11. The Consortium's bulk commodity estimates by building were used for concrete, steel, large bore piping, small bore piping, cable tray, conduit, and cable with one exception. The Consortium's estimates for conduit and large bore piping in the annex building were not used and are considered unreliable. Schedule extensions to account for these high annex building quantities were not included. The Consortium is in the process of validating these quantities.

12. The Consortium's recovery schedule for shield building installation was being finalized during the assessment and was not available for review. Because of the predicted schedule duration increases in other areas of the integrated schedule, it is assumed that the shield building will not remain on the critical path.

13. The assembly and issuance of work packages will support the construction schedule to ensure work fronts are not limited.

14. There are no construction equipment limitations.

15. The indirect-to-direct craft ratio is reduced significantly from its current ratio of 1.3.

16. ITAAC closures do not impact the critical path.

17. Licensing issues (e.g., the need to obtain prior NRC approval of license amendments) do not limit work fronts or enter the critical path.

18. Cyber security issues do not affect the critical path.

19. Simulator and operator qualifications do not affect the critical path.

### 5.2.3 Results

The results of the schedule analysis are identified below:

- The to-go scope quantities, installation rates, productivity, and staffing levels all point to project completion later than the current forecast. Bechtel's assessment, based on certain assumptions, is that the Unit 2 and Unit 3 commercial operation dates will extend as follows:

**Table 5-1. Impacts on Commercial Operation Dates**

| | Unit 2 | Unit 3 |
|---|---|---|
| Current COD | June 2019 | June 2020 |
| Adjustment | 18 to 26 months | 24 to 36 months |
| New COD | Dec 2020 to Aug 2021 | June 2022 to June 2023 |

- The critical path will change from shield building installation to a more typical critical path for power plant projects that includes bulk commodity installations through overall project checkout and testing/startup.
- Increasing schedule confidence to 75% increases the schedule duration by 8 months (included in the 26 months for Unit 2 and the 36 months for Unit 3).
- The stagger between the Units 2 & 3 commercial operation dates is extended by 6 months (from the current 12 months apart to a recommended 18 months apart).
- The peak monthly construction percent complete is reduced from 3.1% to a lesser, more realistic, percentage.
- The primary checkout window is extended by 6 months (from the current 12 months per unit to a recommended 18 months per unit).
- The total craft population is increased by 25% to approximately 3,700. At peak, 850 pipefitters and 730 electricians will be required.
- The bulk installation windows are increased by a minimum of 30%.

Figure 5-1 provides the assessment Level 1 summary schedule. Both the Consortium and the Bechtel assessment schedule activities are shown for comparison. (Figures are located at the end of this section.)

Figure 5-2 through Figure 5-5 provide the mid forecast family of curves for Unit 2 total, nuclear island, turbine island, and balance of plant, respectively.

Figure 5-6 shows the Unit 2 craft manpower and percent complete curves. Figure 5-7 shows the Unit 2 head count by craft (not including subcontract hours). Figure 5-8 shows the Unit 3 craft manpower and percent complete curves.

Figure 5-9 shows the Unit 2 and 3 direct and indirect manpower curves for 12, 18, and 24 month staggers between units. Figure 5-10 shows the Unit 2 and 3 percent complete curves for 12, 18, and 24 month staggers between units.

## 5.3 Observations and Recommendations

Construction and project controls observations and recommendations are identified in Table 5-2.

**Table 5-2. Construction and Project Controls Observations and Recommendations**

| No. | Description |
|---|---|
| CPC1 | Observation(s)<br>The MAB team has been given responsibility for completing the assembly of module CA03 for Unit 2, which was shipped to the site incomplete, because the vendor could not meet the site need date. They also have several Unit 3 module assemblies to complete and all work should be complete by Summer 2016. |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | Recommendation(s)<br>• Since the MAB has a substantial amount of work remaining in addition to the work on Unit 2 CA03, it is recommended that a resource-loaded schedule be developed and some type of plan to predict and measure performance. Since this is not typical construction work, an example might be jobhours per lineal foot of weld. The development of these tools should help keep the work on schedule and within budget. Since the shop is performing so well, a study should be performed to see what other work they can be perform as they complete module work. |
| CPC2 | Observation(s)<br>The Unit 2 auxiliary building CA20 module was set in May 2014, however the fabrication and assembly was incomplete. The outstanding work was substantial and was reported to Bechtel to be as much as 50%. Seventeen months after setting the module, work continues in the field to complete the assembly. The work in the field is substantially more difficult and costly as compared to performing it in the controlled environment of the MAB, which allows easier access using man lifts which cannot be used in the field, better lighting for two shift work, and inside a building so weather is not a factor.<br><br>Recommendation(s)<br>• A detailed evaluation of the to-go work should be performed so that management understands the cost and schedule impacts before deciding to install something out of sequence. The result of the decision to install the CA20 module has been time consuming and costly. |
| CPC3 | Observation(s)<br>• An observation from the POD meetings is that the details discussed in these meetings results in micromanagement and short term planning of the specific construction activity. This type of detail management may be needed to resolve engineering (since it is in punch list mode), procurement, or quality items affecting the construction work, but for this phase of the construction, the detailed construction planning should be done by the area teams.<br>• It was observed that approximately 30 people attend the daily POD, however less than 15 provide input. The remaining participants are there to answer any question that may come up.<br>• Four days per week, the area supervision team spends significant time to gather information to meet with the PMO personnel to provide status of the day's progress and issues so they can be knowledgeable at the POD. This takes craft supervision out of the field, away from the craftsmen where they are needed.<br><br>Recommendation(s)<br>• The focus of the POD should be on resolution of issues (i.e., engineering, procurement, and quality) impacting the construction activities. The area construction teams should develop the three week look-ahead schedule and monitor the plan in the area construction meeting, which should not be held more than twice per week. The reason the project of this size is broken down into areas is because it is too big to manage construction from a central group (for example, a PMO). Delegate to the area team the responsibility for cost and schedule. The PMO should provide support to resolve engineering, procurement, and quality issues as needed and integrate all facets of the project. |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| CPC4 | Observation(s)<br>The field material requisition process is time consuming, resulting in delays in schedule and impacts to productivity. There are nine (9) people who sign off on field requisitions and if one requires changes, the process stops, the changes are made, and the process starts all over again. Several superintendents have indicated that this process applies to all material including construction aids and construction materials.<br><br>Recommendation(s)<br>• Look at streamlining the process for construction aids and material. In addition, look at expanding the min/max program to ensure enough material is continuously maintained to adequately support construction. This would cover items such as stock steel (angles, channels, etc.), fasteners (bolts, nuts, washers, etc.), piping material (studs, gaskets, etc.) and conduit fittings and unistrut. |
| CPC5 | Observation(s)<br>A review of the reading room documents suggests that the budgeted unit rates may not have been estimated and resource-loaded to account for differing locations and complexity. As an example, the budgeted unit rate of 35 to 36 jobhours per ton for rebar installation is used for standard as well as complex installations. The turbine pedestal, elevated slabs, and wall rebar installations require higher unit rates than a base mat installation. Craft productivity against the as budgeted unit rates has been difficult to achieve to date. This results in poor morale and an unmotivated effort to measure craft productivity.<br><br>Recommendation(s)<br>• The project should complete a reforecast based on to date performance, and establish realistic unit rates for the bulk installations. These realistic unit rates times the forecasted quantities will result in better projections of manpower needs by craft needs and craft performance can be monitored.<br>• Adjust the rates to take into account present performance impacts such as: work packaging, skill levels, experience of personnel, and 10 CFR 52 licensing requirements. |
| CPC6 | Observation(s)<br>• The current status of piping deliveries to each unit are as follows:<br>— Unit 2: 82% B31.1 is at site; 56% ASME is at site<br>— Unit 3: 63% B31.1 is at site; 28% ASME is at site<br>• It was stated that 20% to 30% of delivered spools at the site require rework due to changes which include revisions due to valve lengths changes, equipment nozzle relocations, etc. WEC's Engineering Manager explained that the majority of the changes were due to movement of hangers on the piping isometrics, not physical changes to the pipe.<br><br>Recommendation(s)<br>• The project needs to determine how much rework is required on the delivered pipe spools and get it done prior to delivery to the installation point. |
| CPC7 | Observation(s)<br>Indirect labor and materials are a major cost to the project. Presently there are more crafts working indirect (1,100) than direct (800) work. Normally on a project at this stage, indirect costs should be |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | about 30% of direct costs. The addition of an Indirects Manager three (3) months ago is a good addition to the team. This manager will provide visibility to indirect charges so management can make the appropriate changes and reduce the costs. Additionally, a review of the construction equipment plan shows a large part of the construction equipment demobilizing next year, which appears to be too early based on progress to date.<br><br>Recommendation(s)<br>• The project should develop a craft staffing plan to reduce the indirect costs and staffing to a reasonable level. It should be monitored weekly just like direct work. A reforecast should also be performed along with a revised equipment plan. |
| CPC8 | Observation(s)<br>A comparison between CB&I non-manual organizational charts issued 7 months apart revealed significant non-manual turnover. The turnover included several key areas such as the Unit 2 Nuclear Island Construction Manager (this is the fifth manager since the project began), MAB Area Construction Manager, Turbine Building Area Construction Manager, as well as non-manual personnel reporting to area managers. The reported turnover of non-manual is greater than 17%. With such a high turnover rate it will be difficult to build a productive non-manual organization.<br><br>Recommendation(s)<br>• Perform an evaluation of why the turnover in non-manuals is so high. Areas to investigate would include the demand to work excessive overtime, conflicting management direction, or the micromanagement of personnel. The resolution of some of these potential issues would help reduce the turnover of the non-manual workforce. |
| CPC9 | Observation(s)<br>There were 21 rebar dowels left out of Lift 4 of Unit 2 containment slab placement. Engineering required that the dowels be replaced by core drilling and grouting in the dowel rebar. The resolution of the issue and the completion of the work caused weeks of delays to the containment work and possibly the project. Numerous personnel have cast doubt on whether these dowels really needed to be grouted in; i.e., dowel bars with 90 degree or 180 degree hooks could possibly have been used to obtain the required bar development length without core drilling and grouting.<br><br>Recommendation(s)<br>• A dedicated team of senior subject matter experts from both WEC and CB&I engineers should be engaged to review these types of situations to ensure that the proposed fix, which will have a significant impact on schedule, is really required. In addition, this team should assist with resolution of critical issues from the time of discovery of the issue to ensure it is resolved with as small an impact to the project as possible. |
| CPC10 | Observation(s)<br>• The project has had difficulty hiring skilled craftsmen, especially rebar ironworkers. When the project reaches peak staffing the need for pipefitters, welders, and electricians will increase substantially. It is estimate that this project will need in excess of 900 pipefitters and 700 electricians.<br>• Bechtel visited the onsite training facility and were impressed with the capabilities. The Consortium had just trained 13 rebar ironworkers which was immediately helpful to the project and |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | this type of "immediately needed training" needs to be expanded.<br>• A project-specific labor survey had not been recently performed.<br><br>Recommendation(s)<br>• In addition to onsite training, CB&I should consider establishing a training school off site (possibly at local vocational schools) to train pipefitters, electricians, and welders to insure they can fill their needs in a timely manner.<br>• There are 6 onsite classrooms available which should be used full time to develop those crafts that are presently or will be in short supply.<br>• A project-specific labor survey should be performed. |
| CPC11 | Observation(s)<br>Aging of the construction workforce is impacting productivity.<br><br>Recommendation(s)<br>• Develop mentoring and training plan to promote junior craft and field engineering personnel with periodic evaluations and feedback sessions.<br>• Create and staff shadow positions for senior level positions within the Consortium intent on developing new talent that is focused on project completion. |
| CPC12 | Observation(s)<br>The concrete being used is self-consolidating and does not need vibrating. However, in a number of areas, mostly where there is dense rebar, voids in the concrete were evident.<br><br>Recommendation(s)<br>• In areas of dense rebar, additional consolidation such as standard concrete vibrating or form vibrating should be used to ensure complete consolidation of the concrete. |
| CPC13 | Observation(s)<br>• Presently, some parts of the project are working 58 hours (5-10s and 1-8 hours). Studies by the Business Roundtable, Construction Industry Institute, and Trade Unions have been done to assess the impact of working extended overtime. They have shown that after eight (8) weeks, the productivity drops by approximately 40%, which means that you would be getting 40 hours of work for 58 hours pay. Extended overtime also has an effect on absenteeism, accidents, physical and mental fatigue, morale, attitude, turnover and supervision decisions. The schedule also suffers, which adds more pressure to work overtime.<br>• In discussions with CB&I Industrial Relations, it was stated that when the recruiters hire craft personnel, they are told the project is on 4-10s and 8. A general feeling is that the project would maintain the work force if the 6 day weeks were stopped.<br>• The craft turnover rate is 20%. CB&I is expending a lot of money to hire and orient craftsmen.<br><br>Recommendation(s)<br>• The work week should be reduced to no more than 48 hours (4-10s and 1-8 hours). With the monies saved not working as much overtime, consideration should be given to a craft incentive plan that rewards staying on the project until given a reduction in force, and/or productive and safety incentive.<br>• To reduce the turnover, CB&I should consider a craft incentive of $1/hr which would only be |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
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| **No.** | **Description** |
| | paid when a reduction in force occurs. |
| CPC14 | Observation(s)<br>There are occasions where the construction team is too optimistic when scheduling work.<br><br>Recommendation(s)<br>• Work activities should be planned based on a realistic evaluation of the work, rather than optimistic projections due to schedule pressure from management. This way, craftsmen will be working productively. The project should consider a rule that the placement must be signed-off, except for final clean up, the day before the placement |
| CPC15 | Observation(s)<br>Although the construction team is being pushed hard to maintain schedule, the project schedule continues to slip for a variety of reasons, including design changes and clarifications. As a consequence of the focus on schedule, the cost does not receive the attention it should. The craftsmen do not focus on productivity as they should due to the schedule changes over which they have only partial control. The outcome of this will be an extended schedule and a cost overrun.<br><br>Recommendation(s)<br>• Maintain the schedule focus, but not at the expense of project cost. When engineering issues arise, adjust the schedule accordingly, so the craftsmen still feel they have some control and responsibility for working the schedule within budget. |
| CPC16 | Observation(s)<br>During walkdowns of the Unit 2 turbine building and the Unit 3 nuclear island, it was noticed that there were numerous work faces available, but no work was underway. The Unit 3 containment had only approximately 100 craft working. When this was questioned, both superintendents stated that craft personnel had been moved to the Unit 2 nuclear island as it was more important.<br><br>Recommendation(s)<br>• Staff up to allow working of all available work areas. Leave craftsmen assigned to one area so they feel they are part of an area team. It may be appropriate to combine the Unit 2 and Unit 3 containment to better use non-manuals and make some personnel available to fill other project needs. This would allow better incorporation of lessons learned by both non-manuals and craftsmen in Unit 2 to improve Unit 3 performance and schedule. |
