	500.00 LF	-	-	6,275	39	2,332	565	9,172
		5KV #1/0 3/C CU EPR TS-CPE	FOR OXIDATION BLOWER:2	500.00 LF	-	-	6,275	39	2,332	565	9,172
		5KV #1/0 3/C CU EPR TS-CPE	FOR OXIDATION BLOWER:3	500.00 LF	-	-	6,275	39	2,332	565	9,172
		5KV #1/0 3/C CU EPR TS-CPE	FOR OXIDATION BLOWER:4	500.00 LF	-	-	6,275	39	2,332	565	9,172
		5KV #750 KCMIL 1/C CU	4160KV SWGR:B TO 8MVA TRANSFORNER FEEDER - CABLE RUN VIA CABLE TRAY (1500FT x 6)=	9,000.00 LF	-	-	87,570	960	56,942	13,793	158,305
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	FOR OXIDATION BLOWER:1	6.00 EA	-	-	84	13	783	190	1,056
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	FOR OXIDATION BLOWER:2	6.00 EA	-	-	84	13	783	190	1,056
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	FOR OXIDATION BLOWER:3	6.00 EA	-	-	84	13	783	190	1,056
		TERMINATION - COMPRESSION LUG, #1/0, 2 HOLE, COPPER	FOR OXIDATION BLOWER:4	6.00 EA	-	-	84	13	783	190	1,056
		TERMINATION - COMPRESSION LUG, #750, 2 HOLE, COPPER	6 x 2=	12.00 EA	-	-	744	60	3,557	862	5,163
		5/8KV CABLE & TERMINATION					113,750	1,231	72,957	17,673	204,380
		CABLE			200,000		256,333	3,599	213,394	51,692	721,420
44.00.00		CONTROL & INSTRUMENTATION									
	44.13.00	CONTROL SYSTEM									
		DISTRIBUTED CONTROL SYSTEM, RE-PROGRAMMING COST	SERVICE BY VENDOR (ALLOWANCE)	1.00 EA	200,000	-					200,000
		CONTROL SYSTEM			200,000						200,000
		CONTROL & INSTRUMENTATION			200,000						200,000

TEC
BIG BEND STATION
UNIT 3 DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-301
Estimate Date	10/23/20
Reviewed By	BA
Approved By	BA
Estimate No.	35257A

Estimate No.: 35257A
Project No.: A09476-301
Estimate Date: 10/23/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 3 DEMOLITION

Sargent & Lundy

Group	Description	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00	WHOLE PLANT DEMOLITION	7,203,198			74,355	3,434,737	1,576,964	12,214,899
11.00.00	DEMOLITION				601	32,900	16,546	49,447
22.00.00	CONCRETE	40,000		229,045	1,206	45,857	15,238	330,140
23.00.00	STEEL			518,925	3,145	172,094	86,550	777,570
	TOTAL DIRECT	7,243,198		747,970	79,307	3,685,589	1,695,298	13,372,055

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Estimate Totals

Description	Amount	Totals	Hours
Labor	3,685,589		79,307
Material	747,970		
Subcontract	7,243,198		
Construction Equipment	1,695,298		
Process Equipment			
	13,372,055	**13,372,055**	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	221,135		
90-2 Show-up Time	73,712		
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	797,799		
91-2 Field Office Expenses	87,570		
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety	78,634		
91-6 Temporary Facilities	59,826		
91-7 Temporary Utilities			
91-8 Mobilization/Demob.	63,050		
91-9 Legal Expenses/Claims	9,314		
Other Construction Indirects			
92-1 Small Tools & Consumables	39,804		
92-2 Scaffolding			
92-3 General Liability Insur.	39,804		
92-4 Constr. Equip. Mob/Demob	16,953		
92-5 Freight on Material	37,399		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	531,797		
92-9 Contractors Profit	759,710		
	2,816,507	**16,188,562**	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost	4,932,320		
93-8 EPC Fee			
	4,932,320	**21,120,882**	
Contingency			
94-1 Contingency on Const Eq	400,090		
94-3 Contingency on Material	183,776		
94-4 Contingency on Labor	1,205,206		
94-5 Contingency on Subcontr.	1,448,640		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	986,464		
	4,224,176	**25,345,058**	
Escalation			
96-1 Escalation on Const Equip	265,618		
96-3 Escalation on Material	122,154		
96-4 Escalation on Labor	1,226,638		
96-5 Escalation on Subcontract	1,236,600		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	782,005		
	3,633,015	**28,978,073**	
98 Interest During Constr			
		28,978,073	
Total		**28,978,073**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00		WHOLE PLANT DEMOLITION									
	10.22.00	CONCRETE									
		BUILDING/EQUIPMENT FOUNDATION/PAD		1,003.00 CY	-	-		2,031	111,750	43,993	155,743
		CONCRETE						2,031	111,750	43,993	155,743
	10.23.00	STEEL									
		STRUCTURAL, GIRT AND GALLERY STEEL	BOILER	2,347.00 TN	-	-		4,292	214,438	69,362	283,800
		STRUCTURAL, GIRT AND GALLERY STEEL	PRECIP BOX	1,344.00 TN	-	-		1,912	95,509	30,893	126,402
		STRUCTURAL, GIRT AND GALLERY STEEL	PRECIP STEEL	669.00 TN	-	-		952	47,541	15,378	62,919
		STRUCTURAL, GIRT AND GALLERY STEEL	FGD	773.00 TN	-	-		1,100	54,932	17,768	72,700
		STRUCTURAL, GIRT AND GALLERY STEEL	FLY ASH SILO #2 AND STEEL	153.00 TN	-	-		218	10,873	3,517	14,390
		STRUCTURAL, GIRT AND GALLERY STEEL	BALANCED DRAFT STEEL	716.00 TN	-	-		1,018	50,881	16,458	67,339
		STRUCTURAL, GIRT AND GALLERY STEEL	SCR	977.00 TN	-	-		1,390	69,429	22,457	91,886
		DUCTWORK AND STEEL SUPPORTS	DUCTWORK REMOVAL	2,816.00 TN	-	-		10,534	445,065	236,385	681,450
		DUCTWORK AND STEEL SUPPORTS	SCR DUCTWORK REMOVAL	899.00 TN	-	-		3,363	142,086	75,465	217,551
		DEMO CIRCULATING WATER DISCHARGE STRUCTURE		1.00 LS	500,000	-					500,000
		STEEL			500,000			24,778	1,130,754	487,683	2,118,437
	10.25.00	CONCRETE CHIMNEY & STACK									
		CONCRETE CHIMNEY		1.00 LS	3,550,000	-					3,550,000
		CONCRETE CHIMNEY & STACK			3,550,000						3,550,000
	10.31.00	MECHANICAL EQUIPMENT									
		MAIN BOILER AND APPURTENANCES		8,391.00 TN	-	-		23,788	1,188,473	512,166	1,700,639
		STEAM TURBINE GENERATOR		1,411.00 TN	-	-		4,000	169,008	89,764	258,772
		FEEDWATER DEARATING EQUIPMENT		149.00 TN	-	-		422	17,847	9,479	27,326
		BOP EQUIPMENT INCLUDING PUMPS, HEAT EXCHANGERS, COMPRESSORS, TANKS, CHEMICAL FEED, WATER AND OIL SYSTEMS, ETC.		1,060.00 TN	-	-		3,005	126,965	67,434	194,400
		ASH / DUST COLLECTOR EQUIPMENT		186.00 TN	-	-		527	22,279	11,833	34,112
		FGD EQUIPMENT		220.00 TN	-	-		624	26,351	13,996	40,347
		SLAG DEWATERING EQUIPMENT		465.00 TN	-	-		1,224	51,719	27,469	79,188
		CONDENSER		353.00 TN	-	-		1,001	42,282	22,457	64,739
		MECHANICAL EQUIPMENT						34,592	1,644,924	754,598	2,399,522
	10.35.00	PIPING									
		PIPING, VALVES AND HANGERS	INCLUDES ALL PIPING SYSTEMS WITHIN THE BOILER AND TURBINE AREA SUCH AS: MAIN STEAM, HOT/COLD REHEAT, BOILER FEED, FEEDWATER, CONDENSATE, SERVICE WATER, ETC.	1,856.00 TN	-	-		6,943	293,339	155,799	449,138
		PIPING						6,943	293,339	155,799	449,138
	10.37.00	ASBESTOS REMOVAL									
		ASBESTOS ABATEMENT	COST PROVIDED BY TECO	1.00 LS	3,153,198	-	-		-	-	3,153,198
		ASBESTOS REMOVAL			3,153,198						3,153,198
	10.41.00	ELECTRICAL EQUIPMENT									
		TRANSFORMERS		370.00 TN	-	-		989	41,770	22,185	63,955
		MISCELLANEOUS ELECTRICAL EQUIPMENT	MCC'S, CABINETS, PANELS, ETC.	346.00 TN	-	-		925	39,061	20,746	59,807
		ELECTRICAL EQUIPMENT						1,913	80,831	42,931	123,762
	10.42.00	RACEWAY, CABLE TRAY, & CONDUIT									
		CONDUIT		172.00 TN	-	-		1,118	47,236	25,088	72,323
		CABLE TRAY		200.00 TN	-	-		1,200	50,700	26,928	77,628
		RACEWAY, CABLE TRAY, & CONDUIT						2,318	97,936	52,016	149,951
	10.43.00	CABLE									
		CABLE STRIPPABLE		178.00 TN	-	-		1,780	75,205	39,943	115,148
		CABLE						1,780	75,205	39,943	115,148
		WHOLE PLANT DEMOLITION			7,203,198			74,355	3,434,737	1,576,964	12,214,899

