Terrora Unit 1 Lessons Learned Meeting
04-19-2022

Lessons Learned and Best Practices:

Safety

1. Many of the contractors used were not familiar with the Southern Company safety manual at the beginning of the project so the project team set time aside near mobilization to review the safety manual with them which resulted in compliance becoming less of an issue. This included a substation safety review

2. The project team held daily LOTO discussions and also a weekly review of the LOTO boxes in use. They also discussed any upcoming LOTO's that would be required within the next two weeks. The personnel included in these discussions would be the Safety Pro's, superintendents, leads, and plant LOTO coordinators. These meetings were held twice daily when needed.

3. Crane schedules and needs were discussed on a daily basis along with existing and upcoming critical lift plans and the current status of those lift plans. An hourly crane schedule was developed based on these daily discussions.

4. Site Safety committee safety/housekeeping walkdowns were performed with the craft workers on a weekly basis. Photos and results were shared with the entire site. This exercise helped gain buy in for the importance of housekeeping from everyone.

5. The project team encouraged the contactors to use rolling scaffolds and rolling ladders instead of extension and folding ladders when possible to reduce fall hazards.

6. In the future, contractor site safety plans will be required to be submitted and approved closer to mobilization.

7. Angle grinder safety will be added to the employee onboarding orientation.

8. The programmatic Hydro Safety Manual eliminated the possibility of have different contracts with different safety requirements.

9. Contractors need to be clear on who is responsible for a scaffolding competent person.

Schedule

1. Weekly schedule updates were performed morning up until the last 4-5 weeks of the project when they did twice weekly schedule updates so the team would know where the schedule stood.

2. The team was proactive with their integrated schedule, and identified the HIT points where key activities had to be completed by the BOP contractor in order for some of the other contractor work to proceed. A generic example being that piping must be installed before the lube oil equipment could be commissioned and started.

3. The team identified high risk activities such as rotational alignment and added emphasis to those tasks in order to ensure they did not start to run behind and push the overall project schedule performance.

4. Schedule updates were managed by the contractor submitting .pdf schedule markups and the project team scheduler making the Primavera adjustments.

Cost

None

Estimating

1. The project team developed schedules for the estimating process in order to break it down into more manageable pieces.

2. The project team would like to see cable estimates into more detail for tracking purposes. Currently everything less than 1000k volts is rolled up into the same estimate line item.

3. The project team along with the estimating team developed a standardized estimate template for both man hours and quantities which has been adopted for use going forward.

Environmental

None

Scope

1. The team would like to see design corrections, lessons learned, and redlines to quickly get incorporated into standard designs for upcoming units. New design iterations will not move forward until all redline drawings have been completed.

2. The turbine and generator work should be bid first in order to capture any scope changes that occur because of unexpected results from the bid process such as increased generator output.

3. Focus needs to be added to the turbine/generator coupling design and any interferences that result from the modernization work.

Staffing Levels

1. The Terrora U1 team utilized a larger startup group near the tail end of the project which helped to eliminate schedule slippage during the startup and commissioning phase.

Supply Chain Management

None

Vendor Quality

1. All vendor quality documentation such as motor alignment sheets should be available upon delivery for pre-fabricated skid-mounted equipment.

2. Factory acceptance testing should be performed if at all possible. This was not done on some of the Terrora U1 equipment due to COVID travel restrictions and equipment was delivered that was wired incorrectly and had multiple drawing mistakes.

Owner Engagement / Timeliness of Decisions

None

Document Control

None

Design

None

Startup & Commissioning

1. Early involvement from the startup team was a Lesson Learned from the Terrora U2 project and the team feel startup was engaged at the right time and with a good plan for U1.

2. Keep the affected Unit in “Planned Outage (PO)” status as long as possible during startup and commissioning and directly thereafter to avoid any situations where a “Forced Outage (FO)” situation arises.

3. The permanent tagging process is time consuming but it works. Assets with descriptions need to be defined and finalized earlier to facilitate completing the tagging process.

4. The startup team can be used as another “check point” to verify that PID”s match line lists, descriptions, etc. Any discrepancies that need to be resolved will be initiated with a FCR.

5. The startup team created a project commissioning guide for individual units that has helped the entire project team.