| CPC17 | Observation(s)<br>• The superintendent provided drawings of the raceway and hangers in the containment which showed congested areas. From looking at the drawings it is evident that there will be numerous interferences. Additionally, the electrical hangers are much more complex than normal electrical hangers.<br>• In the containment, hangers are located by plant latitude and longitude. Locating these will require a survey crew rather than allowing the craftsmen to do it.<br><br>Recommendation(s)<br>• An interference review should be performed and any interference found should be resolved prior to start of installation. Some estimates should be performed to determine whether it is cheaper to install the hanger as designed or redesign the hanger. Once a decision is made, a |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
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| **No.** | **Description** |
| | reforecast should be performed to determine what the real costs would be.<br>• Hanger locations need to be located on the drawing using reference lines in the containment. |
| CPC18 | Observation(s)<br>Based on discussions with supervision and field engineering and attending the PMO meetings, it is apparent that there are numerous design changes and design clarifications that affect the work resulting in negative impacts to the schedule of the work. The majority of these are in the civil discipline. One would expect similar issues in piping mechanical and electrical.<br><br>Recommendation(s)<br>• Ensure that the design organization recognizes the importance of design changes and clarifications and is staffed to address them immediately. The negative impacts to the project will not decrease as long as changes continue and clarifications are slow to come from engineering and will continue throughout the project unless a change is made. |
| CPC19 | Observation(s)<br>The present staffing curves for manual manpower are classic bell shaped curves. Based on Bechtel's experience, the manual manpower curve will increase towards the latter part of the project and then drop off sharply at the end of the project. In addition, there are no crafts shown on the chart nine (9) months prior to commercial operation to close out punch list items.<br><br>Recommendation(s)<br>• Re-evaluate the staffing levels based on historical data and ensure there are crafts budgeted for punchlist completion. |
| CPC20 | Observation(s)<br>Installation tolerances are provided for all commodities and may not be exceeded without prior engineering approval. CB&I construction has attempted to relax the requirements and documented their requests in the civil generic guidance document. There are numerous situations where the commodity cannot be installed because of design interferences. As each situation arises, progress is affected while engineering evaluates the situation. The Strategic Planning Group is trying to identify these interferences, but they are not able to identify all of them.<br><br>Recommendation(s)<br>• Assemble a team of subject matter experts who can meet with field engineering to identify those areas where tolerance increases would help solve installation and interference problems. Examples would include increasing rebar spacing tolerances, increasing pipe location tolerances, etc. |
| CPC21 | Observation(s)<br>The project team has a robust safety program which has achieved some impressive results. The safety package handed out at the weekly safety meeting contained a one page tailgate topic for each day of the week. Some of the tailgate write-ups are overly detailed and contain a substantial amount of information, which might be hard to understand and retain.<br><br>Recommendation(s)<br>• Keep up the good work! The safety department might consider simplifying the tailgate write-up so it could be easier to understand and retain. (For example, the September 25, 2015 tailgate |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
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| **No.** | **Description** |
| | topic on chemical labeling was perhaps too complex.)<br>• At the daily morning safety briefing, each craftsman is required to sign the morning bulletin. This probably takes 15 minutes for the crew to sign the bulletin which is 15 minutes the craft is not at the work face. The need for signatures should be re-evaluated. |
| CPC22 | Observation(s)<br>• The current work package procedure requires the craft foreman (or his designee) to check out the work package each morning and return it to document control each night. If changes have occurred in the last 24 hours it is on hold until field engineering updates it. The work packages must be at the work face during work activities. Some work packages are hundreds of pages long and they contain all related drawings, drawing changes and specifications. A significant amount of time is lost each day implementing the work package process.<br>• Some work packages contain three volumes, some of them over three inches think. The foreman only needs a small amount of this paperwork to perform his daily tasks.<br><br>Recommendation(s)<br>• Assign a team to review and streamline the work package process. One change might be having the responsible field engineer hold the work package and only issue the relevant drawings (and changes) and inspection, hold points, and signoff sheets to the foreman.<br>• At a minimum, incorporate the design changes into the construction drawings before the craft start work. (It is time consuming for the foreman to refer to multiply design change documents when trying to execute the work). Remove the specifications and standard details from the packages given the foreman, they can be referenced and copies kept in the field stick file trailers. The work packages should only include what is needed by the foreman for their work. |
| CPC23 | Observation(s)<br>Normally, the bulk commodity installation curves are somewhat parallel with the civil work in advance of the piping which is in advance of the electrical work. On the V.C. Summer project, the curves do not parallel each other with some electrical work crossing piping. The time between commodity installations does not appear sufficient to allow installation of bulks in an efficient manner.<br><br>Recommendation(s)<br>• Adjust the schedule for the bulk installation of commodities to allow enough time between work activities to achieve an efficient and cost effective installation program. |
| CPC24 | Observation(s)<br>• The monthly progress report shows construction progress advancing approximately 0.5% per month with a total to date (August 2015) of 21% complete. In order for the plant to complete on schedule, monthly construction progress must increase to close to 3%. There are several work faces without craftsmen, (examples: Unit 2 turbine building elevated slabs; the Unit 3 containment only had 100 men working, and no work in the Unit 3 turbine building.)<br>• It takes approximately one hour before the craftsmen get to their workplace. At both of the coffee breaks and lunch time, the craftsmen leave the work area resulting in unproductive time leaving and returning to work. |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | Recommendation(s)<br>• The project needs to staff up to work all available work faces.<br>• Assign a senior construction person to evaluate methods to have the craftsmen spend more time at the workface (One example: move the tool boxes into the building near the work area.)<br>• Have coffee breaks and lunch in the work areas. |
| CPC25 | Observation(s)<br>The Consortium's Integrated Project Schedule has 50 mandatory constraints--20 associated with Unit 2, 24 associated with Unit 3, and six site-specific.<br>• A majority of the mandatory constraints affect fabrication of shield building panels that are forecast for later deliveries from the fabricator, the latest being for Unit 2 149'-6" transition panels currently forecast to be complete 9 months later than the constrained date. The Consortium stated during the September 9, 2015 presentation that a mitigation plan is in process for the shield building panels.<br>• There is a constraint on the Unit 2 auxiliary building R251 module that is currently forecasted to be complete 5 months later than the constrained date.<br>• There is a constraint on the Unit 3 CA01 module ready to lift that is currently forecasted to complete 4 months later than the constrained date.<br>• There is a constraint on the Unit 3 CA20 module ready to lift that is currently forecasted to complete 4 months later than the constrained date.<br><br>Recommendation(s)<br>• Remove mandatory constraints, and allow the schedule to move based on the logic. Prioritize development of mitigation/recovery plans based on their potential impact to the schedule. Only incorporate mitigation plan recovery into the schedule after it has been fully developed and approved by all parties. |
| CPC26 | Observation(s)<br>The baseline forecast was developed based on a performance factor of 1.15. Recent (last 6 months) performance has been greater than 2.0 on Unit 2, and greater than 1.5 on Unit 3, primarily driven by civil building construction impacts.<br><br>Recommendation(s)<br>• Update the forecast based on recent performance. Reassess manpower needs based on updated forecast.<br>• Implement a small sample of piping and electrical work packages well ahead of bulk installation period to assess potential impacts early.<br>• Plan to ramp-up slowly, gradually, to achieve an acceptable productivity level, train leads, and identify challenges and impediments prior to ramping up to full bulk installation mode. |
| CPC27 | Observation(s)<br>The Owners' oversight organization does not have a proper Project Controls staff.<br><br>Recommendation(s)<br>• Hire an experienced project controls manager, lead planner, and lead cost engineer to perform analysis of the Consortium schedule and cost forecasts.<br>• A separate set of tracking tools should be created by the Owner to provide verification of |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | Consortium reporting.<br>• Special attention needs to be made on the cost reimbursable portions of the scope. This newly formed Project Controls group would provide recommendations and identify areas requiring additional investigations. |
| CPC28 | Observation(s)<br>Consortium reports are provided in either a summary form or in an integrated manner making validation difficult.<br><br>Recommendation(s)<br>• Where contractually possible, the Owners should request the data that creates the reports not just the reports. The recommended Project Controls team would then analyze the data rather than just reviewing the report. |
| CPC29 | Observation(s)<br>The Consortium has narrowed focus into individual windows with a total horizon of around 9 months. The project reporting has followed suit and a majority of the reports provided focus upon this short time horizon. The reports to the Owners need to continue to be overall project focused.<br><br>Recommendation(s)<br>• Request all reports provided by the Consortium for the monthly meetings contain the overall view regardless of topic. Breakouts are acceptable and sometimes needed, but overall focus must remain on the overall project performance. |
| CPC30 | Observation(s)<br>Not all reports and or graphical representations provided within reports include the baseline and/or the Consortium's current forecast.<br><br>Recommendation(s)<br>• Request all reports provided to the Owners include both baseline information and a current forecast if different than the baseline. If the current forecast is later than the baseline, the Consortium should provide a recovery forecast plan. If cost is being discussed and the cost forecast exceeds the baseline, an estimate at completion should be required. |
| CPC31 | Observation(s)<br>Bechtel was told that the contract contains a portion of fixed price and cost reimbursable terms. The charging practice, if not tracked closely, could allow for improper cross charging between accounts.<br><br>Recommendation(s)<br>• Request staffing plans by position which account for the total project baseline budget for the tracking of jobhours. For the tracking of material type budgets, such as equipment or small tools, a baseline monthly usage plan should also be submitted for baseline tracking purposes. This document would serve as the basis for future negotiations and would provide enough detail for scope increase discussions and also validation of current actual charges. |
| CPC32 | Observation(s)<br>Schedule contingency has not been included within the integrated schedule. |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
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| **No.** | **Description** |
| | Recommendation(s)<br>• Analyze the schedule to identify activities within the critical and near critical paths that contain potential float. At the time of rebaselining the schedule, a schedule contingency analysis should be run and the desired probability of outcome should be agreed on. |
| CPC33 | Observation(s)<br>In reviewing the bulk piping curves, it was identified that the underground and aboveground commodities were included within the same chart. Tracking these together can be misleading especially when validating the sustained rates to ensure an achievable plan.<br><br>Recommendation(s)<br>• Separate the curves and track all underground quantities separate from aboveground quantities. Also, after creating separated curves, compare the current installation plan to historicals to validate their viability. |
| CPC34 | Observation(s)<br>While reviewing the bulk curves, it was identified that the bulk curves were not developed through the use of standard "S" shape curves. The "S" curves were altered to allow for additional time between the 10% and 90% completion windows to lower the sustained rates. This artificial increase in the sustained rate window reduces the sustained rate for comparison purposes but does not alter the real installation pace required to meet the plan.<br><br>Recommendation(s)<br>• Only use a standard "S" shaped work-off curve when evaluating the schedule duration viability. |
| CPC35 | Observation(s)<br>Bulk quantity installation curves reflect an overly aggressive plan when compared to Bechtel historical experience of peak sustained installation rates. Also, the separation of each commodity within the "family of curves" is not reflective of Bechtel historical experience. An example of this is the distance between the raceway and cable percent complete curves. The cable installation percent complete follows closely to the raceway installation percent complete. Historically, the more achievable plan reflects that a substantial portion of the installation of tray and conduit is complete prior to the commencement of cable pulling. This separation allows for pulls from point to point without having to coil at each end. Having to coil the cable rather than pulling to its final location creates additional hours due to double handling.<br><br>Recommendation(s)<br>• Create a new more achievable baseline Level 3 schedule. During development of the schedule, ensure appropriate time is allocated for bulk installation windows.<br>• Update the schedule forecast based on median range of achievable peak sustained rate.<br>• Review quantities by system, and align to the schedule and start-up system waterfall. Prioritize bulks by system turnover demands. Balance this priority with area releases, and methods that would allow the highest productivity to be achieved. Compare system driven quantity curve against peak sustained rate forecast, and adjust accordingly.<br>• Plan work packages around the most productive methods of bulk installation (e.g., cable trees), with consideration for ability to support system turnovers. |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
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| **No.** | **Description** |
| CPC36 | Observation(s)<br>• During the review and analysis of the quantities provided by the Consortium, it was identified that the total quantity of aboveground conduit appears to be high compared to Bechtel historicals.<br>• Inversely, the total quantity for cable appears to be low. These quantities were also reviewed from a ratio perspective and result in an overall ratio unlike any of Bechtel's past projects.<br><br>Recommendation(s)<br>• Review the electrical quantities in the annex building and turbine building and update as needed. Revise the Level 2 and 3 schedules and also the bulk curves to align with the account for the new quantities. |
| CPC37 | Observation(s)<br>• The consortium project schedule is large and complex, forcing daily maintenance and status updates. Varying levels of the schedule are comingled in the same projects, and are loaded with varying degrees of resource data, resulting in duplication<br>• The Level 1 schedule (as presented in the monthly project review meeting package) effectively highlights the critical path and major project activities on a single page. However, dates are only included for certain activities and a timescale is not provided, therefore target and forecast dates for other major activities are not clear. The schedule also appears to start in January 2015, showing no status of actual work completed prior to that date.<br>• The Level 2 schedule is made up of "WBS summary" (work breakdown structure) type activities which are essentially hammock activities for all detailed activities within that WBS. This schedule provides a summary by unit, building, elevation, and commodity, and is fully resource loaded with jobhours through project completion. The Level 2 schedule appears to have many activities working in parallel, which isn't necessarily the case. When viewed at a lower level of detail, the Level 2 hammock (summary) activities capture all activities from fabrication through punch list and touch-up activities. In many cases, fabrication begins several months or more prior to installation, and there are also large gaps between bulk installation and final completion activities within a WBS (work breakdown structure). This approach skews the Level 2 activities into much longer durations than when the bulk of the work is actually planned to be performed. Furthermore, as the Level 2 schedule is fully resource loaded, this approach is spreading those resources over a longer period of time, reducing the resulting peak manpower requirements. This can be problematic if the Level 2 schedule is the primary tool being utilized to determine manpower requirements.<br>• The Level 3 schedule is the detailed working level schedule for the project. Development of this schedule is ongoing, and is currently being reviewed at 6 to 9 month durations beyond the data date. Due to the level of detail and number of activities in this schedule, this schedule is considered to be a Level 5 implementation schedule. Resources are being loaded in this schedule as well as some quantities, but do not appear to be complete enough to be used for forecasting purposes. The Consortium's project controls group is performing daily reviews of this schedule due to its large size and complexity, and the volume of changes being input on a day-to-day basis. The team has established a good process for managing the existing schedule, but daily updating and reviews are excessive for this size and scope of project.<br><br>Recommendation(s) |