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
11.00.00		DEMOLITION									
	11.23.00	STEEL									
		STRUCTURAL STEEL	REMOVE TEMPORARY STEEL FOR SCR	140.00 TN	-	-		455	24,898	12,522	37,419
		STRUCTURAL STEEL	REMOVE TEMPORARY STEEL FOR BOILER	45.00 TN	-	-		146	8,003	4,025	12,028
		STEEL						601	32,900	16,546	49,447
		DEMOLITION						601	32,900	16,546	49,447
22.00.00		CONCRETE									
	22.13.00	CONCRETE									
		FLOWABLE FILL, 1500 PSI	FILL CIRCULATING WATER TUNNEL	2,411.00 CY	-	-	229,045	1,206	45,857	15,238	290,140
		CONCRETE FLOOD WALL REPAIRS		1.00 LS	40,000	-					40,000
		CONCRETE			40,000		229,045	1,206	45,857	15,238	330,140
		CONCRETE			40,000		229,045	1,206	45,857	15,238	330,140
23.00.00		STEEL									
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, PRIME PAINTED ONLY	TEMPORARY STEEL FOR SCR	140.00 TN	-	-	392,700	2,380	130,234	65,498	588,431
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, PRIME PAINTED ONLY	TEMPORARY STEEL FOR BOILER	45.00 TN	-	-	126,225	765	41,861	21,053	189,139
		ROLLED SHAPE					518,925	3,145	172,094	86,550	777,570
		STEEL					518,925	3,145	172,094	86,550	777,570

TEC
BIG BEND STATION
UNIT 3 POST DEMOLITION

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-301
Estimate Date	10/23/20
Reviewed By	BA
Approved By	BA
Estimate No.	35258A
Cost index	FLTAM

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Estimate No.: 35258A
Project No.: A09476-301
Estimate Date: 10/23/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 3 POST DEMOLITION

Group	Description	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00	WHOLE PLANT DEMOLITION	250,000						250,000
21.00.00	CIVIL WORK			148,797	430	20,691	8,879	178,367
23.00.00	STEEL			227,215	1,691	92,016	25,733	344,965
24.00.00	ARCHITECTURAL	1,200,000		20,800	444	19,117	4,384	1,244,301
27.00.00	PAINTING & COATING			103,500	7,970	371,974	44,629	520,103
41.00.00	ELECTRICAL EQUIPMENT	250,000						250,000
	TOTAL DIRECT	1,700,000		500,312	10,536	503,798	83,625	2,787,735

Estimate Totals

Description	Amount	Totals	Hours
Labor	503,798		10,536
Material	500,312		
Subcontract	1,700,000		
Construction Equipment	83,625		
Process Equipment			
	2,787,735	**2,787,735**	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision	30,200		
90-2 Show-up Time	10,100		
90-3 Cost Due To OT 5-10's	98,600		
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management	109,100		
91-2 Field Office Expenses	67,000		
91-3 Material&Quality Control	17,000		
91-4 Site Services	14,000		
91-5 Safety	10,700		
91-6 Temporary Facilities	8,200		
91-7 Temporary Utilities	9,000		
91-8 Mobilization/Demob.	8,600		
91-9 Legal Expenses/Claims	1,300		
Other Construction Indirects			
92-1 Small Tools & Consumables	16,300		
92-2 Scaffolding	38,100		
92-3 General Liability Insur.	5,400		
92-4 Constr. Equip. Mob/Demob	800		
92-5 Freight on Material	25,000		
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A	108,600		
92-9 Contractors Profit	155,100		
	733,100	**3,520,835**	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost	436,020		
93-8 EPC Fee			
	436,020	**3,956,855**	
Contingency			
94-1 Contingency on Const Eq	19,700		
94-3 Contingency on Material	122,900		
94-4 Contingency on Labor	221,500		
94-5 Contingency on Subcontr.	340,000		
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	87,200		
	791,300	**4,748,155**	
Escalation			
96-1 Escalation on Const Equip	14,300		
96-3 Escalation on Material	104,600		
96-4 Escalation on Labor	246,800		
96-5 Escalation on Subcontract	413,000		
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	110,200		
	888,900	**5,637,055**	
98 Interest During Constr			
		5,637,055	
Total		**5,637,055**	