| Table 5-2. Construction and Project Controls Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | • Adjust the Level 1 schedule to include a time-scaled baseline and target and forecast dates for all identified activities. Expand the start of the window schedule to show major project status since project inception.<br>• Create a Level 3 control schedule with no more than 5,000 activities per unit. The Level 2 schedule can be used at a starting point, but would need to be converted to "task" activities as opposed to "hammock activities". The Level 3 schedule should be at a sufficient level of detail to identify all critical interfaces between each phase of the project. The recommended structure is to identify construction activities by unit, building, elevation, area, and commodity. A custom data field should be added to identify systems associated with each activity, to ensure proper tie in from construction to startup. This schedule should be resource loaded with key quantities and jobhours and maintained/aligned to the current forecast for the project. Weekly meeting and management reviews should use this Level 3 schedule as opposed to lower level schedules.<br>• Develop more detailed Level 5 implementation schedules as needed to manage near term commitments for critical areas. These can be in Excel rather than Primavera, and in addition to time-scaled format, can be in the form of a bingo-sheet, checklist, or other method to track status. Primavera is currently over-used for this level of the schedule, demanding more maintenance, update, meetings, etc., that strain project resources. |

Figure 5-1. V.C. Summer Units 2 & 3 Project Assessment
Summary Schedule



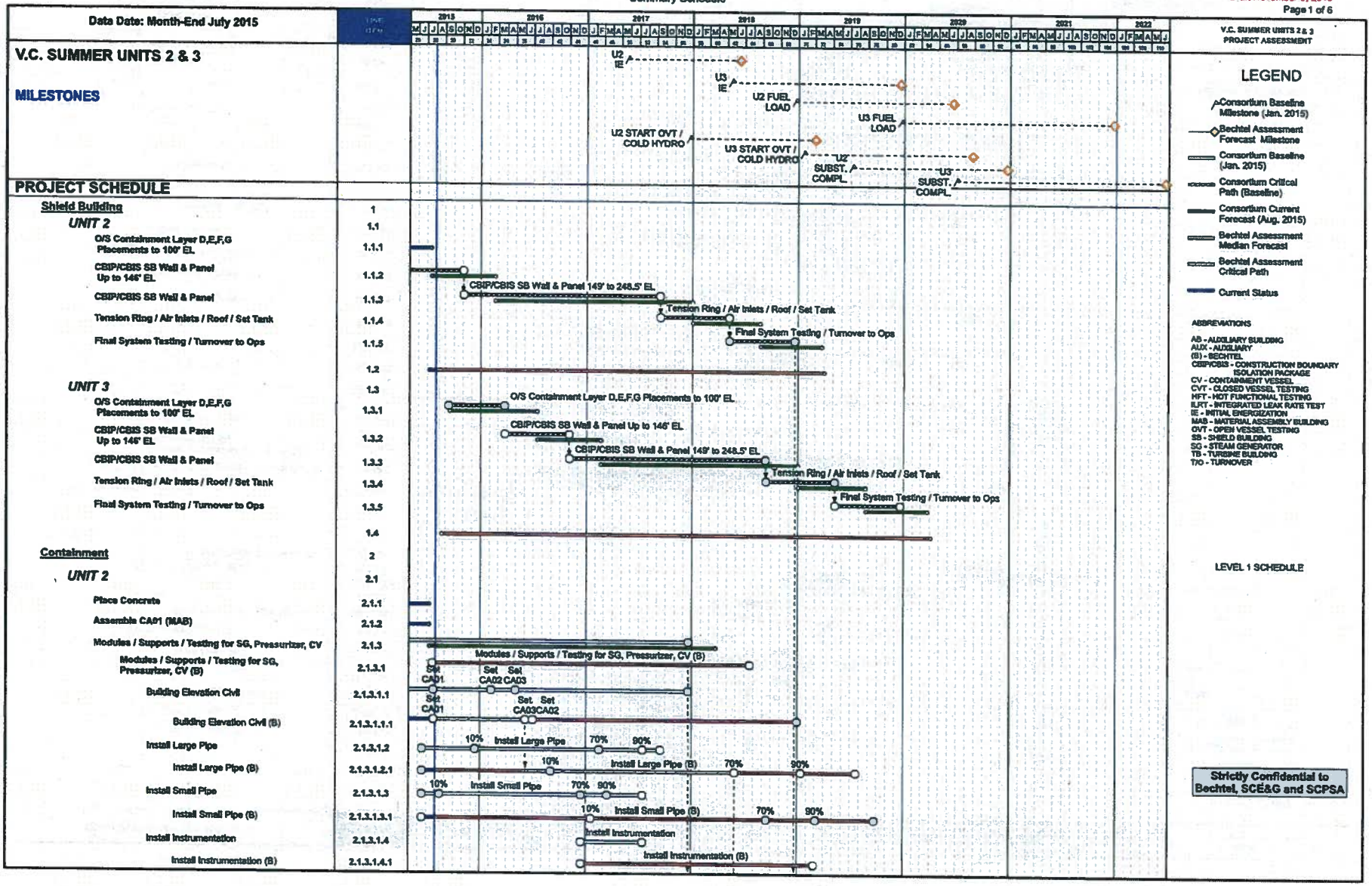


Figure 5-1. V.C. Summer Units 2 & 3 Project Assessment
Summary Schedule



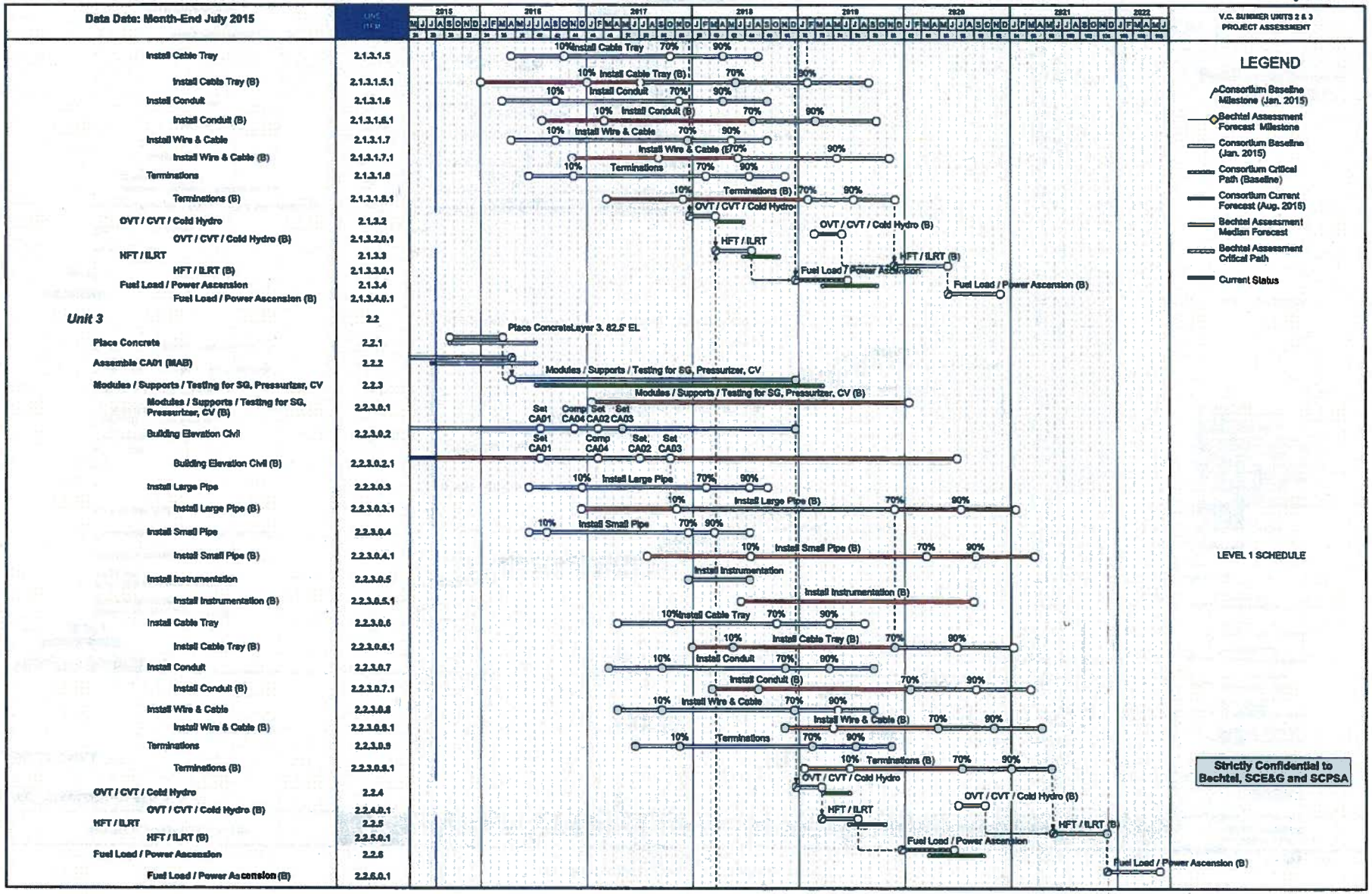


Figure 5-1. V.C. Summer Units 2 & 3 Project Assessment
Summary Schedule



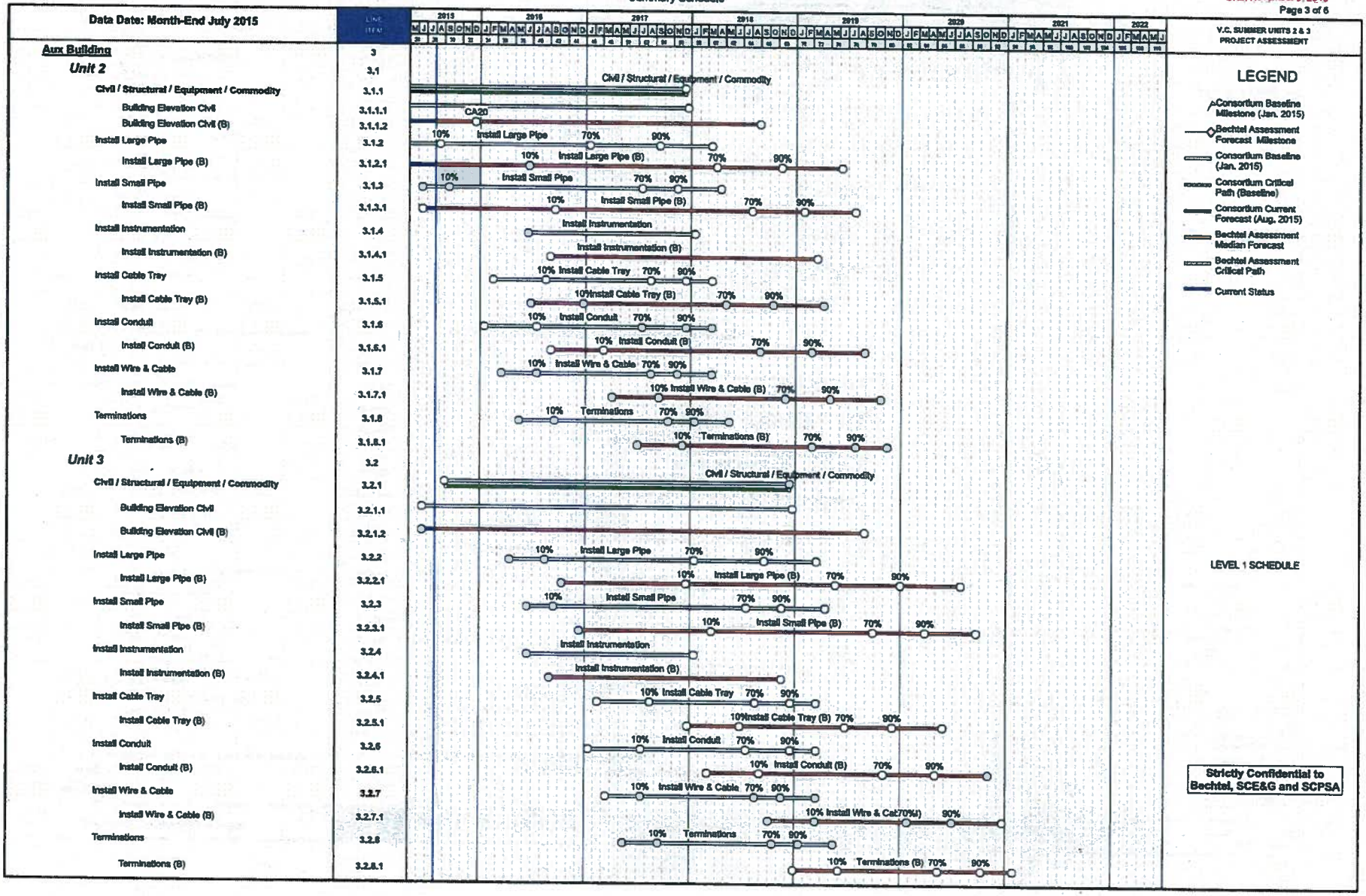


Figure 5-1. V.C. Summer Units 2 & 3 Project Assessment
Summary Schedule



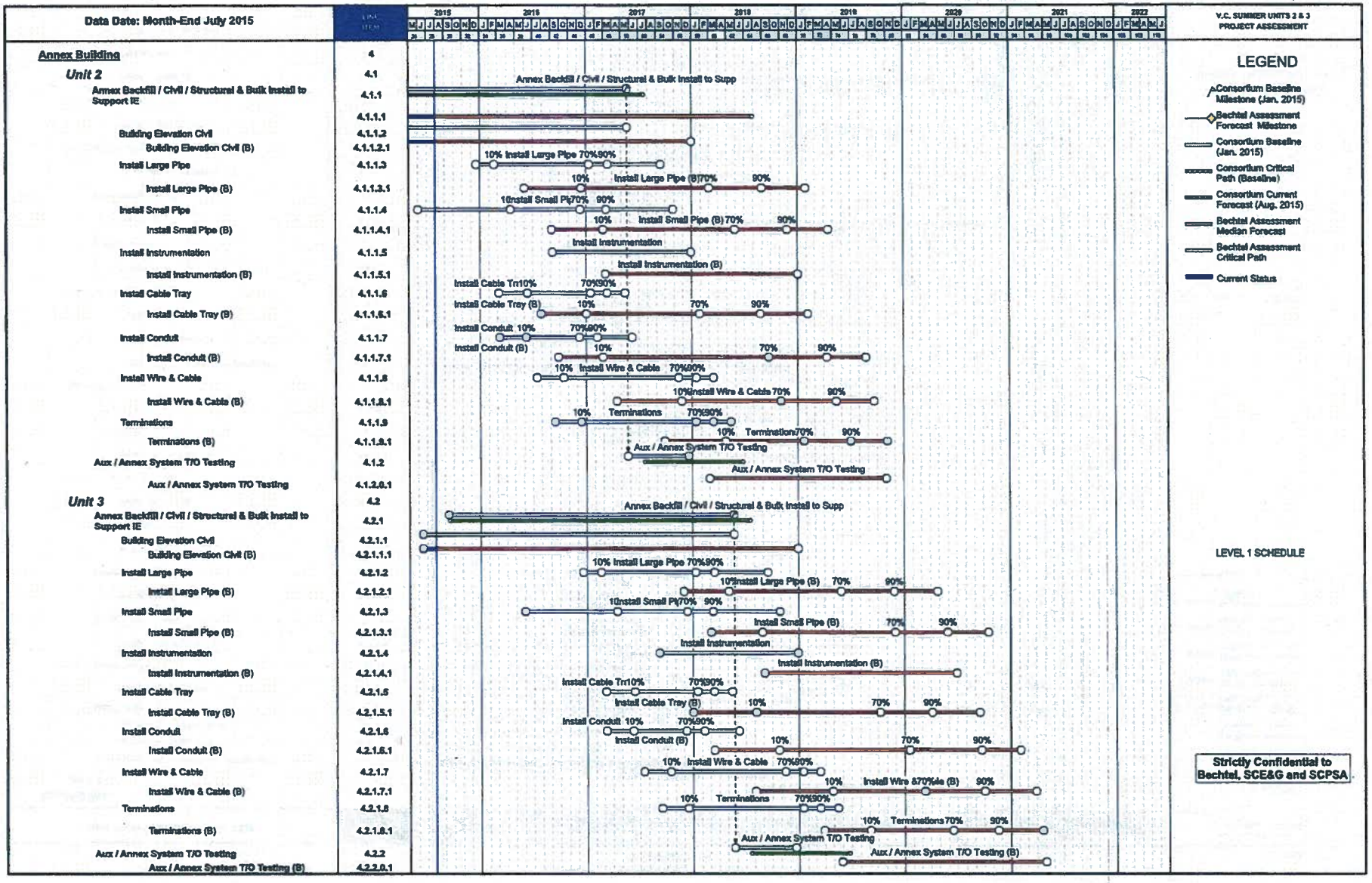


Figure 5-1. V.C. Summer Units 2 & 3 Project Assessment
Summary Schedule



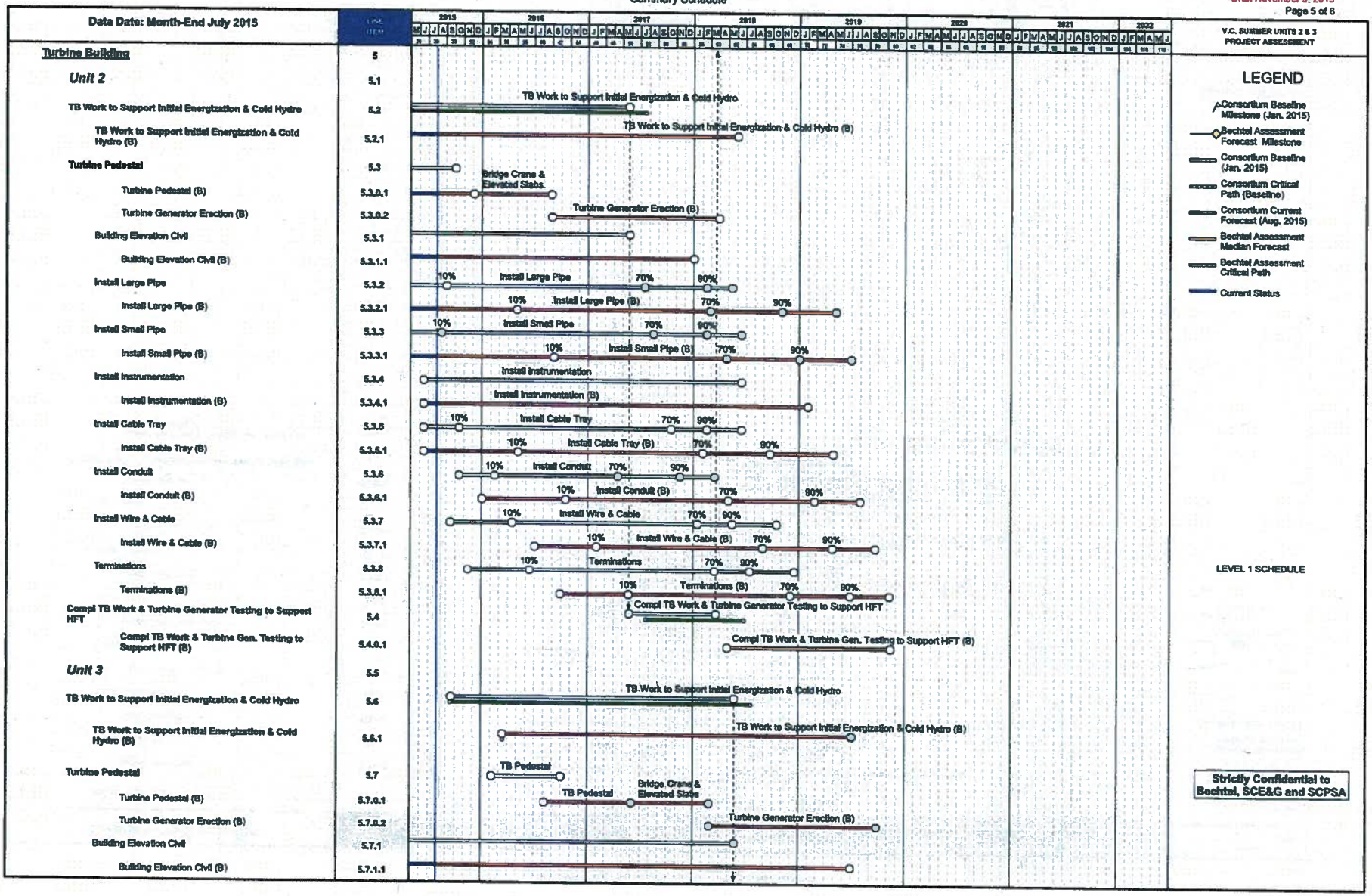


Figure 5-1. V.C. Summer Units 2 & 3 Project Assessment
Summary Schedule



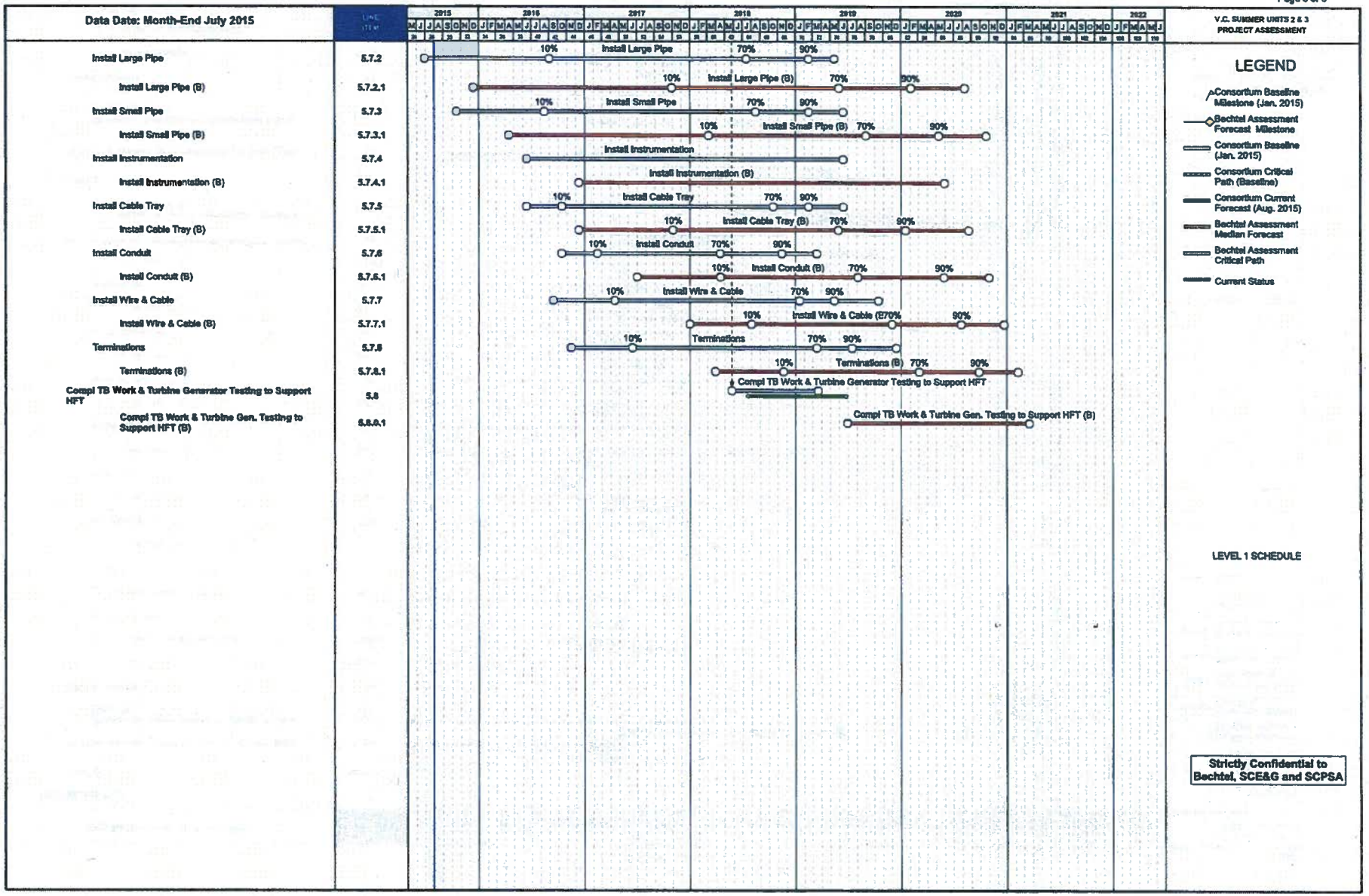


Figure 5-2. Unit 2 Midpoint Forecast - Total Family of Curves

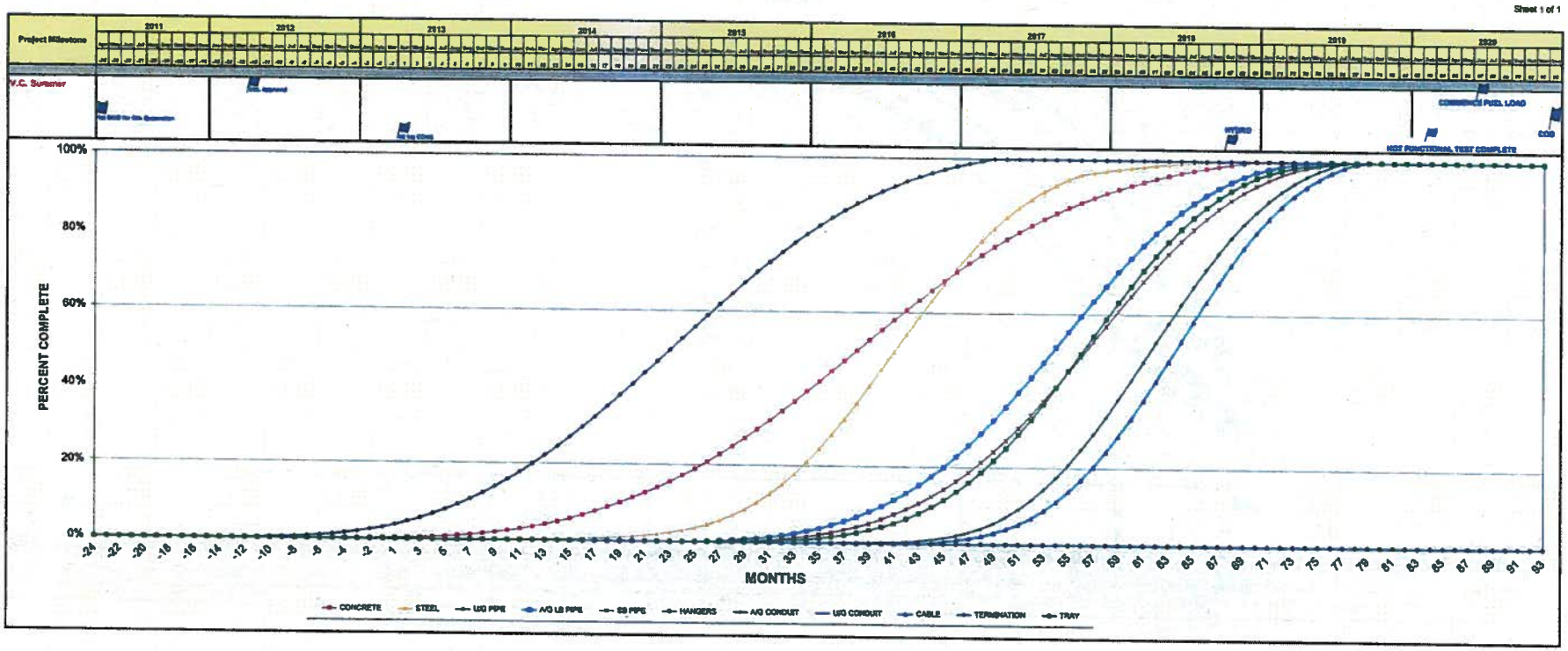


Figure 5-3. Unit 2 Midpoint Forecast - Nuclear Island Family of Curves

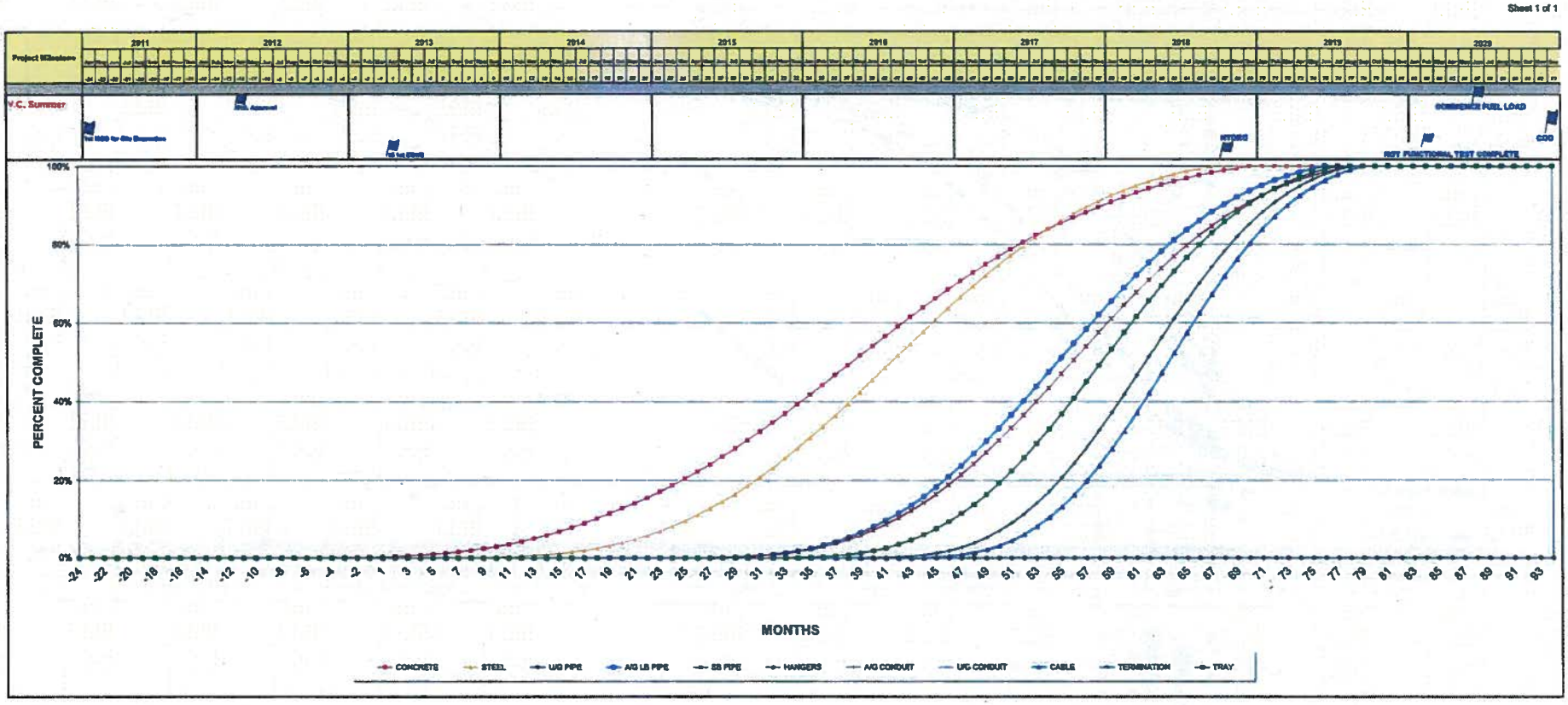
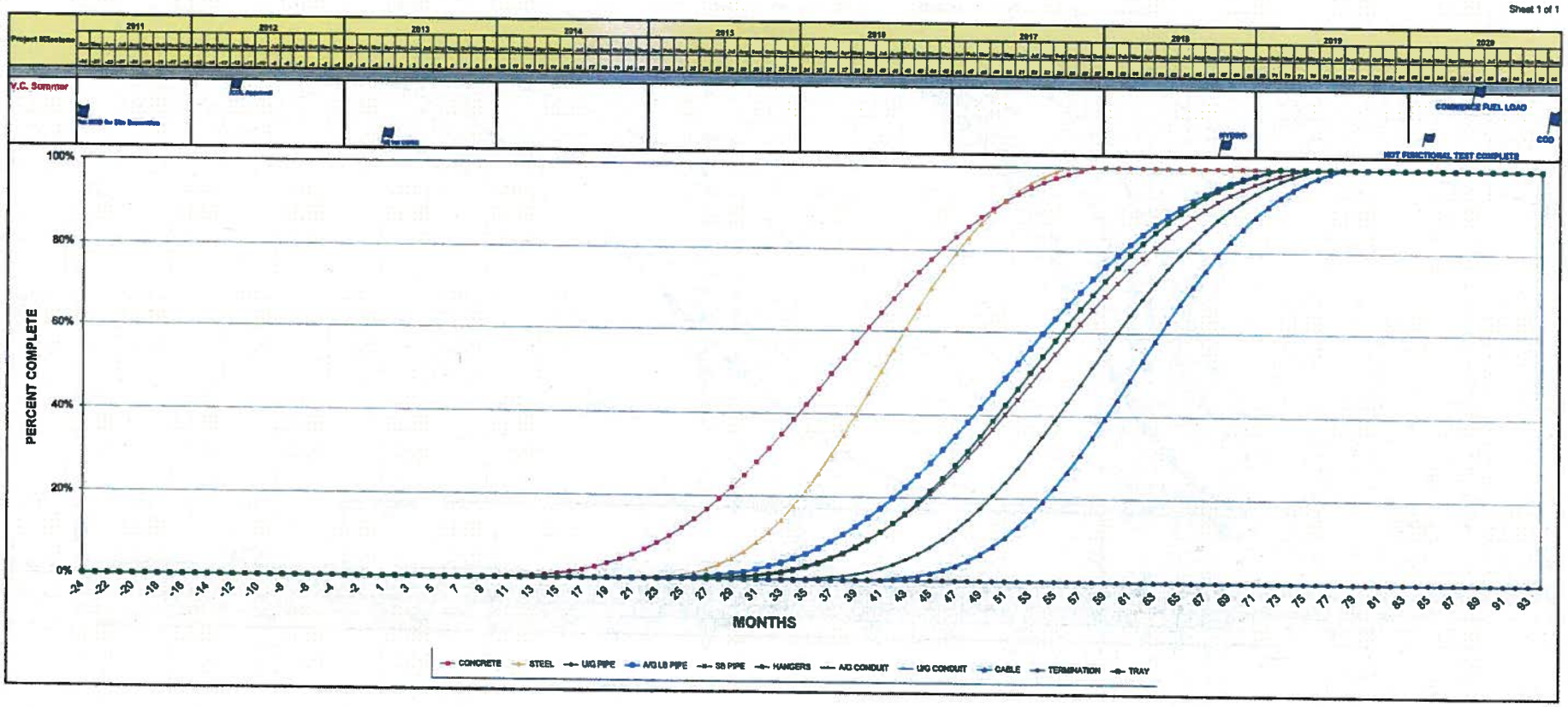


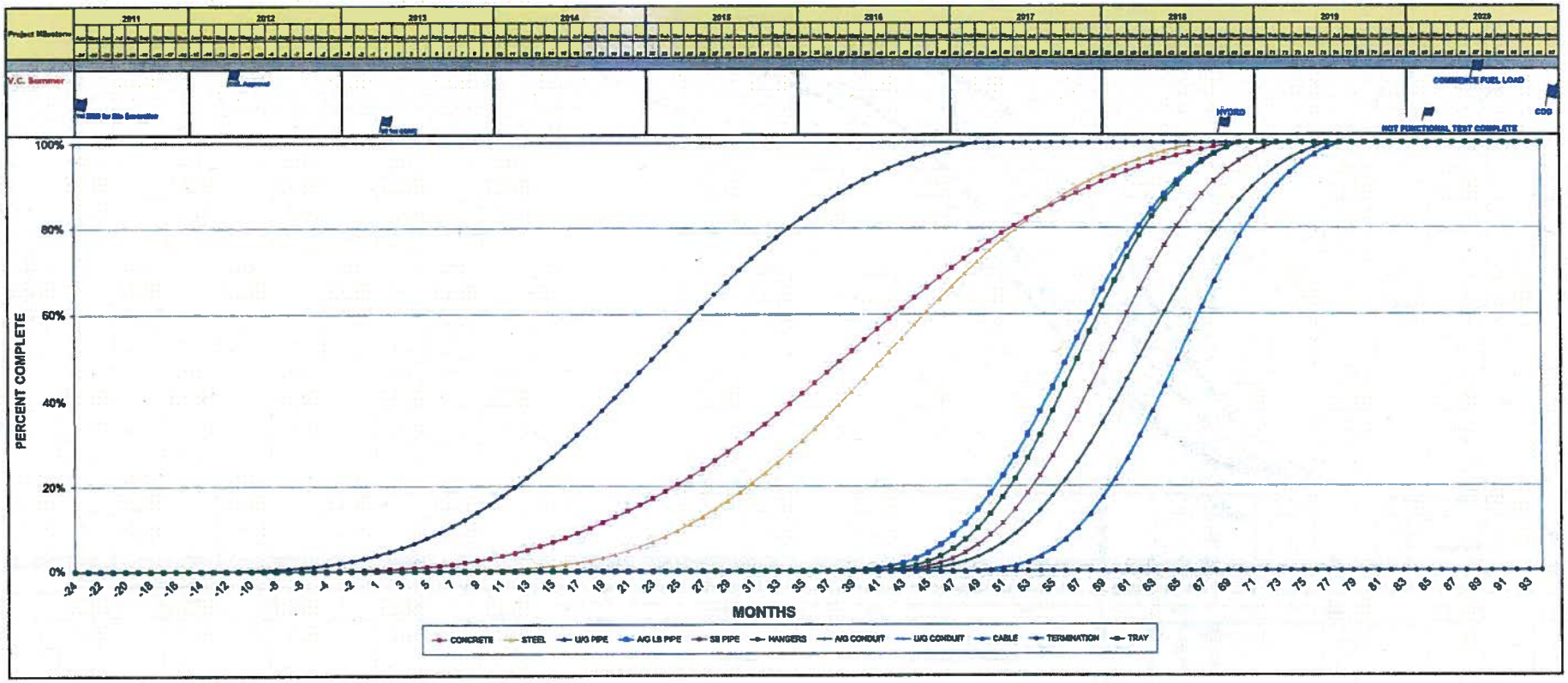
Figure 5-4. Unit 2 Midpoint Forecast - Turbine Island Family of Curves



Draft November 9, 2015

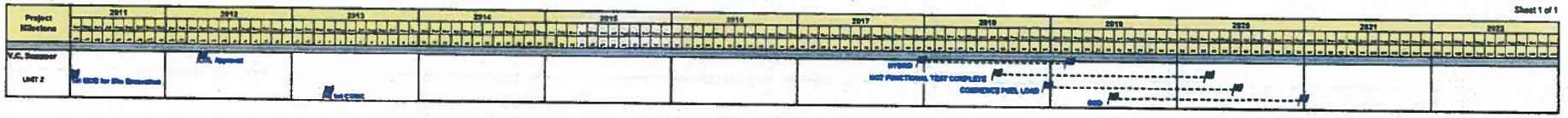
**Figure 5-5. Unit 2 Midpoint Forecast - Balance of Plant Family of Curves**

Sheet 1 of 1

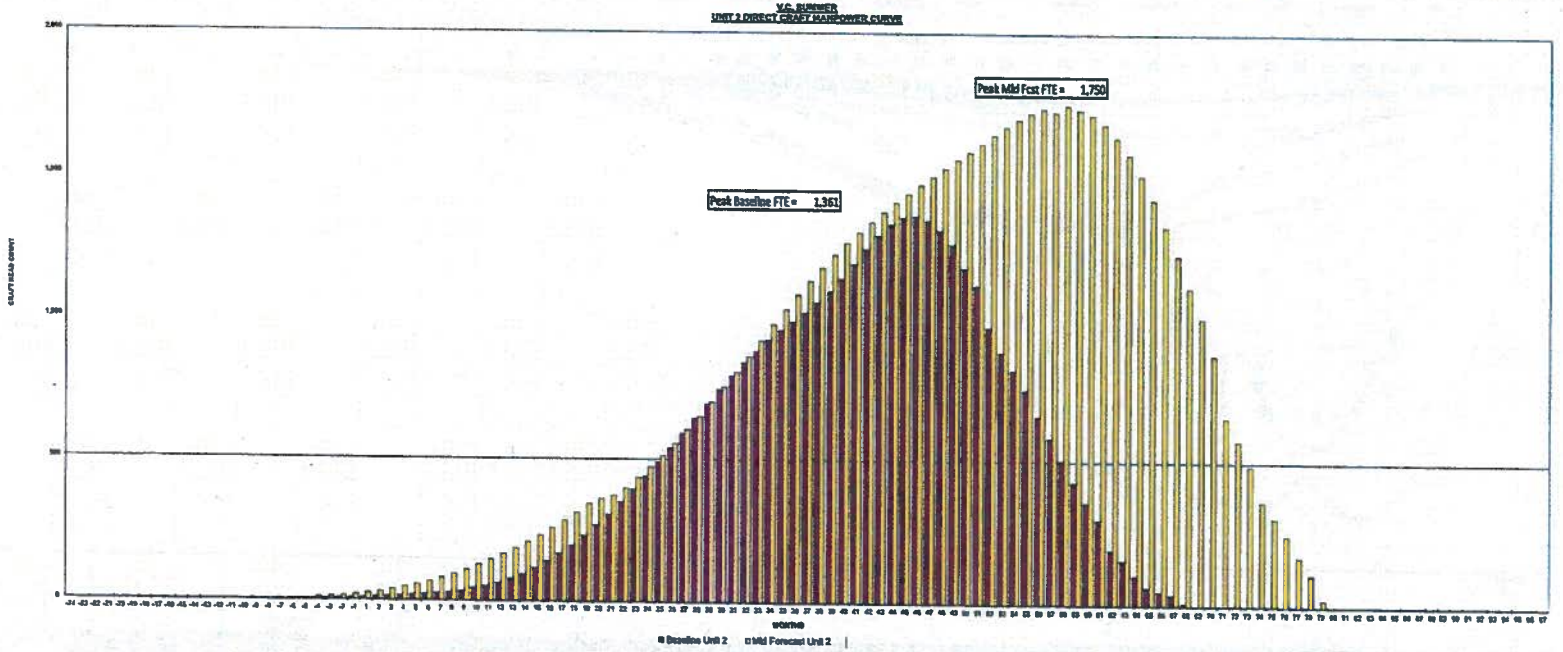



**Strictly Confidential to Bechtel, SCE&G and SCPSA**

Figure 5-6. Unit 2 Direct Craft Manpower Curve and Percent Complete Curve





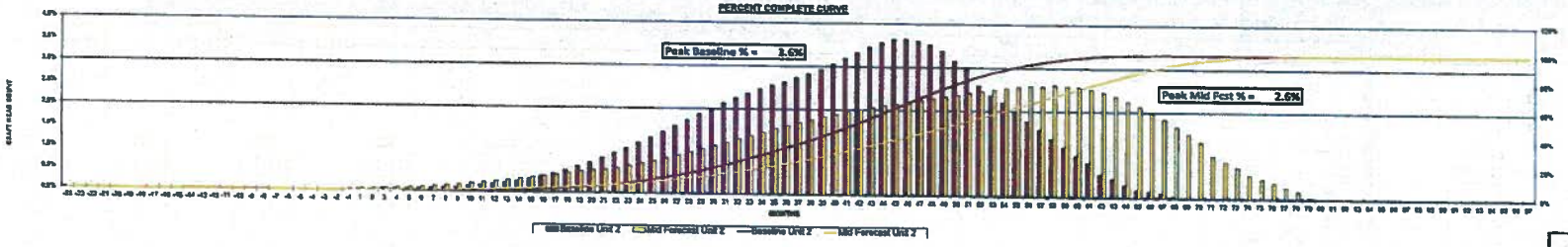




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Figure 5-7. Unit 2 Headcount by Craft (Does not Incl S/C Hrs)

Draft November 9, 2015

Sheet 1 of 1

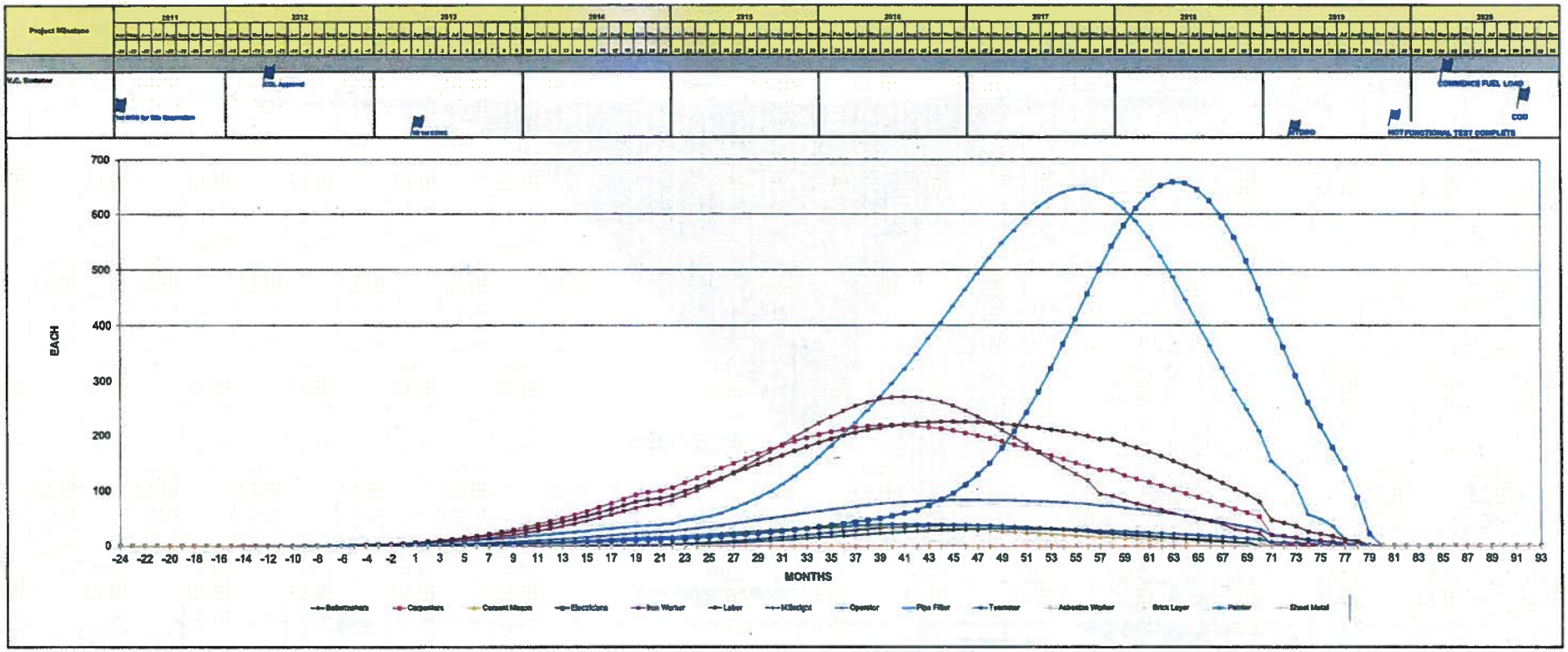


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Figure 5-8. Unit 3 Direct Craft Manpower Curve and Percent Complete Curve

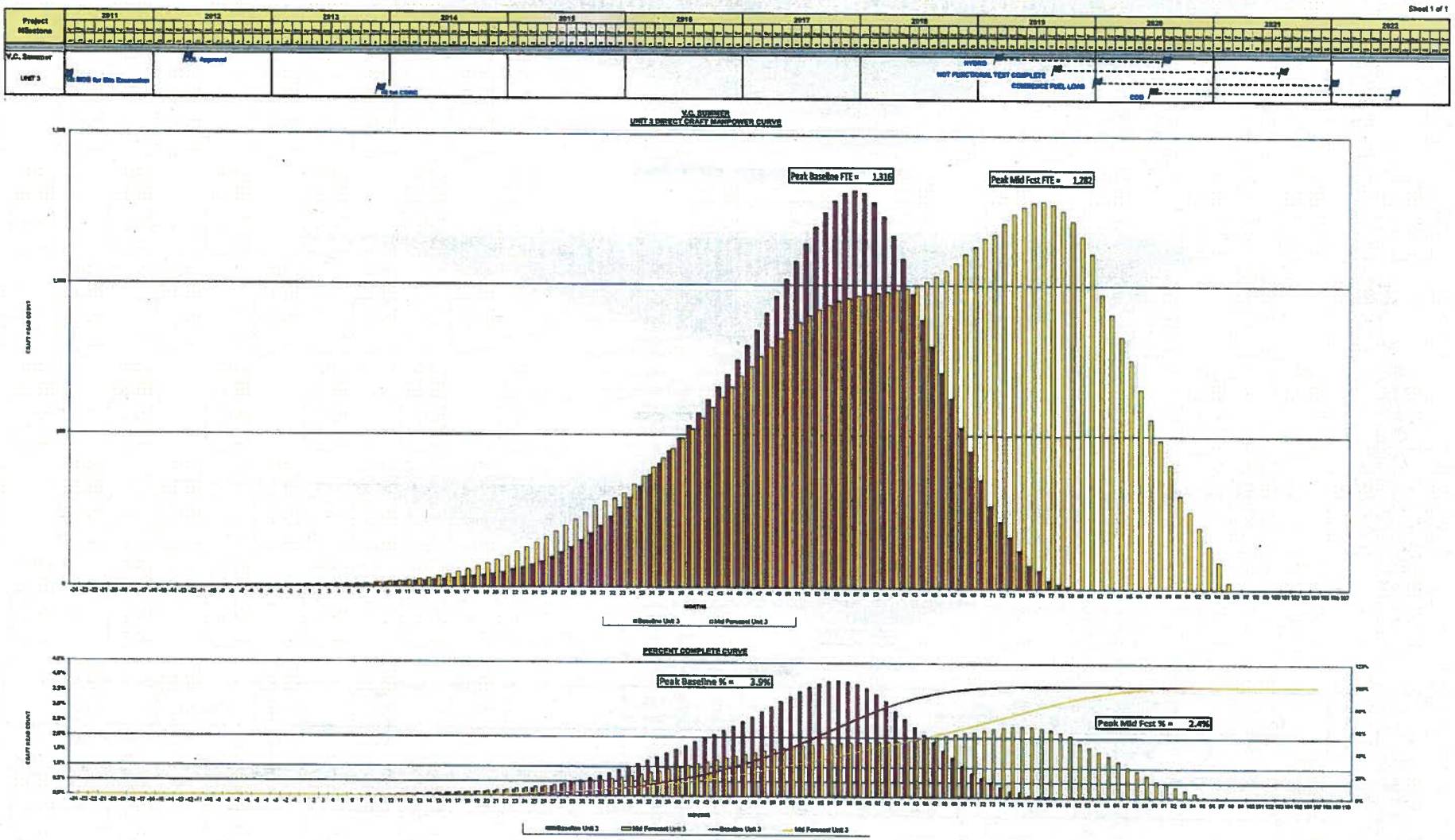
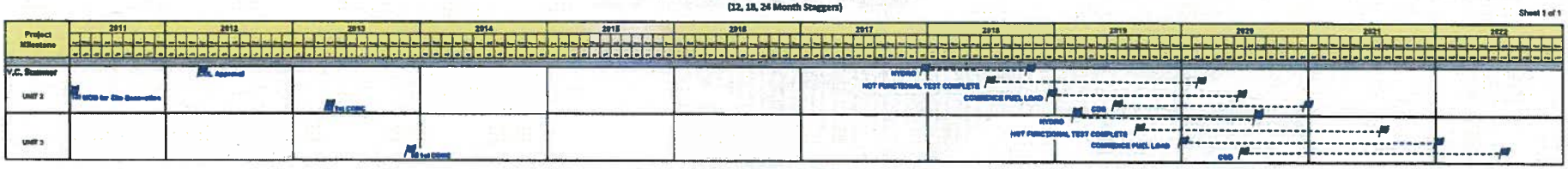
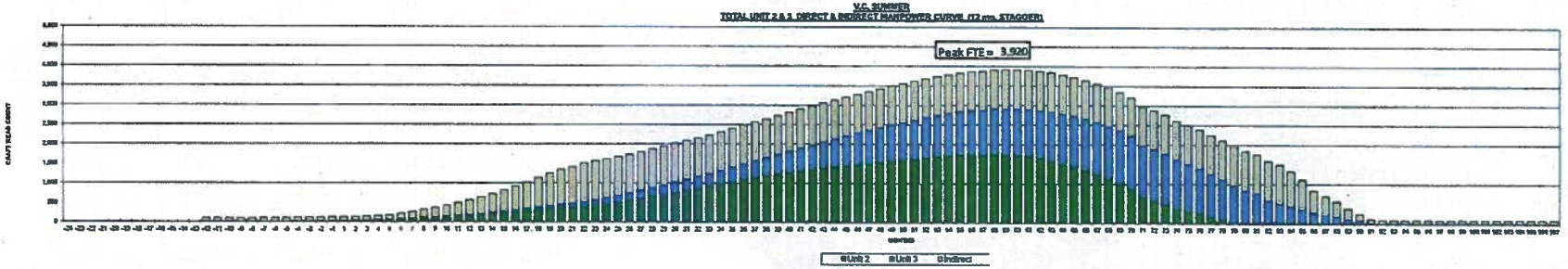
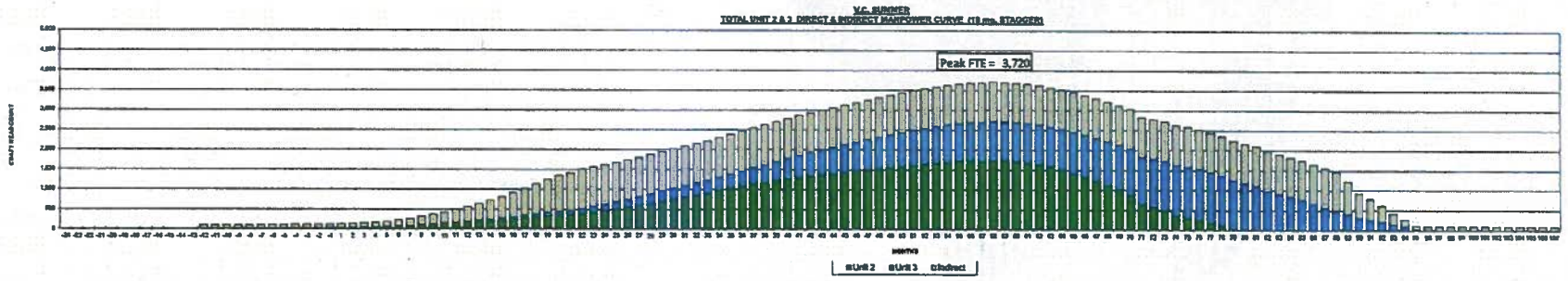


Figure 5-9. Total Unit 2 3 Direct Indirect Manpower Curves
(12, 18, 24 Month Staggers)