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Process Equipment Cost	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
10.00.00		WHOLE PLANT DEMOLITION									
	10.99.00	DEMOLITION, MISCELLANEOUS									
		INSPECT, CLEAN OUT AND REPAIR DRAINS		1.00 LS	250,000	-					250,000
		DEMOLITION, MISCELLANEOUS			250,000						250,000
		WHOLE PLANT DEMOLITION			250,000						250,000
21.00.00		CIVIL WORK									
	21.57.00	ROAD, PARKING AREA, & SURFACED AREA									
		BITUMINOUS ASPHALT	ASPHALT TO REPAVE REMOVED BOILER AREA AND TO THE SOUTH	1,503.00 TN	-	-	148,797	430	20,691	8,879	178,367
		ROAD, PARKING AREA, & SURFACED AREA					148,797	430	20,691	8,879	178,367
		CIVIL WORK					148,797	430	20,691	8,879	178,367
23.00.00		STEEL									
	23.17.00	GALLERY									
		GALVANIZED GRATING, 2" DEEP x 3/16" BEARING BAR WITH HOLD DOWN CLIPS	FOR TURBINE DECK GRATING	4,200.00 SF	-	-	97,860	924	50,058	6,552	154,470
		GALLERY					97,860	924	50,058	6,552	154,470
	23.25.00	ROLLED SHAPE									
		MEDIUM WEIGHT MEMBERS, 21 LB/LF TO 40 LB/LF, GALVANIZED	FOR TURBINE DECK GRATING	41.00 TN	-	-	129,355	767	41,958	19,181	190,494
		ROLLED SHAPE					129,355	767	41,958	19,181	190,494
		STEEL					227,215	1,691	92,016	25,733	344,965
24.00.00		ARCHITECTURAL									
	24.17.00	ELEVATOR									
		FREIGHT ELEVATOR		1.00 LS	1,200,000	-					1,200,000
		ELEVATOR			1,200,000						1,200,000
	24.37.00	ROOFING									
		METAL, UNINSULATED	REPAIRING ROOF, CLOSING OPENINGS AND OTHER LOCATIONS	2,400.00 SF	-	-	7,800	264	10,329	1,354	19,482
		ROOFING					7,800	264	10,329	1,354	19,482
	24.41.00	SIDING									
		METAL, UNINSULATED, 24 GA, GALVANIZED CORRUGATED		4,000.00 SF	-	-	13,000	180	8,788	3,031	24,819
		SIDING					13,000	180	8,788	3,031	24,819
		ARCHITECTURAL			1,200,000		20,800	444	19,117	4,384	1,244,301
27.00.00		PAINTING & COATING									
	27.17.00	PAINTING									
		STEEL PAINTING	EXTERIOR PAINTING, POST DISMANTLEMENT	35,500.00 SF	-	-	35,500	2,734	127,585	15,308	178,393
		STEEL PAINTING	INTERIOR PAINTING, TURBINE BUILDING	68,000.00 SF	-	-	68,000	5,237	244,389	29,322	341,710
		PAINTING					103,500	7,970	371,974	44,629	520,103
		PAINTING & COATING					103,500	7,970	371,974	44,629	520,103
41.00.00		ELECTRICAL EQUIPMENT									
	41.35.00	LIGHTNING PROTECTION									
		LIGHTNING PROTECTION	ALLOWANCE	1.00 LS	100,000	-					100,000
		LIGHTNING PROTECTION			100,000						100,000
	41.37.00	LIGHTING ACCESSORY (FIXTURE)									
		LIGHTING - FIXTURES, ACCESSORY	ALLOWANCE	1.00 LS	150,000	-					150,000
		LIGHTING ACCESSORY (FIXTURE)			150,000						150,000
		ELECTRICAL EQUIPMENT			250,000						250,000

TEC
BIG BEND STATION
UNIT 3 ENGINEERING DEMOLITION SUPPORT

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-301
Estimate Date	10/23/20
Reviewed By	BA
Approved By	BA
Estimate No.	35259A
Cost index	FLTAM

Estimate No.: 35259A
Project No.: A09476-301
Estimate Date: 10/23/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION
UNIT 3 ENGINEERING DEMOLITION SUPPORT

Group	Description	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost

Estimate Totals

Description	Amount	Totals	Hours
Labor			
Material			
Subcontract			
Construction Equipment			
Process Equipment			
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision			
90-2 Show-up Time			
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management			
91-2 Field Office Expenses			
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety			
91-6 Temporary Facilities			
91-7 Temporary Utilities			
91-8 Mobilization/Demob.			
91-9 Legal Expenses/Claims			
Other Construction Indirects			
92-1 Small Tools & Consumables			
92-2 Scaffolding			
92-3 General Liability Insur.			
92-4 Constr. Equip. Mob/Demob			
92-5 Freight on Material			
92-6 Freight on Process Equip			
92-7 Sales Tax			
92-8 Contractors G&A			
92-9 Contractors Profit			
Project Indirect Costs			
93-1 Engineering Services	2,023,250		
93-2 CM Support	1,190,000		
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
	3,213,250	**3,213,250**	
Contingency			
94-1 Contingency on Const Eq			
94-3 Contingency on Material			
94-4 Contingency on Labor			
94-5 Contingency on Subcontr.			
94-6 Contingency on Process Eq			
94-7 Contingency on Indirect	642,700		
	642,700	**3,855,950**	
Escalation			
96-1 Escalation on Const Equip			
96-3 Escalation on Material			
96-4 Escalation on Labor			
96-5 Escalation on Subcontract			
96-6 Escalation on Process Eqp			
96-7 Escalation on Indirects	492,100		
	492,100	**4,348,050**	
98 Interest During Constr			
		4,348,050	
Total		**4,348,050**	

TEC
BIG BEND STATION UNIT 3 DEMOLITION
DEMOLITION UNIT 3 SCRAP VALUE

Estimator	GA
Labor rate table	20FLTAM DEMO
Project No.	A09476-301
Estimate Date	10/23/20
Reviewed By	BA
Approved By	BA
Estimate No.	35225A

Estimate No.: 35225A
Project No.: A09476-301
Estimate Date: 10/23/20
Prep./Rev/App.: GA/BA/BA

TEC
BIG BEND STATION UNIT 3 DEMOLITION
DEMOLITION UNIT 3 SCRAP VALUE

Group	Description	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
18.00.00	SCRAP VALUE		(5,226,829)					(5,226,829)
	TOTAL DIRECT		(5,226,829)					(5,226,829)

Estimate Totals

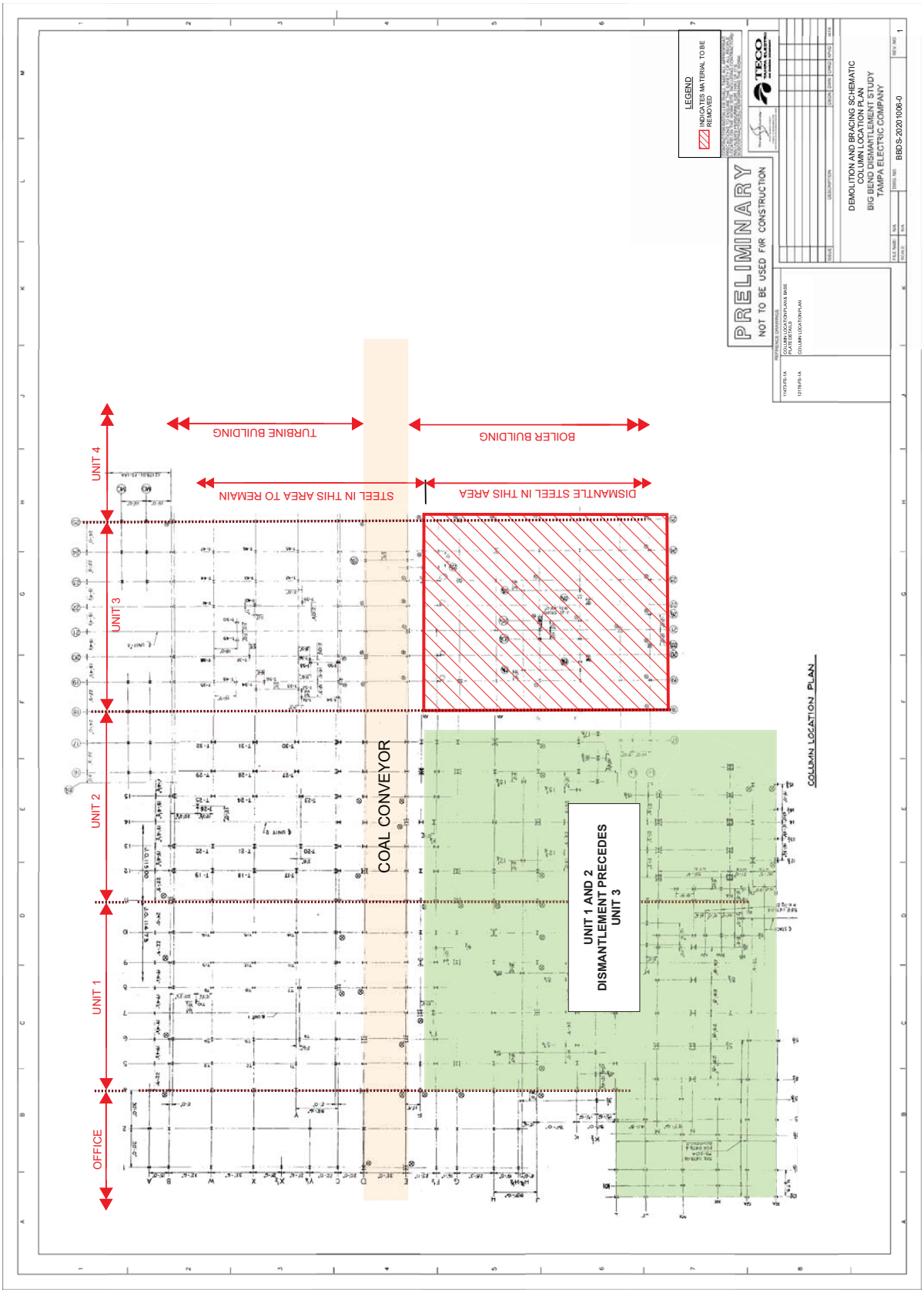
Description	Amount	Totals	Hours
Labor			
Material			
Subcontract			
Construction Equipment			
Scrap Value	(5,226,829)		
	(5,226,829)	(5,226,829)	
General Conditions			
Additional Labor Costs			
90-1 Labor Supervision			
90-2 Show-up Time			
90-3 Cost Due To OT 5-10's			
90-4 Cost Due To OT 6-10's			
90-5 Per Diem			
Site Overheads			
91-1 Construction Management			
91-2 Field Office Expenses			
91-3 Material&Quality Control			
91-4 Site Services			
91-5 Safety			
91-6 Temporary Facilities			
91-7 Temporary Utilities			
91-8 Mobilization/Demob.			
91-9 Legal Expenses/Claims			
Other Construction Indirects			
92-1 Small Tools & Consumables			
92-2 Scaffolding			
92-3 General Liability Insur.			
92-4 Constr. Equip. Mob/Demob			
92-5 Freight on Material			
92-6 Freight on Scrap			
92-7 Sales Tax			
92-8 Contractors G&A			
92-9 Contractors Profit			
		(5,226,829)	
Project Indirect Costs			
93-1 Engineering Services			
93-2 CM Support			
93-3 Start-Up/Commissioning			
93-4 Start-Up/Spare Parts			
93-5 Excess Liability Insur.			
93-6 Sales Tax On Indirects			
93-7 Owners Cost			
93-8 EPC Fee			
		(5,226,829)	
Contingency			
94-1 Contingency on Const Eq			
94-3 Contingency on Material			
94-4 Contingency on Labor			
94-5 Contingency on Subcontr.			
94-6 Contingency on Scrap			
94-7 Contingency on Indirect			
		(5,226,829)	
Escalation			
96-1 Escalation on Const Equip			
96-3 Escalation on Material			
96-4 Escalation on Labor			
96-5 Escalation on Subcontract			
96-6 Escalation on Scrap			
96-7 Escalation on Indirects			
		(5,226,829)	
98 Interest During Constr			
		(5,226,829)	
Total		**(5,226,829)**	

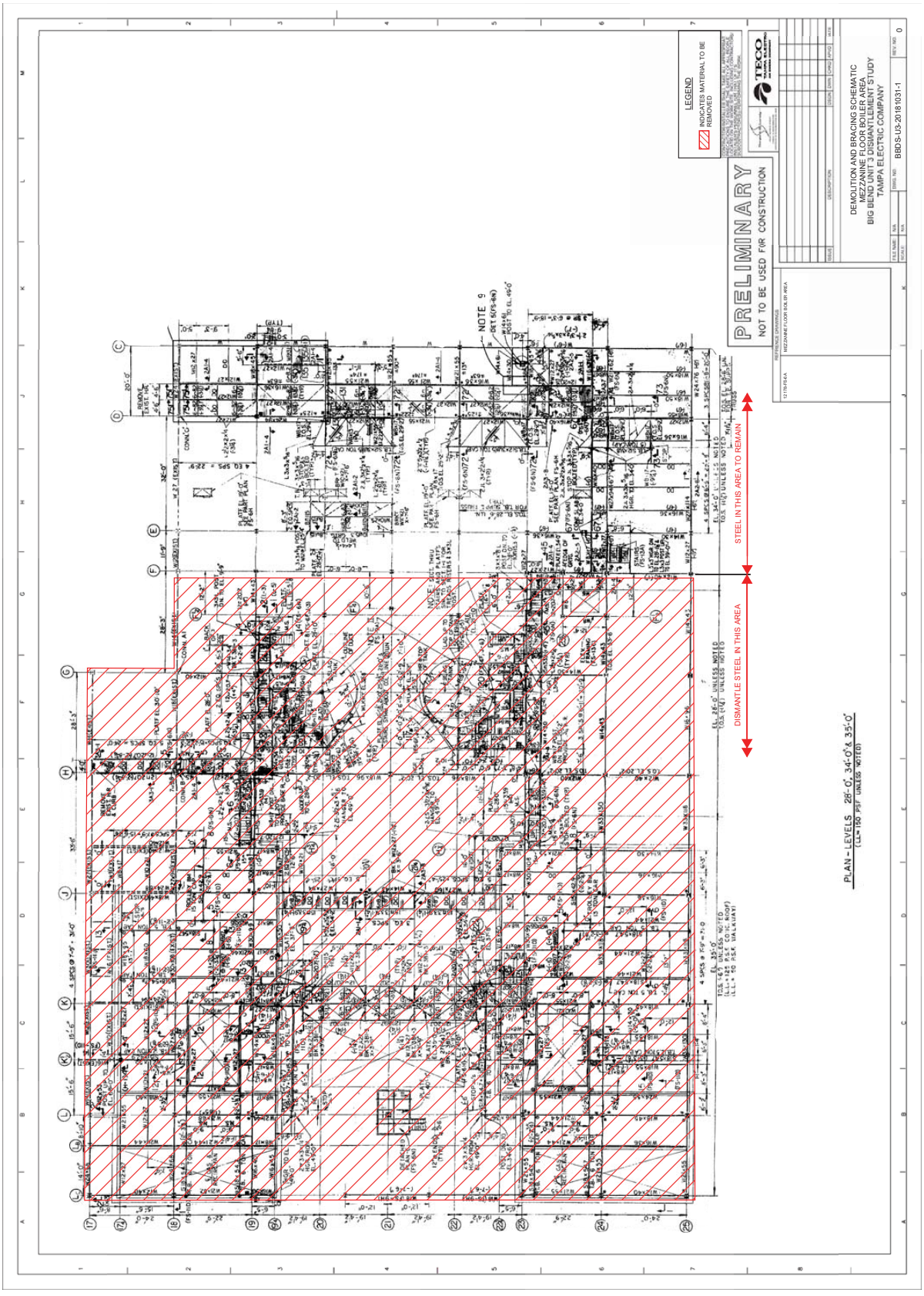
TEC
BIG BEND STATION UNIT 3 DEMOLITION
DEMOLITION UNIT 3 SCRAP VALUE

Group	Phase	Description	Notes	Quantity	Subcontract Cost	Scrap Value	Material Cost	Man Hours	Labor Cost	Equip Amount	Total Cost
18.00.00		SCRAP VALUE									
	18.10.00	MIXED STEEL									
		CARBON STEEL, FREIGHT INCLUDED	INCLUDES CONTINGENCY	-25,748.00 TN	-	(4,796,852)	-				(4,796,852)
		MIXED STEEL				(4,796,852)					(4,796,852)
	18.30.00	COPPER									
		#1 INSULATED COPPER WIRE 65%, FREIGHT INCLUDED	INCLUDES CONTINGENCY	-178.00 TN	-	(429,977)	-				(429,977)
		COPPER				(429,977)					(429,977)
		SCRAP VALUE				(5,226,829)					(5,226,829)