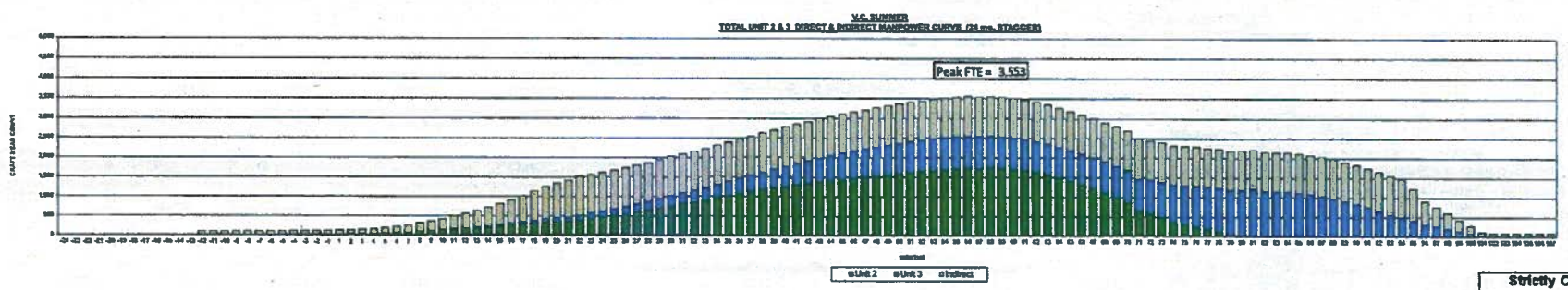
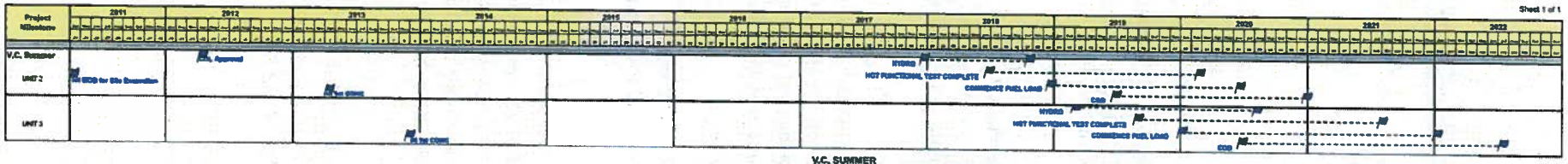
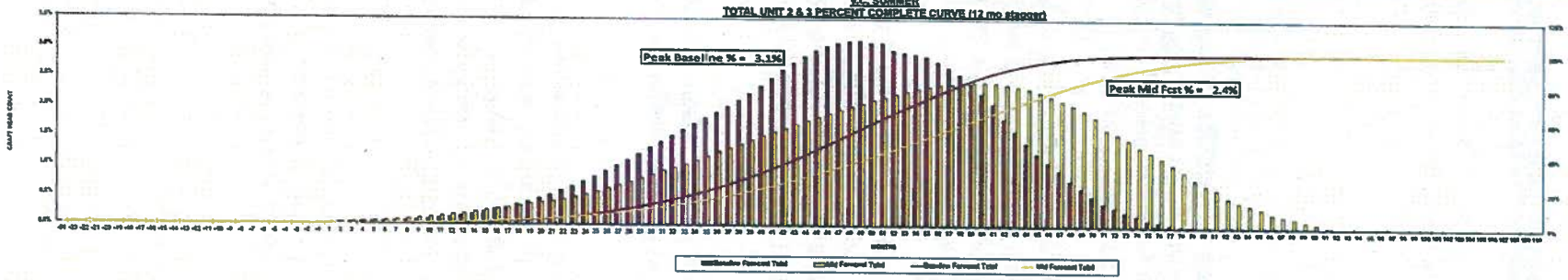
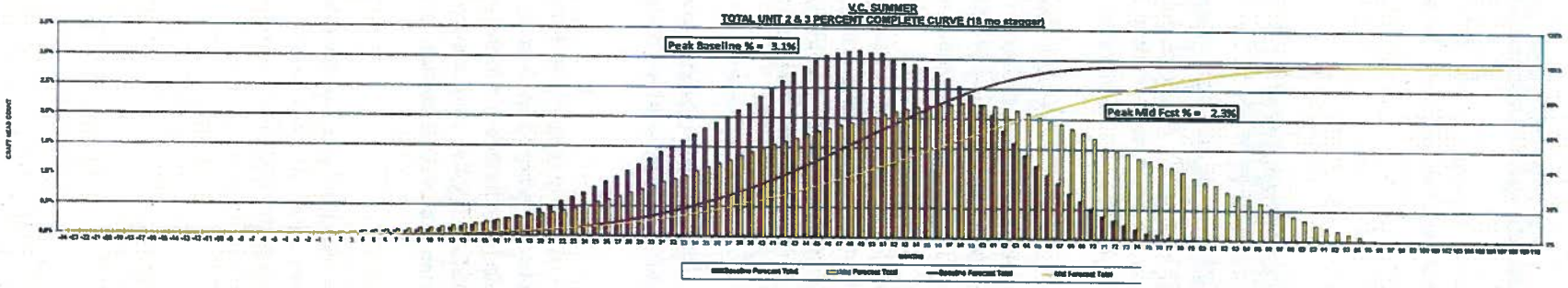
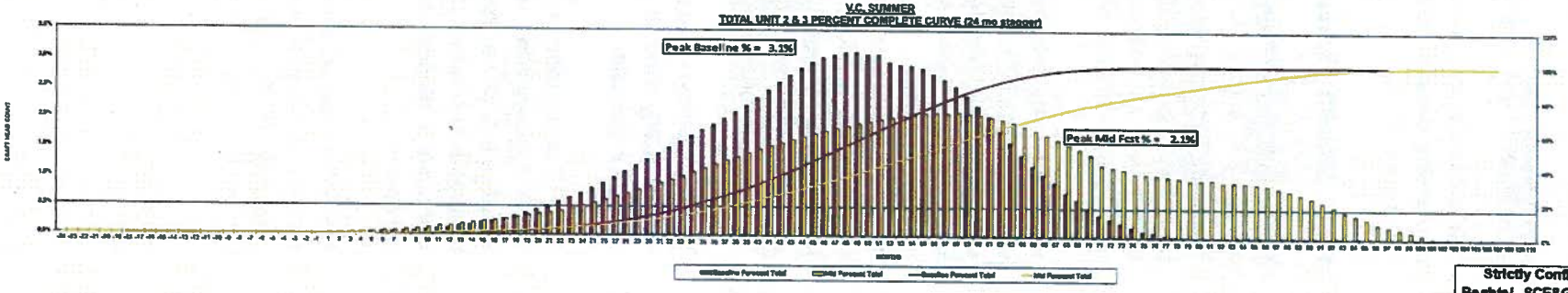



Figure 5-10. Total Unit 2 & 3 Percent Complete Curves
(12, 18, 24 Month Staggers)



# 6. Startup

This section describes the assessment of the startup aspects of the project. Section 6.1 provides a summary of the current status. Section 6.2 provides startup observations and recommendations.

## 6.1 Current Status

### 6.1.1 Initial Test Program Organization

The Initial Test Program (ITP) is set up for an integrated organizational approach. The Owners have overall responsibility for the ITP; however, leadership has been delegated to the Consortium, and a WEC employee has been named the test director. The balance of the organization will be a mix of Owner and Consortium supplied personnel.

Reporting to the test director is the Component Test Group (CTG), currently led by a CB&I employee. The CTG will take turnover of systems from construction and conduct component testing. CTG test engineers will be discipline based and will specialize in the type of component tests related to his/her discipline (electrical, mechanical, control systems).

The test director leads the Preoperational Test Group (PTG). The PTG will take system turnovers from the CTG, conduct system start-up and tuning, and write and conduct system preoperational tests. Each PTG test engineer will be the point of contact for each of his/her assigned systems and will manage and execute all system-level testing activities. The project plan currently includes 155 to 160 systems and subsystems.

The Startup Test Group (STG) is also currently led by the test director. The STG will take system/facility turnover from the PTG and will support preparations for fuel load and the power ascension program.

The ITP organization is structured similarly to those used in many nuclear power plant facilities. There is a separation between component testing, system testing, and power ascension testing activities that will facilitate high confidence in the results of the test program. It is a program that integrates the Owner, NSSS supplier, and designer/constructor personnel to leverage the right resources to properly progress through component testing, preoperational testing, and power ascension.

In addition, the currently assigned test director has worked for many years in the nuclear power industry, with a significant track record in operation, outage management, and startup of nuclear power plants. This test director appeared well organized and to have a good grasp of the complexity of the project and how to approach it.

### 6.1.2 Test Program Integrity

#### a. Transition from Construction to the Initial Test Program

To separate the bulk construction program from the ITP, a formal turnover process will designate the official transfer of care, custody, and control from construction to the CTG. Boundary identification packages (BIPs) have been established to break the facility into smaller and more manageable blocks. There are currently about 555 BIPs that will be the basis for turning the facility equipment over to the CTG.

To provide further separation, performance of work activities will switch from the Consortium's QA program to the Owner's QA program. Subsequent construction access to systems transferred to the CTG will be controlled by a work authorization process controlled by the CTG. The work authorization process will provide for the release of work, ensure system configuration supports the nominated construction activity, and identify any required re-testing of components.

The above is intended to provide a high level of confidence that completed testing activities are not invalidated by unauthorized construction activities and are consistent with the approach used in many nuclear power plant facilities.

#### b. Preoperational Test Procedure Plan

All system preoperational tests will be treated as if they were safety related (i.e., a single development, review, approval, and performance process regardless of the safety significance of the test). The review plan also provides for a full NRC review cycle and a full Joint Test Working Group (JTWG) review/approval cycle prior to test performance and after performance (test results).

Preoperational test specifications are being developed to identify and collect all requirements to be included in each test procedure. The intent is to assemble the design requirements, system parameters, regulatory requirements, ITAAC commitments, and all acceptance criteria for each system. After each test specification is reviewed and approved, the system preoperational test procedure will be developed.

The above is intended to provide a high level of confidence that the preoperational test program adequately demonstrates the integrity of the systems installed in the plant.

#### c. Startup and Power Ascension Test Procedure Plan

Power ascension test procedures are similar for the new AP1000 units at V.C. Summer and Vogtle, and the Test Director is coordinating a combined effort to get the basic test procedures developed through a sharing of responsibility to develop the procedures. The total list was divided between the two sites. After each site develops its assigned tests, it should be a simple exercise to "localize" each of the procedures to ensure they become specific to each site.

#### d. Control Circuit Testing

To verify what has been installed is exactly per the project drawings, the CTG will verify control wiring "point to point" (cold checked) prior to being energized. After cold checking, the circuits will be energized and verified for functional correctness. Initial checks on the control loops may be conducted from remote stations since the current schedule does not suggest the control room will be ready. However, to meet the NRC regulatory guide requirement, those control loops initially verified from remote stations will be re-verified from the control room after it is available. This facilitates an earlier start of control loop functionality to support earlier equipment initial operation, as well as final verification to meet the stipulations in the regulatory guide.

#### e. Component Test Data Base

All component testing is to be tracked, planned, and statused using an Excel spreadsheet (Component Test Matrix) that is currently loaded from a manual takeoff of P&IDs, and it will be kept current through review of all changes issued by engineering. The spreadsheet includes planned durations of each activity, allows entry of actual durations, and calculates percent complete of each and cumulative activities (activity durations should not be confused with jobhours associated with each activity). Real-time updates of completed data records will be made manually on a daily basis, or as turned in to the admin doing the entry, for a reasonably current representation of progress/status. This is separate from the tracking of ITAAC activity progress.

A completions database is a typical, but critical, element in the control and management of the testing activities. What separates this from the typical completions databases is the ability to apply estimated durations to each activity, and use the results to support schedule development. Manloading and levelization of resources will still be performed in the commercial scheduling software.

### 6.1.3 Training of Operations and Maintenance Personnel

Training of permanent plant operations and maintenance personnel is the responsibility of the Owner. This was not specifically reviewed; however, it was briefly discussed during interviews with the ITP personnel. The current plan includes significant participation of the operations and maintenance personnel in the entire ITP, from component testing through preoperational testing. This is important to the preparation of the plant staff in their assumption of responsibility for system operation prior to fuel load and is consistent with the approach used in many nuclear power plant facilities.

### 6.1.4 Test Program Staffing

The current staffing plan has a peak (Unit 2/Unit 3 overlap) of 75 WEC test engineers, about 60 CB&I component test engineers, and about 25 Owner personnel. The staffing seems a little higher than the staffing needed based on previous preoperational and startup testing programs at

nuclear power plant facilities; however, historical dual unit plant startups were typically staggered 12 to 18 months apart, not the 8 to 9 months currently on the project schedule.

The test group will have a dedicated craft labor pool that comes out of construction. The WEC labor budget has been verified against the current staffing plan, while the CB&I budget has not yet been verified but is in progress.

### 6.1.5 Test Program Schedule

#### a. Schedule Development/Maturity

The component testing and preoperational testing schedules are developed to the point where prerequisite activities and associated ties are established, and the system-level fragnet templates have been loaded to each startup system. Additionally, standard activity durations have been plugged-in and the group is in the beginning phases of adjusting the durations per the Component Test Matrix and the estimated durations for preoperational tests based on complexity. It is too early to determine if the overall schedule duration will be consistent with the 17 to 18 months currently planned between energization and fuel load, as it may take 3 to 4 months to complete the adjustments and perform resource leveling exercises.

#### b. Construction Turnover to CTG

Review of the Construction to Component Test Group BIP turnover waterfall schedule indicates turnovers are planned to occur from September 2015 through January 2019; the distribution is as follows:

- 2015: 2 turnovers
- 2016: 44 turnovers (cumulative 46)
- 2017: 475 turnovers, 86% of total (cumulative 521, 94% of the total BIPs)
- 2018: 33 turnovers (cumulative 554)
- 2019: 1 turnover (Cumulative 555)

The current plan calls for 86% (or 475) of the BIPs to be turned over in 2017 alone, which is more than 30 BIPs per month. This is a high rate of turnovers that will be difficult to maintain. Even though the turnover process allows for consolidation of BIPs into fewer, larger turnover packages; this rate still indicates that 86% of the systems will be turned over to the CTG in a 12 month period.

This high number of turnovers produces a cumulative total of 94% at the end of 2017; yet, terminations are shown to be less than 70% complete in most areas. The turnover of completed BIPs does not seem to match the number of terminations completed, as it indicates that the last 6% of the BIPs contain over 30% of the terminations, which does not seem correct.

In addition, stringing the turnover of systems over a 31-month period may present problems. The concept of simultaneous operations, where bulk construction activities will be conducted in close proximity to components (and potentially systems) that will be energized and in testing introduces the concepts of Permit to Work (Energized Equipment Lockout/Tagout) and NFPA 70E , Standard for Electrical Safety in the Workplace (arc flash protection). This extends the period of time that poses safety risk to personnel and has a higher potential to slow installation of construction bulks and slip schedule. This can all be managed; but, a total turnover duration (first turnover to last turnover) of 18 to 20 months is more typical of nuclear power plant facilities.

The current project schedule indicates an approximate 9 month stagger between Unit 2 and Unit 3 hot functional tests. This is more aggressive than what was experienced on many past nuclear power plant facilities, which could preclude leveraging personnel from Unit 2 on Unit 3, as well as introducing the concept of two new units on the same site overlapping initial fuel load activities and initial power ascension.

## 6.2 Observations and Recommendations

Startup observations and recommendations are identified in Table 6-1.

**Table 6-1. Startup Observations and Recommendations**

| No. | Description |
|---|---|
| S1 | Observation(s)<br>The current ITP staffing plan includes heavy Tech Staff, Operations, and Maintenance staff participation.<br><br>Recommendation(s)<br>• Be diligent with dedication of these resources to support the ITP. The hands-on experience acquired through participation in the test program is important to good performance during the early days of plant initial operation. |
| S2 | Observation(s)<br>The current schedule identifies about 8 months lag between the Unit 2 and Unit 3 hot functional tests. This lag is significantly shorter than previous dual unit nuclear sites, and drives the testing group staffing levels fairly high.<br><br>Recommendation(s)<br>• Evaluate the likelihood of realizing an 8 month lag between Units 2 & 3. If realistic, ensure mitigations have been planned in case of events on one of the units while the other is in the vulnerable position of still in the testing phase. If not realistic, consider historical lags closer to 12 to 18 months. |
| S3 | Observation(s)<br>The construction turnover of BIPs to the CTG is planned to occur over a 31-month period. This is a long time to have equipment in various stages of testing and layup.<br><br>Recommendation(s)<br>• Consider reducing the duration of the turnover period to 18 months. This may permit realloca- |

| Table 6-1. Startup Observations and Recommendations | |
|---|---|
| **No.** | **Description** |
| | tion of resources to complete systems in a more reasonable schedule, reduce the duration the facility would be in a simultaneous operations mode, and possibly reduce the cost of actually completing BIPs. |
| S4 | Observation(s)<br>The timing of construction completion of bulks does not align with the timing of BIP turnovers. At the end of 2017, construction plans to be less than 70% complete with terminations, yet, plans to have turned over 94% of the BIPs.<br><br>Recommendation(s)<br>• Reexamine construction terminations per cent complete compared to BIP turnovers and adjust the project schedule accordingly. |
| S5 | Observation(s)<br>The overall ITP organization and program are well thought out and follow proven philosophies and processes.<br><br>Recommendation(s)<br>• Continue along this execution plan and make modifications only if project or regulator changes warrant them. |

# 7. Conclusions

The AP1000 is a first-of-a-kind technology, 10 CFR 52 is a new licensing process, and these are the first new nuclear plants being constructed in the U.S. in decades. Challenges would be expected.

However, the V.C. Summer Units 2 & 3 project suffers from various fundamental EPC and major project management issues that must be resolved for project success:

- The Consortium's project management approach does not provide appropriate visibility and accuracy to the Owners on project progress and performance.
- The Consortium's forecasts for schedule durations, productivity, forecasted manpower peaks, and percent complete do not have a firm basis. Bechtel's assessment, based on certain assumptions, of the Unit 2 and 3 commercial operation dates indicates:

| Impacts on Commercial Operation Dates | | |
|---|---|---|
| | Unit 2 | Unit 3 |
| Current COD | June 2019 | June 2020 |
| Adjustment | 18 to 26 months | 24 to 36 months |
| New COD | Dec 2020 to Aug 2021 | June 2022 to June 2023 |

- There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
- The Consortium lacks the project management integration needed for a successful project outcome.
- The WEC-CB&I relationship is strained, caused to a large extent by commercial issues.
- The overall morale on the project is low.
- The Contract does not appear to be serving the Owners or the Consortium particularly well.
- The issued design is often not constructible resulting in a significant number of changes. The construction planning and constructability review efforts are not far enough out in front of the construction effort to minimize impacts.
- There is significant engineering and licensing workload remaining (currently over 800 engineers). ITAAC closure will be a significant effort.
- Emergent issues potentially requiring NRC approval of LARs remain a significant project concern.
- There is a significant disconnect between construction need dates and procurement delivery dates.