ATTACHMENT 2

Boiler Building Demolition and Bracing Schematics


LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
COLUMN LOCATION PLAN
BIG BEND DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-20201006-0
TURBINE BUILDING
BOILER BUILDING
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
UNIT 4
UNIT 3
UNIT 2
UNIT 1
OFFICE
COAL CONVEYOR
UNIT 1 AND 2
DISMANTLEMENT PRECEDES
UNIT 3
COLUMN LOCATION PLAN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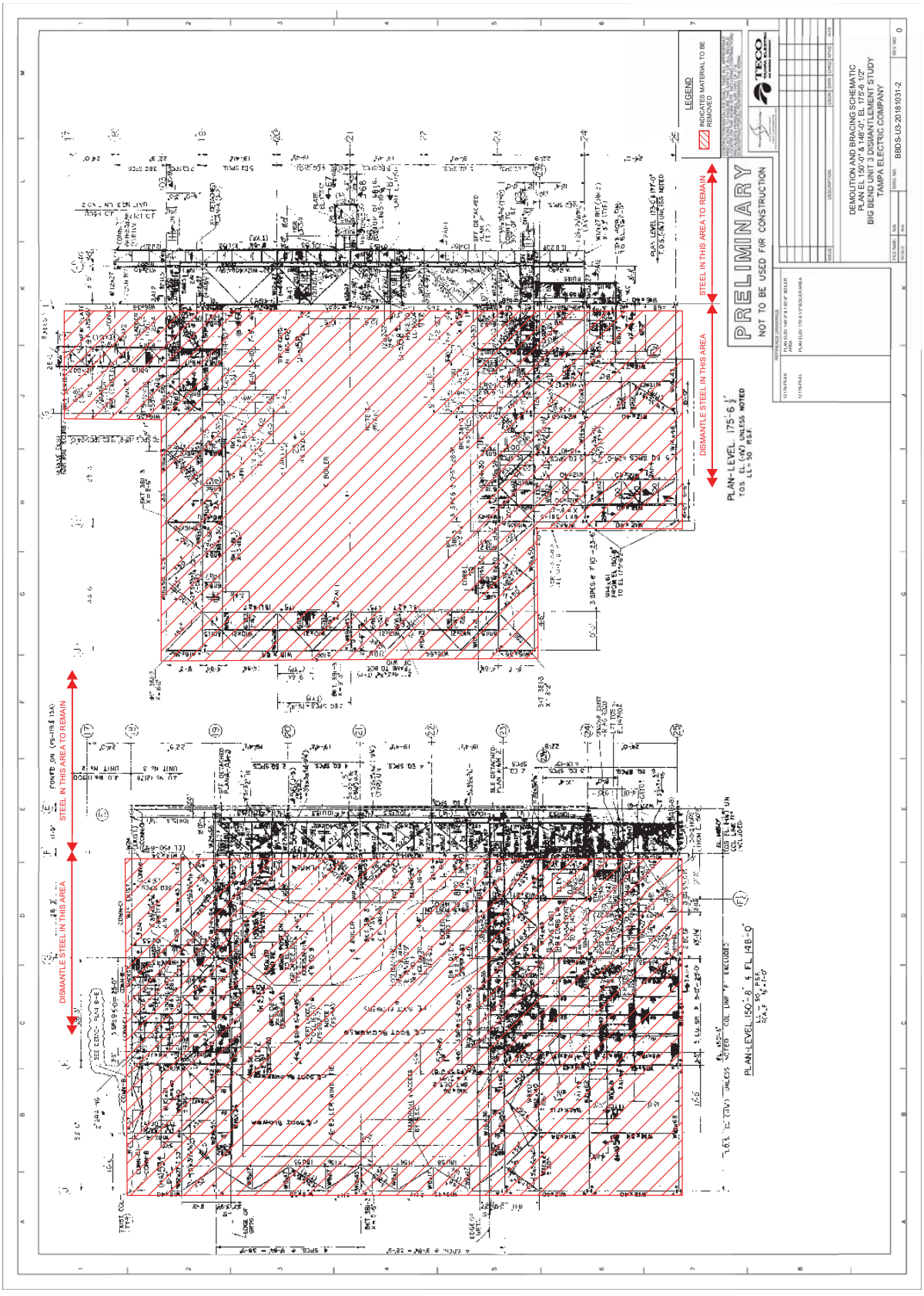
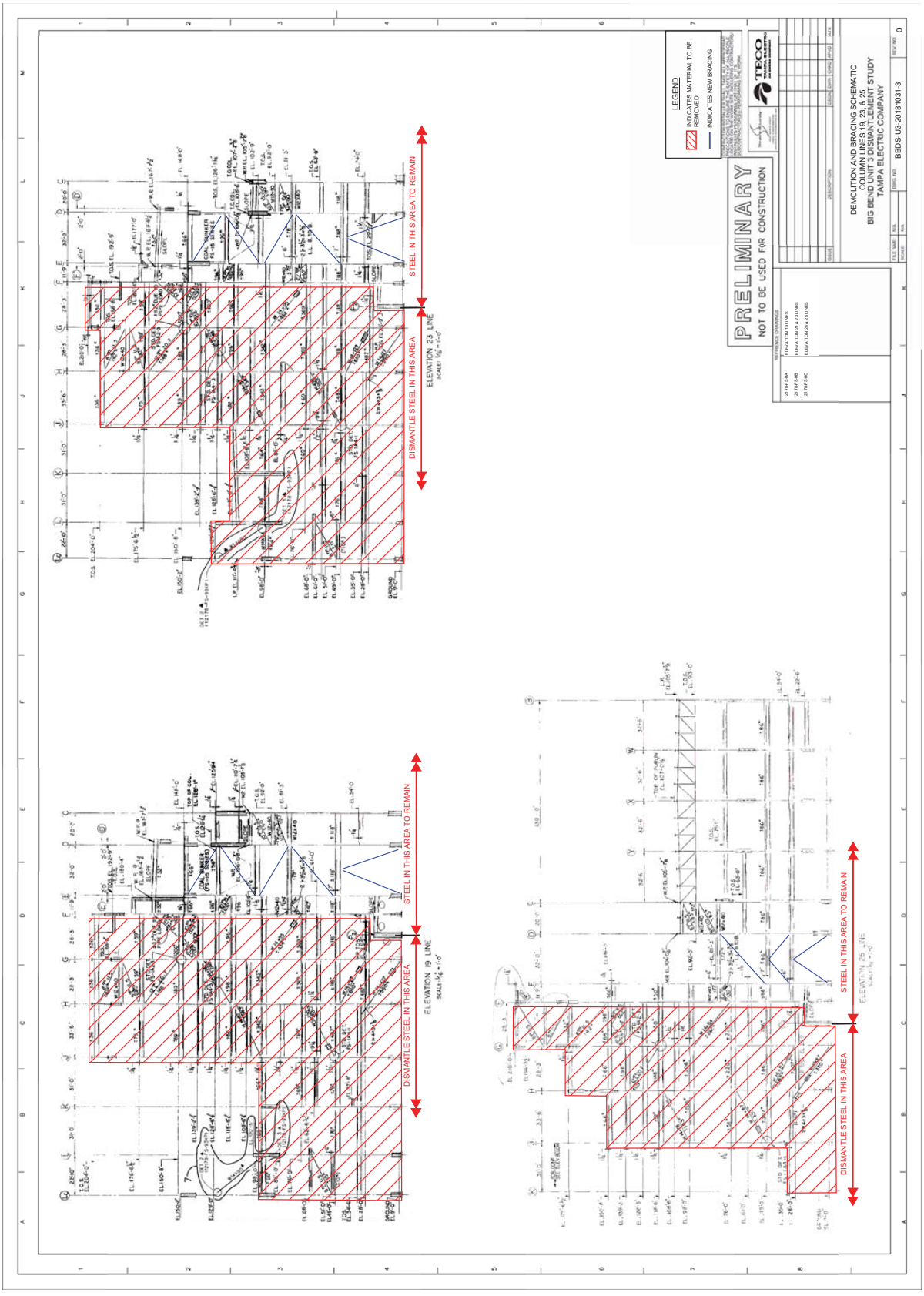
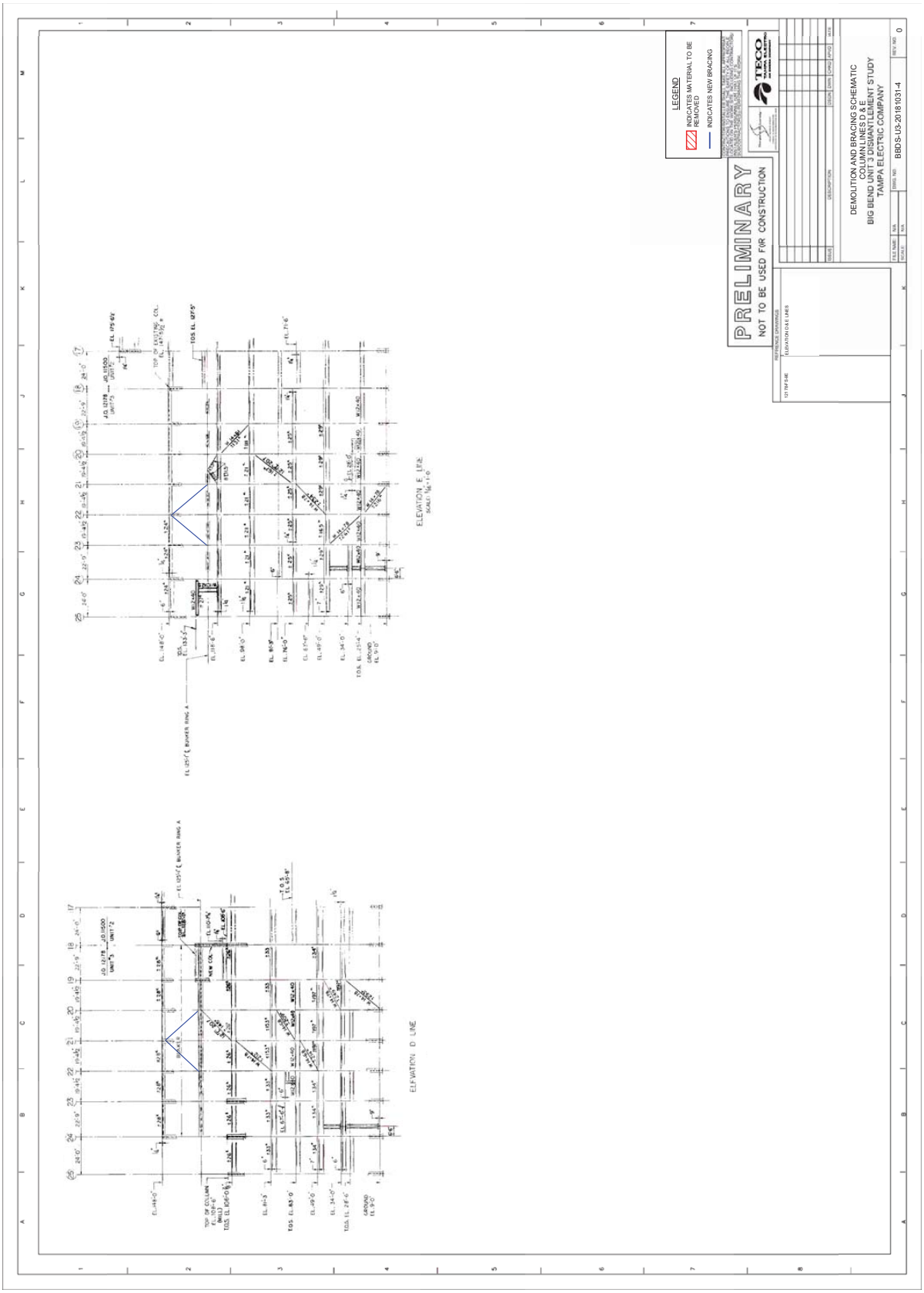
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
MEZZANINE FLOOR ROOFER AREA
BIG BEND UNIT 1 DIGITAL TWIN STUDY
TAMPA ELECTRIC COMPANY
BBDS-U3-20181031-1
NOTE 9
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
PLAN - LEVELS 28'-0", 34'-0" & 35'-0"


LEGEND
INDICATES MATERIAL TO BE REMOVED
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
BIG BEND UNIT 3 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U3-20181031-2
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
PLAN-LEVEL 175'-6"
TOS EL (+0') UNLESS NOTED
LL= 50 PSF
PLAN-LEVEL 150'-8" & EL 148'-0"
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA


LEGEND
INDICATES MATERIAL TO BE REMOVED
INDICATES NEW BRACING
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
COLUMN LINES 19, 23 & 25
BIG BEND UNIT 1 DISMANTLEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U3-20181031-3
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
ELEVATION 23 LINE
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA
ELEVATION 19 LINE
STEEL IN THIS AREA TO REMAIN
DISMANTLE STEEL IN THIS AREA

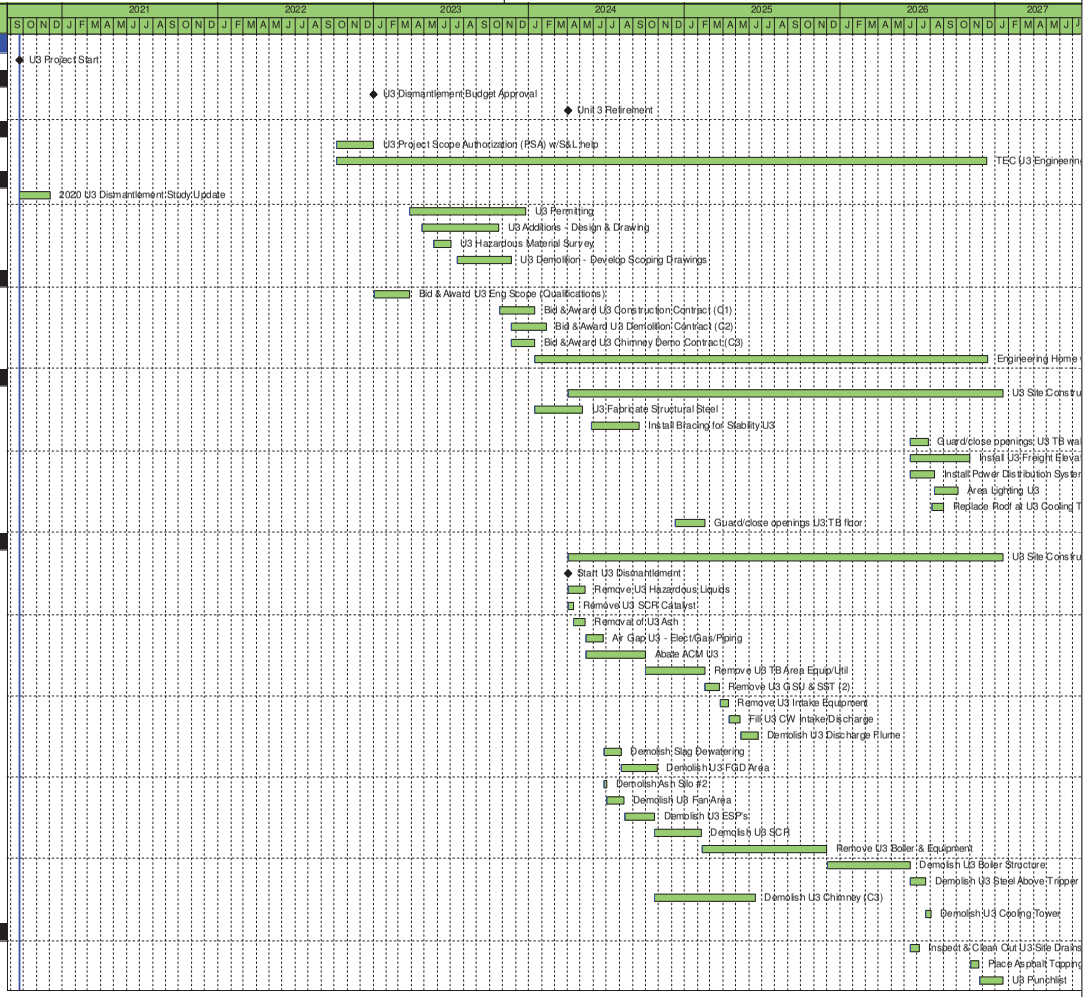

LEGEND
INDICATES MATERIAL TO BE REMOVED
INDICATES NEW BRACING
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
DEMOLITION AND BRACING SCHEMATIC
COLUMN LINES D & E
BIG BEND UNIT 2 FINAL ELEMENT STUDY
TAMPA ELECTRIC COMPANY
BBDS-U3-20181031-4
ELEVATION E LINE
ELEVATION D LINE

ATTACHMENT 3

Dismantling Sequence Schedule

BB3 Dismantling Sequence — 27-Oct-20 11:16

Activity ID	Activity Name	Rem Dur	Start	Finish
BB3 Dismantling Sequence		1633	22-Sep-20	18-Jan-27
A1000	U3 Project Start	0	22-Sep-20	
U3 Milestones		325	02-Jan-23	01-Apr-24
A1020	U3 Dismantlement Budget Approval	0		02-Jan-23*
A1030	Unit 3 Retirement	0		01-Apr-24*
U3 TEC Activities		1089	06-Oct-22	11-Dec-26
A10501	U3 Project Scope Authorization (PSA) w/S&L help	60	06-Oct-22	02-Jan-23
A1060	TEC U3 Engineering Staff	1089	06-Oct-22	11-Dec-26
U3 Engineering		833	22-Sep-20	25-Dec-23
A1080	2020 U3 Dismantlement Study Update	50	22-Sep-20	02-Dec-20
A1090	U3 Permitting	195	28-Mar-23	25-Dec-23
A1100	U3 Additions - Design & Drawing	130	25-Apr-23	23-Oct-23
A1110	U3 Hazardous Material Survey	30	23-May-23	03-Jul-23
A1120	U3 Demolition - Develop Scoping Drawings	90	18-Jul-23	20-Nov-23
U3 Procurement		1030	03-Jan-23	14-Dec-26
A1140	Bid & Award U3 Eng Scope (Qualifications)	60	03-Jan-23	27-Mar-23
A1150	Bid & Award U3 Construction Contract (C1)	60	24-Oct-23	15-Jan-24
A1160	Bid & Award U3 Demolition Contract (C2)	60	21-Nov-23	12-Feb-24
A1170	Bid & Award U3 Chimney Demo Contract (C3)	40	21-Nov-23	15-Jan-24
A1180	Engineering Home Office Support U3	760	16-Jan-24	14-Dec-26
U3 New Construction (Additions) (C1)		785	16-Jan-24	18-Jan-27
A1200	U3 Site Construction Support (Additions)	730	02-Apr-24	18-Jan-27
A1210	U3 Fabricate Structural Steel	80	16-Jan-24	06-May-24
A1220	Install Bracing for Stability U3	80	28-May-24	16-Sep-24
A1230	Guard/close openings U3 TB wall	30	16-Jun-26	27-Jul-26
A1240	Install U3 Freight Elevator	100	16-Jun-26	02-Nov-26
A1250	Install Power Distribution System U3	40	16-Jun-26	10-Aug-26
A1260	Area Lighting U3	40	11-Aug-26	05-Oct-26
A1270	Replace Roof at U3 Cooling Tower	20	04-Aug-26	31-Aug-26
A1280	Guard/close openings U3 TB floor	50	10-Dec-24	17-Feb-25
U3 Dismantling (C2 unless noted)		730	02-Apr-24	18-Jan-27
A1300	U3 Site Construction Support (Demolition)	730	02-Apr-24	18-Jan-27
A1310	Start U3 Dismantlement	0	02-Apr-24	
A1320	Remove U3 Hazardous Liquids	30	02-Apr-24	13-May-24
A1330	Remove U3 SCR Catalyst	10	02-Apr-24	15-Apr-24
A1340	Removal of U3 Ash	20	16-Apr-24	13-May-24
A1350	Air Gap U3 - Elect/Gas/Piping	30	14-May-24	24-Jun-24
A1360	Abate ACM U3	100	14-May-24	30-Sep-24
A1370	Remove U3 TB Area Equip/Util	100	01-Oct-24	17-Feb-25
A1380	Remove U3 GSU & SST (2)	25	18-Feb-25	24-Mar-25
A1390	Remove U3 Intake Equipment	15	25-Mar-25	14-Apr-25
A1400	Fill U3 CW Intake/Discharge	20	15-Apr-25	12-May-25
A1410	Demolish U3 Discharge Flume	30	13-May-25	23-Jun-25
A1420	Demolish Slag Dewatering	30	25-Jun-24	05-Aug-24
A1430	Demolish U3 FGD Area	60	06-Aug-24	28-Oct-24
A1440	Demolish Ash Silo #2	5	25-Jun-24	01-Jul-24
A1450	Demolish U3 Fan Area	30	02-Jul-24	12-Aug-24
A1460	Demolish U3 ESP's	50	13-Aug-24	21-Oct-24
A1470	Demolish U3 SCR	80	22-Oct-24	10-Feb-25
A1480	Remove U3 Boiler & Equipment	210	11-Feb-25	01-Dec-25
A1490	Demolish U3 Boiler Structure	140	02-Dec-25	15-Jun-26
A1500	Demolish U3 Steel Above Tripper	25	16-Jun-26	20-Jul-26
A1510	Demolish U3 Chimney (C3)	170	22-Oct-24	16-Jun-25
A1520	Demolish U3 Cooling Tower	10	21-Jul-26	03-Aug-26
U3 Post Demolition Activities		155	16-Jun-26	18-Jan-27
A1540	Inspect & Clean Out U3 Site Drains	15	16-Jun-26	06-Jul-26
A1550	Place Asphalt Topping for U3 Drainage	15	03-Nov-26	23-Nov-26
A1560	U3 Punchlist	40	24-Nov-26	18-Jan-27