- The amount of stored material onsite is significant, creating the need for an extended storage and maintenance program.
- Construction productivity is poor for various reasons including changes needed to the design, sustained overtime, complicated work packages, aging workforce, etc.
- The indirect to direct craft ratio is high.
- Field non-manual turnover is high.
- The Owners do not have an appropriate project controls team to assess/validate Consortium reported progress and performance.
- The schedule for the startup test program is in the early stages of development. The BIP turnover rate appears to be overly aggressive.

Bechtel recognizes that the recently announced purchase of CB&I nuclear by WEC may change some of the recommendations regarding the Consortium. Nonetheless, most of the recommendations identified in this report still apply to the project under the new EPC contract structure.

# Appendix A

# Documents Received from the Owners and the Consortium

# Appendix A
# Documents Reviewed from the Owners and the Consortium

Documents reviewed during the assessment are identified in Table A-1.

**Table A-1. Documents Reviewed During the Assessment**

| No. | Description | Hard Copy (HC) or Electronic (E) |
|---|---|---|
| 1.1 | VCS Project Supply Chain Management-Procurement Plan, VSG-GW-GPH-010), 5/8/15, 87 pages | E |
| 1.1.1 | VCS Project Construction Execution Plan (VSG-GW-GCH-001), Rev 2, 11/19/09, 64 pages | E |
| 1.1.2 | VCS Project Resource Staffing Plan, VSG-GW-GXH-001), 2/6/09, 11 pages | E |
| 1.1.3 | VCS Project Regulatory-Licensing Management Plan, (VSG-GW-G:H-001), Rev 5, 6/5/09, 14 pages | E |
| 1.1.4 | VCS Project Execution Plan (VSG-GW-GBH-300), Rev 3, 8/13/09, 52 pages | E |
| 1.1.5 | VCS Project Engineering Plan (VSG-GW-GEH-001), Rev 2, 1/18/12, 50 pages | E |
| 1.1.6 | VCS Project Completion and Closeout Plan (VSG-GW-GBH-370), Rev 1, 3/4/09, 19 pages | E |
| 1.1.7 | VCS Integrated Project Risk Management Plan (VSG-GW-GBH-310), Rev 1, 9/5/13, 10 pages | E |
| 1.1.8 | VCS ITAAC Program Execution Plan (VSG-GW-GLH-002), Rev 3, 1/12/15, 37 pages | E |
| 1.1..9 | NNDG-CS-0001 Rev. 5 - Oversight of Construction Activities (NNDG-CS-0001), Rev 5, 1/22/15, 8 pages | E |
| 1.1.10 | Project Oversight Strategy Plan, Rev. 2, 11/12/14,28 pages | E |
| 1.1.11 | NNDG-AP-0003 - Oversight Plan Development and Execution (NNDG-AP-0003), 6/11/14, 10 pages | E |
| 1.1.12 | NND-CS-0013 - Risk Assessment of Consortium Construction Activities, 1/22/15, 9 pages | E |
| 1.1.13 | NND-QS-0006 Rev. 2 - NND QS Audits, Rev 2, 12/17/15, 40 pages | E |
| 1.1.14 | NND-CS-0013 Attachment 1 From Review 06-18-2015, 6/18/15,7 pages | E |
| 1.1.15 | NND-AP-0308 Rev. 0 - Construction Readiness Review Procedure, 5/29/14, 9 pages | E |
| 1.1.16 | NND-AP-0304 Rev. 1 - Construction Oversight, Rev 1, 4/30/13, 11 pages | E |
| 1.1.17 | NND-AP-0024 Rev. 3 - Assessment Program, Rev 3, 10/9/14, 83 pages | E |
| 1.1.18 | NND-AP-0018 Rev. 5 - Observation Program , Rev 5, 2/3/15,33 pages | E |
| 1.1.19 | AP1000 Initial Test Program - Commissioning Program and Turnover | E |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| | Plan (VSG-GW-GBH-360), Rev 2) , 1/12/15,129 pages | |
| 1.1.20 | NND-AP-0002 Rev. 15 - Corrective Action Program (NND-AP-0002), Rev 15), 3/31/15,63 pages | E |
| 1.2 | V.C. Summer Units 2 & 3 Monthly Status Report - MARCH 2015, 107 pages | E |
| 1.2.1 | V.C. Summer Units 2 & 3 Monthly Status Report - JUNE 2015, 111 pages | E |
| 1.2.2 | V.C. Summer Units 2 & 3 Monthly Status Report - APRIL 2015, 116 pages | E |
| 1.2.3 | V. C. Summer Units 2 & 3 Monthly Status Report - MAY 2015, 112 pages | E |
| 1.2.4 | 2015 07 16 - July PRM (final), 7/16/15,170 pages | E |
| 1.2.5 | 2015 06 17 - June PRM Slides (Final), 6/18/15,181 pages | E |
| 1.2.6 | 2015 05 21 - May PRM (final), 168 pages | E |
| 1.2.7 | 2015 04 17 - April PRM (final as presented), 154 pages | E |
| 1.2.8 | 2015 03 17 - March PRM (final), 154 pages | E |
| 1.3 | June 2015 Consortium Monthly Meeting Minutes, 6-18-15, 103 pages | E |
| 1.3.1 | May 2015 Consortium Project Review Meeting Minutes, 6-17-15, 97 pages | E |
| 1.3.2 | May 2015 Project Review Meeting Minutes - Owner Comments, 5-21-15, 7 pages | E |
| 1.3.3 | March 2015 Project Review Meeting Minutes - Owner Comments, 3/19/15, 8 pages | E |
| 1.3.4 | March 2015 Consortium Project Review Meeting Minutes, 4/8/15, 88 pages | E |
| 1.3.5 | June 2015 Project Review Meeting Minutes - Owner Comments, 6/18/15, 9 pages | E |
| 1.3.6 | June 2015 Consortium Project Review Meeting Minutes, 7/14/15, 103 pages | E |
| 1.3.7 | April 2015 Project Review Meeting Minutes - Owner Comments, 4/16/15, 8 pages | E |
| 1.3.8 | April 2015 Consortium Project Review Meeting Minutes, 90 pages | E |
| 1.5 | VC Summer Site Overall Craft Staffing (Includes Absenteeism and PF) dated 5/5/2015, 1 pages, 11 X 17 | HC |
| 1.5.1 | VC Summer Site Overall Craft Forecast and Actuals, dated 8/27/15, 1 pages, 11 X 17 | HC |
| 1.5.2 | Power Leadership_CBI_as of Jan 2015, 1 page | E |
| 1.5.3 | NND Staffing_8-15 (Owner Staffing), 2 pages | E |
| 1.6 | Westinghouse Engineering org charts for VCS Assessment, 6-1-15, 7 pages | E |
| 1.6.1 | NP&MP Org Charts for VCS Assessment – 6-1-15, 8 pages | E |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| **No.** | **Description** | **Hard Copy (HC) or Electronic (E)** |
| 1.6.2 | Westinghouse Nuclear Automation org charts for VCS Assessment - July 28, 2015, 8 pages | E |
| 1.6.3 | VC Summer Site Org Chart - CB&I - Jan 2015, 1/29/15,16 pages | E |
| 1.6.4 | Westinghouse Nuclear Automation org charts for VCS Assessment - July 28, 2015, 8 pages | E |
| 1.6.5 | Westinghouse Engineering org charts for VCS Assessment - July 28, 2015, 7 pages | E |
| 1.6.6 | WEC VCS Org Chart - Site 07-28-15, 1 page | E |
| 1.6.7 | Power_Leadership_CBI_2015.7.15, 1 page | E |
| 1.6.8 | NP&MP Org Charts for VCS Assessment, 6/1/15,22 pages | E |
| 1.6.9 | NP&MP Org Charts for VCS Assessment - July 28, 2015, 22 pages | E |
| 1.7 | Calendar of Weekly/Monthly Meetings (w/Owner attends highlighted), 3 pages, 8.5 X 11 | HC |
| 1.8 | Top 17 Risks – Mitigation Plans (As of August 3, 2015; VC Summer Schedule Risk Register, dated 8/5/15, 14 pages, , 8.5 X 11 | HC |
| 1.8.1 | VCS Items Meeting, dated 9/4/15,9 pages, , 8.5 X 11 | HC |
| 1.8.2 | VC Summer Plan of the Day – 9/3/15, 36 pages, PowerPoint , 8.5 X 11 | HC |
| 2.1 | Design Completion (Luca Oriani, Westinghouse), 5 pages, 8.5 X 11 | HC |
| 2.3.1 | WEC PCC Level 1 Critical Issues List, 3 pages, 11 X 17 | HC |
| 2.3.2 | Issues List, dated 9/4/15, 5 pages, 8.5 X 11 | HC |
| 2.8. | Pending DCP List, 9/3/15, 4 pages, 8.5 X 11 | HC |
| 2.8.1 | VC Summer LAR Cross Reference, 9/10/15, 18 pages, PowerPoint 8.5 X 11 | HC |
| 2.8.2 | Overview of the AP1000 Design Change Process, dated 1/14/15, 18 pages, PowerPoint , 8.5 X 11 | HC |
| 2.9 | AP1000 Plant Major Milestones, 28 pages, PowerPoint 8.5 X 11 | HC |
| 2.9.1 | P&ID Revisions (P2P, 8/31/15), 10 pages, 11 X 17 | HC |
| 3.2 | Weekly Modules 4-Box Report - 07-14-15 Rev. 1, 37 pages | E |
| 4.1 | VCS 2 & 3 Weekly Construction Metric 15-07-27, 58 pages | E |
| 4.2.1 | Unit 3 Total CB&I Commodity Percents Complete (graph), dated 9/3/15, 3 pages, 11 X 17 | HC |
| 4.2.2 | VC Summer Site Total CB&I Percents Complete (graph) | HC |
| 4.2.3 | Unit 2 CB&I Commodity Percents Complete | HC |
| 4.3 | VCS Project Subcontracting Strategy – Report, dated 8/31/15, 17 pages, 11 X 17 | HC |
| 4.4 | VC Summer Daily Report 7 21 2015, 7/21/15,6 pages | E |
| 4.5 | VC Summer Equipment List, 25 pages, 8.5 X 11 | HC |
| 5.1 | 2015-08-03 Month End U3 Integrated Calc Major Milestone-Key Dates, 8/6/15, 1 page | E |
| 5.1.1 | 2015-08-03 Month End U2 Integrated Calc Major Milestone-Key | E |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| | Dates, 8/6/15, 1 page | |
| 5.1.2 | 2015-06-29 Month End U3 Integrated Calc Major Milestone-Key Dates, 7/7/15, 1 page | E |
| 5.1.3 | 2015-06-29 Month End U2 Integrated Calc Major Milestone-Key Dates, 7/7/15, 1 page | E |
| 5.1.4 | 2015-06-01 Month End U3 Integrated Calc Major Milestone-Key Dates, 6/5/15, 1 page | E |
| 5.1.5 | 2015-06-01 Month End U2 Integrated Calc Major Milestone - Key Dates, 6/5/15, 1 page | E |
| 5.1.6 | 2015-04-27 Month End U2 Integrated Calc Major Milestone-Key Dates, 4/28/15,1 page | E |
| 5.1.7 | 2015-04-27 Month End U3 Integrated Calc Major Milestone-Key Dates, 4/28/15, 1 page | E |
| 5.1.8 | 2015-03-30 Month End U3 Integrated Calc Major Milestone-Key Dates, 4/9/15, 1 page | E |
| 5.1.9 | 2015-03-30 Month End U2 Integrated Calc Major Milestone-Key Dates, 4/9/15,1 page | E |
| 5.2 | 2015-08-03 U3 Crit Path ILRT, 8/5/15, 4 pages | E |
| 5.2.1 | 2015-08-03 U3 Crit Path COD, 8/5/15, 4 pages | E |
| 5.2.2 | 2015-08-03 U2 Crit Path ILRT, 8/5/15, 4 pages | E |
| 5.2.3 | 2015-08-03 U2 Crit Path COD, 8/5/15, 5 pages | E |
| 5.2.4 | 2015-06-29 U3 Crit Path ILRT, 6/30/15, 4 pages | E |
| 5.2.5 | 2015-06-29 U3 Crit Path COD, 7/7/15,4 pages | E |
| 5.2.6 | 2015-06-29 U2 Crit Path ILRT, 6/29/15,3 pages | E |
| 5.2.7 | 2015-06-29 U2 Crit Path COD, 7/7/15,4 pages | E |
| 5.2.8 | 2015-06-01 U3 Crit Path COD, 6/3/15,4 pages | E |
| 5.2.9 | 2015-06-01 U3 Crit Path ILRT, 6/4/15, 4 pages | E |
| 5.2.10 | 2015-06-01 U2 Crit Path ILRT, 6/3/15,3 pages | E |
| 5.2.11 | 2015-06-01 U2 Crit Path COD, 6/2/15,6 pages | E |
| 5.2.12 | 2015-04-27 U3 Crit Path ILRT, 4/30/15,4 pages | E |
| 5.2.13 | 2015-04-27 U3 Crit Path COD, 4/30/15,5 pages | E |
| 5.2.14 | 2015-04-27 U2 Crit Path ILRT, 4/30/15,5 pages | E |
| 5.2.15 | 2015-04-27 U2 Crit Path COD, 4/30/15,4 pages | E |
| 5.2.16 | 2015-03-30 U3 Crit Path ILRT, 4/6/15,4 pages | E |
| 5.2.17 | 2015-03-30 U3 Crit Path COD, 4/6/15, 4 pages | E |
| 5.2.18 | 2015-03-30 U2 Crit Path ILRT, 4/1/15, 4 pages | E |
| 5.2.19 | 2015-03-30 U2 Crit Path COD, 4 pages | E |
| 6.1 | QA Audits at VC Summer 2014/2015, 1 page, 8.5 X 11 | HC |
| 6.1.1 | Quality Assurance Scheduled Surveillances, dated 8/26/15, 18 pages, 8.5 X 11 | HC |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| **No.** | **Description** | **Hard Copy (HC) or Electronic (E)** |
| 6.5 | NND-AUD-201503 Owner's COL and Project Oversight Audit, 7/2/15,16 pages | E |
| 6.5.1 | NND-15-0247 2015 Corrective Action Program Audit Report, 4/16/15,9 pages | E |
| 6.5.2 | NND-15-0143 Parallel Module Fabrication Process Audit Report, 3/24/15,8 pages | E |
| 6.5.3 | NND-15-0090 2015 Procurement Processes Audit Report, NND-AUD-201501, 2/20/15,8 pages | E |
| 6.5.4 | 2015 Audit Schedule Rev. 1, 6/12/15,2 pages | E |
| 7.1 | Licensing Weekly 8-3-15, 10 pages | E |
| 7.1.1 | Licensing Weekly 8-10-15, 10 pages | E |
| 7.1.2 | Licensing Weekly 7-6-15, 11 pages | E |
| 7.1.3 | Licensing Weekly 7-27-15, 10 pages | E |
| 7.1.4 | Licensing Weekly 7-20-15, 10 pages | E |
| 7.1.5 | Licensing Weekly 7-13-15, 10 pages | E |
| 7.1.6 | Licensing Weekly 6-8-15, 11 pages | E |
| 7.1.7 | Licensing Weekly 6-29-15, 12 pages | E |
| 7.1.8 | Licensing Weekly 6-15-15, 11 pages | E |
| 7.1.9 | Licensing Weekly 6-22-15, 11 pages | E |
| 7.1.10 | Licensing Weekly 6-1-15, 11 pages | E |
| 7.2.11 | 2015-08-10 VC Summer NRC Schedule, 3 pages | E |
| 7.2.12 | 2015-08-03 VC Summer NRC Schedule, 3 pages | E |
| 7.2.13 | 2015-07-27 VC Summer NRC Schedule, 3 pages | E |
| 7.2.14 | 2015-07-20 VC Summer NRC Schedule, 3 pages | E |
| 7.2.15 | 2015-07-13 VC Summer NRC Schedule, 3 pages | E |
| 7.2.16 | 2015-07-06 VC Summer NRC Schedule, 3 pages | E |
| 7.2.17 | 2015-06-29 VC Summer NRC Schedule, 3 pages | E |
| 7.2.18 | 2015-06-22 VC Summer NRC Schedule, 3 pages | E |
| 7.2.19 | 2015-06-15 VC Summer NRC Schedule, 3 pages | E |
| 7.2.20 | 2015-06-08 VC Summer NRC Schedule, 3 pages | E |
| 7.2.21 | 2015-06-01 VC Summer NRC Schedule, 3 pages | E |
| 7.4 | VCS Permit Status 6-11-15, 5 pages | E |
| 7.8 | NRC Report 8-4-15, 8/4/15,3 pages | E |
| 7.8.1 | NRC Report 7-7-15, 7/7/15,3 pages | E |
| 7.8.2 | NRC Report 7-21-15, 7/21/15,3 pages | E |
| 7.8.3 | NRC Report 7-14-15, 7/14/15,3 pages | E |
| 7.8.4 | NRC Report 6-9-15, 6/9/15,3 pages | E |
| 7.8.5 | NRC Report 6-2-15, 6/2/15,3 pages | E |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| 7.8.6 | NRC Report 6-16-15,6/16/15,3 pages | E |
| 7.8.7 | NRC Report 5-5-15, 5/5/15,3 pages | E |
| 7.8.8 | NRC Report 5-19-15, 5/19/15,3 pages | E |
| 7.8.9 | NRC Report 5-13-15, 5/13/15,3 pages | E |