Sargent & Lundy

ATTACHMENT 4

Application of Gannon Lessons Learned to Big Bend Dismantling

Tampa Electric Company
Big Bend Power Station - Unit 3
2020 Dismantlement Study

Attachment 4
Application of Gannon Lessons Learned to Big Bend Dismantling

Sargent & Lundy

	Lesson Learned Category and Description	Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
1	**COORDINATION**				
1.1	The plant required constant communication of the status.			X	The execution contracts will include regular status meetings.
1.2	Walk-downs were performed weekly with plant managers, and every single time revealed issues that were added to the scope.	X			The dismantlement study has used these lessons learned to minimize the potential for extra work.
1.3	The duration it took to demolish the last unit boiler was much greater than the contractor had estimated.	X		X	The study schedule uses long durations for demolition. The contractor will be required to maintain a schedule.
2	**DRAWINGS**				
2.1	Most drawings had outdated information.		X		Reference drawings will be reviewed during engineering.
2.2	The drawings were never updated after the dismantlement because Jim Montgomery retired.		X		TEC will need to develop a plan on how to handle the drawing cleanup after demolition.
3	**ARCHITECTURAL / BUILDING ENVELOPE**				
3.1	New roofs had to be put on several structures. Roofs need to be designed to Factory Mutual standards. Installation must be well-documented.				Not applicable; no roofs have been identified as requiring replacement.
3.2	New siding was required where the boiler voids had been. There was significant effort to design, fabricate, and install the girts and wind columns to receive the siding.	X			Closing off of wall opening created by demolition has been included in the estimated quantities.
3.3	When we re-roofed the slab areas over the former boilers, we had to raise the height of the handrail which took engineering and construction effort.				Not applicable; Big Bend is not saving the boiler structures and any roof access is not changing.
3.4	The plant required additional interior and exterior lighting in the older areas of the plant.	X			New lighting has been included in the estimated quantities.
3.5	While areas of roofing and siding were exposed, there were problems controlling rainwater infiltration. We got complaints from operations a number of times.			X	Requirement to be placed on the contractor to provide temporary shielding when large openings are not sealed immediately after an opening is created.
3.6	Lightning protection was added to the entire turbine building.	X			Lightning protection has been included in the estimated quantities.
3.7	After the boilers were demolished, water was blowing in a door, so the plant made us add a canopy.			X	Similar to 3.5 above.
3.8	Many areas of roofing were damaged by the activities of the demolition, falling objects, and water infiltration. Roof deck was found to be rusted out and had to be replaced.	X			Roof replacement areas have been included in the estimate to account for known problems and potential damage during demolition.

Attachment 4

Application of Gannon Lessons Learned to Big Bend Dismantling

	Lesson Learned Category and Description	Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
4	**CIVIL (YARD)**				
4.1	Earth crane pads were built for the very large crane that was used. These crane pads were spread around the site when the crane was relocated for the next unit. This resulted in a lot of extra fill that cost money to remove.			X	Contractor will be responsible for the means and methods of their work.
4.2	I had to review multiple lift plans and also evaluate pit walls for crane surcharge.		X	X	Contractor is responsible for lift plans as part of means and methods. Engineering should only be reviewing those plans.
4.3	Underground concrete was frequently in the way of new light pole bases and drains when we re-paved.		X		Addressed through adequate engineering planning of new lights.
4.4	Knowing the location of the circulating water tunnels was vital at all times. It would have paid to paint them on the ground surface at the start.			X	Intake lines are painted at grade. Requirement can be added to specification for contractor to mark discharge locations.
4.5	The plant made us revise the entrance gate with a new guard house, fencing, gates, and card readers.				Not applicable; new entrance is not anticipated for Big Bend.
5	**CONCRETE**				
5.1	At the screenwell structure, we had to design infill framing where the pumps and screens were removed.	X			In fill quantities are included in the estimate.
5.2	We had to infill pits around the old boiler feed pumps. This required engineering and construction.				This was not identified as necessary during the 2018 study.
5.3	Cable cutting was used to demo pedestals. It left some rough surfaces that were not great for walking.	X			The estimate includes asphalt paving to lessen the uneven surfaces created by demolition.

Attachment 4

Application of Gannon Lessons Learned to Big Bend Dismantling

Lesson Learned Category and Description		Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
6	STEEL				
6.1	Much grating and handrail had to be replaced.				Not considered in the estimate; no areas of concern were identified during the 2018 study.
6.2	Checkered plate was rusty and had to be replaced in large areas.				Not considered in the estimate; no areas of concern were identified during the 2018 study.
6.3	Corroded pieces of steel were continuously discovered and had to be mitigated on an almost daily basis.				It is understood that this is likely the case at Big Bend; however, it was decided that a value could not be assigned to cover this situation.
6.4	The cost to repaint the steel inside the turbine building was estimated and was prohibitively expensive. We painted the exterior steel only.	X			Painting of both interior and remaining exterior steel is included in the estimate.
6.5	The entire structure had to be modeled to design the supplemental bracing steel and ensure that the turbine building was safely braced.		X		Some modeling was done during the 2018 study and is anticipated for the full design effort.
6.6	I was regularly asked to design field splices because beams could not be flown in between the webs of two columns.		X	X	Engineering should consider this when developing details; the project will need to work with the contractor.
6.7	I was asked to evaluate existing floors for lifts.		X	X	This should be the contractor's responsibility with review by engineering.
6.8	An over-height structure was required to ensure that trucks would not hit the pipe rack.				Not applicable to Big Bend
6.9	I was asked to evaluate beams for rigging loads many times. Rigging was especially difficult for the very heavy steam pipes.			X	This should be the contractor's responsibility.
6.10	The plate girders were hard to demolish. They are too large to lift at once, so we had to demo them in sections. We had the contractor hire a structural engineer to provide a sequencing plan. Even then, one of the pieces folded over while it was being flown.			X	Contractor is responsible for lift plans as part of means and methods. They will be required to hire a structural engineer to facilitate their work.
6.11	Some items that had tied back to the tripper building had to be resupported or replaced. For example, a hydrogen vent and a jib crane serving the cooling tower.	X			These were evaluated during the 2018 study and included in the estimate.

Attachment 4
Application of Gannon Lessons Learned to Big Bend Dismantling

Lesson Learned Category and Description		Address Lesson Learned with: Estimate	Engineering	Contract	Remarks
7	**MECHANICAL**				
7.1	Floor drains were filled with debris over time and had to be cleaned at great cost.	X			The estimate includes an allowance for cleaning out and fixing the drains.
7.2	Roof drains were leaking, missing, etc. and had to be refurbished. The scaffold was expensive, because it had to be suspended from the main turbine building roof trusses. This may not be an issue at Big Bend.	X			The estimate includes replacing some of the roof drains.
7.3	Turbine building ventilation refurbishment due to demolition changing the building configuration.	X			The adjusted costs to the estimate includes an allowance to replace the ventilation system.
8	**Construction Utilities**				
8.1	Water usage fees associated with dust mitigation during demolition were in excess of $100,000.	X			An allowance has been included in the adjusted costs.