| 8.1 | Engineering, Procurement and Construction Agreement between SCE&G, for Itself and as Agent for the SC Public Service Authority, as owner and a Consortium consisting of Westinghouse Electric Company LLC and Stone & Webster, Inc., as Contractor for AP1000 Nuclear Power Plants Dated as of May 23, 2000 (Confidential Trade Secret Information – Subject to Restricted) dated 5/23/08 (176 pages, 8.5 X 11) | HC |
| 9.1.1 | Owner Org Charts - Bechtel Assessment, 1 page | E |
| 9.1.1.2 | Owner Org Charts - Bechtel Assessment, 14 pages | E |
| 9.3 | Exhibit A, Scope of Work/Supply and Division Responsibility, 62 pages, 8.5 X 11 | HC |
| 9.3.1 | AP1000 Plant Division of Responsibility – VC Summer 2&3 (VSG-GW-G8Y-100), 70 pages, 8.5 X 11 | HC |
| 10.1 | Commercial Review Meeting, dated 8/19/15, 7 pages, PowerPoint 8.5 X 11 | HC |
| 10.2 | Unit 3 Standard Plant Performance (Month end July 2015), 1 page, 11 X 17 | HC |
| 10.12 | VC Summer U0 CSI Site-Specific EPC, dated 9/7/15, 3 pages, 11 X 17 | HC |
| 11.2 | Modules Illustration, 1 page, 8.5 X 11 | HC |
| 11.2.1 | AP1000 Module Overview NI Structural Modules, 166 pages, PowerPoint 8.5 X 11 | HC |
| 11.27 | Project Controls Meeting Material (9/15 Meeting), 15 pages, 11X17 | HC |
| 12.1 | VC Summer Plan of the Day, October 01, 2015, 33 pages, PowerPoint 8.5 X 11 | HC |
| 12.2 | Nuclear Island Mechanical Systems Reference Document Package,AP1000, May 2015 (Includes General Arrangements, Room Numbering and Module Locations, 79 pages, 11X17 | HC |
| 12.3.1 | Un-redacted Article 3 added (9/25/15)<br>Un-redacted Article 7 added (9/25/15), but related Exhibit J, not added.<br>Un-redacted Article 9 and 10 added (9/25/15)<br>- Schedule E, project schedule – not added<br>- Schedule F, milestone schedule – not added<br>- Schedule J, price adjustment provisions – not added | HC |
| 12.3.2 | Agreement Change Order 1 – 7/14/08, Engineering, Procurement and Construction Agreement, 8 pages, 8.5 X 11 | HC |
| 12.3.3 | Agreement Change Order 2 – 9/10/09 (provision of Limited Scope Simulators, LSS) 12 pages, 8.5 X 11 | HC |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| 12.3.4 | Agreement Change Order 3 – 1/14/10, Parr Road Rehabilitation, 27 pages, 8.5 X 11 | HC |
| 12.3.5 | Agreement Change Order 5 – 5/4/10, Revised Senior Reactor Operator Instructor Training Program, 37 pages, 8.5 X 11 | HC |
| 12.3.6 | Agreement Change Order 6 – 6/29/10, (substitute HydraNuts ILO AP1000 Standard Plant reactor vessel stud tensioners . . . ), 14 pages, 8.5 X 11 | HC |
| 12.3.7 | Agreement Change Order 7 – 7/1/10, (Stone & Webster . . . .), 9 pages, 8.5 X 11 | HC |
| 12.3.8 | Agreement Change Order 8 – 4/11/11, (transfer Stone & Webster Target Price COW to Firm Price . . . ), 51 pages, 8.5 X 11 | HC |
| 12.3.9 | Agreement Change Order 9 – 11/23/10, (RFP to reconfigure outgoing transmission lines from VCS#2 switchyard . . . ), 5 pages, 8.5 X 11 | HC |
| 12.3.10 | Agreement Change Order 10 – 11/22/10, Access to Westinghouse Primavera Architecture, 12 pages, 8.5 X 11 | HC |
| 12.3.11 | Agreement Change Order 11 – 2/14/11, Study and Analyze the Impact of Delayed COL. Receipt of Construction Schedule, 8 pages, 8.5 X 11 | HC |
| 12.3.12 | Agreement Change Order 12 – 12/8/11, Impa ct from Health Care and Education Reconcillation Act of 2010, 12 pages, 8.5 X 11 | HC |
| 12.3.13 | Agreement Change Order 13 – 2/14/12, Ovation Work Stations. 4 pages, 8.5 X 11 | HC |
| 12.3.14 | Agreement Change Order 14 – 2/26/12, Cyber Security Phase 1, 53 pages, 8.5 X 11 | HC |
| 12.3.15 | Agreement Change Order 15 – 2/16/12,WLS Discharge Piping, 4 pages, 8.5 X 11 | HC |
| 12.3.16 | Agreement Change Order 18 – 9/17/14, Perch Guards, 6 pages, 8.5 X 11 | HC |
| 12.3.17 | Agreement Change Order 19 – 10/1/14, Simulator Hardware/Software/Training, 11 pages, 8.5 X 11 | HC |
| 12.3.18 | Agreement Change Order 20 – 12/2/14, Method of Calculating ACA Impact 2011, 2012, 2013, 8 pages 8.5 X 11 | HC |
| 12.3.19 | Agreement Change Order 21 – 2/16/15, ITAAC Maintenance, 8 pages, 8.5 X 11 | HC |
| 12.3.20 | Agreement Change Order 22 – 7/30/15, Common-Q Maintenance Training System Equipment and Software, 31 pages, 8.5 X 11 | HC |
| 12.3.21 | Agreement Change Order 23 – 8/5/15, Simulator Development System (SDS), 64 pages, 8.5 X 11 | HC |
| 12.3.22 | Agreement Change Order 24 – 8/20/15, 94 pages, 8.5 X 11 | HC |
| 12.5 | Field Fabrication and Installation Specification, 3.9 Installation of Spool Pieces and Field Fabricated Piping/Training, 6 pages, 8.5 X 11 | HC |
| 12.5.1 | Piping Isometric General Notes, Dwg. No. APP-GW-P_W-100, 1 page, 11 X 17 | HC |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| 12.5.2 | Piping Isometric Symbol Legend, Dwg No. APP-GW-PLW-102, 1 page, 11 X 17 | HC |
| 12.5.3 | Shield Building Stell Wall Panels EL 100-0" to 248'-6 1/2 " General Notes, Sheet 1 & 2, 11 X 17 | HC |
| 12.5.4 | AP1000 Structural Modules General Notes Dwg No. APP-GW-S9-100 through 107, 7 pages, size 11X17 | HC |
| 12.5.5 | General Notes Mechanical Modules (Dwg No. APP-GW-K9-100 through 103, 4 pages, size 11X17 | HC |
| 12.9 | Westinghouse Home Office Engineers not charging/charging VC Summer Project, 1 page, size 8.5 X 11 | HC |
| 12.9.1 | CB&I Total Head Count for Design Engineering and Support, 1 page, size 8.5 X 11 | HC |
| 12.10 | Historical and Open E&CDRs and N&Ds,4 pages, size 8.5 X 11 | HC |
| 12.13 | Cives CGD Submittal Review Status, 1 page, 8.5 X 11 | HC |
| 12.15 | Site Overall Total, Direct Construction Only (Planned and Earned Hours) curve, 1 page, 11X17 | HC |
| 12.17 | VC Summer Total Steel Commodity, 7 pages, 11X17 | HC |
| 12.21 | CB&I Direct Construction Labor Summary, dated May, 2015, 1 page, 11X17 | HC |
| 12.23 | Available Work Assuming No Manpower Constraints (table), 1 page, 8.5 X 11 | HC |
| 12.24 | VC Summer Initial Test Program Unit 2 & 3, Target Completion Schedule, 1 page, 11X17 | HC |
| 12.26 | EBS_NND_ Daily Active Detail, 7 pages, 8.5 X 11 | HC |
| 12.28 | ROS Impacts Report, 6 pages, 11X17 | HC |
| 12.29 | Engineering Impacts Report, 1 pages, 8.5 X 11 | HC |
| 13.1 | Westinghouse Engineering Remaining Schedule (2015-09-28), 135 pages, 8.5 X 11 | HC |
| 13.7 | WEC PO Status report, 1 page, 8.5 X 11 | HC |
| 13.9 | Corrective Action Program Status (CAPS) Report, dated 9/17/15, 19 pages, 8.5 X 11 | HC |
| 14.2 | Indirect Cost Review, 22 pages, 8.5 X11 | HC |
| 14.3 | Indirect/direct hours Week Ending 08-16-15 (Indirect Labor Report), 4 pages, 8.5 X 11 | HC |
| 15.6 | Summary of the key engineering activities in the ECS remaining in the schedule that have a tie to construction, 1 page, 8.5 X 11 | HC |
| 15.6.1 | Post-Engineering Design Closure Work Streams, 1 page, 8.5 X 11 | HC |
| 15.6.2 | Engineering Items – ROYG (2015 – 09-28), pages 1 – 70, 11X17 | HC |
| 15.6.3 | Procurement Items – ROYG (2015-09-28) pages 1-128, 11X17 | HC |
| 15.6.4 | Licensing Items - ROYG (2015-09-28) pages 1-12, 11X17 | HC |
| 15.7 | Engineering Resources, 1 page, 8.5 X 11 | HC |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| 15.9 | VC Summer Discussion on I&C Schedule & PRS – July 2015, 10 pages | HC |
| 15.9.1 | I&C Baseline 8 Engineering Remaining, 51 pages, 8.5 X 11 | HC |
| 15.11 | Annex Building Cable Tray Plan Area EL 100' – 0", Sheet 2 of 2, Dwg No. APP4031-ER-013, 1 page, 11X17 | HC |
| 15.11.1 | Annex Building Cable Tray Support Location Plan Area 1 & Area 4 EL 100' – 0" Sheet 2 0f 3, Dwg No. APP4031-SH-014, 1 page, 11X17 | HC |
| 15.11.2 | Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" Sh 1 of 3 Dwg No. APP-4031-SHX-01201, 1 page, 11X17 | HC |
| 15.11.3 | Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" Sh 2 of 3, Dwg No. APP-4031-SHX-01301 1 page, 11X17 | HC |
| 15.11.4 | Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" Sh 3 of 3, Dwg No. APP-4031-SHX-01401 1 page, 11X17 | HC |
| 15.11.5 | Fabrication Requirements Cope Tray Supports Seismic Category III Trapeze Rod Support Detail, Dwg No. APP-SH27-VF-201, 1 page, 11X17 | HC |
| 15.11.6 | Annex Building – Area 4 Structural Steel Roof Supplemental Steel Plan, Dwg No. AP-4044-SS-005, 1 page, 11X17 | HC |
| 15.13 | Remaining Hold DDs, 37 pages, 1 page 8.5 X 11, 36 pages 11 X 17 | HC |
| 15.13 – 15.14 | Hold Docs missing DD, 3 pages, 11 X 17 | HC |
| 15.16 | CB&I Remaining Equipment Deliveries, 100 pages, 11X17 | HC |
| 15.16.1 | Westinghouse Remaining Equipment Deliveries, 17 pages, 11X17 | HC |
| 16.1 – 16.6 | List – Construction Package – On Hold, 3 pages, 11X17 | HC |
| 16.1 – 16.6.1 | VC Summer Unit -2 Auxiliary Building Room Plan 12306, Strategic Planning Team September 14, 2015 (DRAFT), dated 9/14/15, 13 pages, 8.5 X 11 | HC |
| 16.1 – 16.6.2 | Email (fr James B. Kelly to Con Matthews dated 9/24/15, Subject: Drawings required for Electrical cable tray supports with APP-GW-GBH-451, Rev 0, AP1000 Standard Plant Engineering Document List – Annex Building Areas 1, 2, 3 – Raceways and Supports Construction Deliverables – Elevation 100' to 117'6" (AN2-RC-X) 15 pages, 8.5 X 11 | HC |
| 16.1 – 16.6.3 | Annex Building Cable Tray Plan Area 1 El. 100' -0" Sheets 1 o f3, Dwg No. APP-4031-ER-012, 1 page 11X17 | HC |
| 16.1 – 16.6.4 | Liquid Radwaste System, Auxiliary Building Room 12259, Annulus Pipe Chase, Dwg No. APP-WLS-PLW-451, 1 page, 11X17 | HC |
| 16.1 – 16.6 | Pipe Support Drawing WLS System, Dwg No. APP-WLS-PH-12R00891, 1 page, 11X17 | HC |
| 16.1 – 16.6.5 | Shield Building Lower Annulus Inside Embedments Development View Radius 69'-6" (Sheet 1), Dwg No. APP-1020-CE-100, 1 page, 11X17 | HC |
| 16.1 – | Shield Building Lower Annulus Inside Embedments Index Develop- | HC |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| 16.6.6 | ment View Radius 69'-6" (Sheet 1), Dwg No APP-1020-CEX-100, 1 page, 11X17 | |
| 16.1 – 16.6.7 | Shield Building Lower Annulus Inside Embedments Index Development View Radius 69'-6" (Sheet 2), Dwg No APP-1020-CEX-102, 1 page, 11X17 | HC |
| 16.1 – 16.6.8 | Shield Building Lower Annulus Inside Embedments Index Development View Radius 69'-6" (Sheet 4), Dwg No APP-1020-CEX-104, 1 page, 11X17 | HC |
| 16.1 – 16.6.9 | Standard Embedment Plates Deformed Wire Anchor (DWA) Type, Dwg No APP-CE01-CE-002, 1 page, 11X17 | HC |
| 16.2/3 | Overall Modules Response status, 11 pages, 8.5 X 11 | HC |
| 16.10 | RBL (APP), RBL (CPP), Support Qualification, # Supports Qualified by month, 2 pages, 8.5 X 11 | HC |
| 17.2 | VCS Unit 2 – Construction T/O to Component Test (Waterfall), 13 pages, size 8.5 X 11 | HC |
| 17.2.1 | VCS Unit 1 - Service Water – Service Water Initial Test Program, 1 page, size 11 X 17 | HC |
| 17.3 | EDCR Listing – from 4/30/15 to 10/1/2015, 10 pages, 8.5 X 11 | HC |
| 17.3.1 | CBI EDCR Listing - pages 1 to 108, 8.5 X 11 | HC |
| 17.4 | WEC – CBI Staffing Summary Table, 1 page, 8.5 X 11 | HC |
| 17.5 (2.9) | Weekly ECS Report Out, 9/30/15, 48 pages, 8.5 X 11 | HC |
| 17.6 | Monthly Engineering Completion Status Meeting, September 9th, 2015, 22 pages, PowerPoint, size 8.5 X 11 | HC |
| 17.6.1 | Monthly Engineering Completion Status Meeting, October 7, 2015, 24 pages, PowerPoint, size 8.5 X 11 | HC |
| 17.7 (2.3) | Level 1 Issue Executive Summary Report, 2 pages, 8.5 X 11 | HC |
| 17.8 | CB&I 1X4 POs Released, 3 pages, | HC |
| 17.9 | CBI To-Go POs, 1 page, 8.5 X 11 | HC |
| 17.10 | Standard Plant ITAAC 2.3 06.09b.iv Performance Documentation Plan (Doc. No. APP-RNS-ITH-004), 11 pages, size 8.5 X 11 | HC |
| 17.10.1 | Standard Plant ITAAC 2.2 02.02a Performance Documentation Plan (Doc. No. APP-PCS-ITH-014), 13 pages, size 8.5 X 11 | HC |
| 17.10.2 | Standard Plant ITAAC 2.1 02.11b.iii Performance and Documentation Plan (Doc No APP-RCS-ITH-048), 12 pages, size 8.5 X 11 | HC |
| 17.10.3 | Standard Plant ITAAC 2.1 02.08b Performance and Documentation Plan (Doc No APP-RCS-ITH-056), 13 pages, size 8.5 X 11 | HC |
| 17.10.4 | Standard Plant ITAAC 2.1 02.08d.vii Performance and Documentation Plan (Doc No APP-RCS-ITH-060), 10 pages, size 8.5 X 11 | HC |
| 19.2 | Work Package Review Task Team, 3 pages, 8.5 X 11 | HC |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| **No.** | **Description** | **Hard Copy (HC) or Electronic (E)** |
| -- | CBI AP1000 Strategic Planning Team – Unincorporated DCP Report, 5 pages, 8.5 X 11 | HC |
| -- | VCS Monthly Project Review Meeting, September 17, 2015, 156 pages, PowerPoint 8.5 X `11 | HC |
| -- | VCS Site Design Engineering Drawing Booklet (1), System P&IDs & Electrical One-lines, 321 pages, 11X17 | HC |
| -- | VCS Plan of the Day - 9-9-15, 35 pages | E |
| -- | VC Summer Units 2 & 3 Project Assessment Consortium Meeting (Presentation), dated 9/9/15, (2 Copies), 131 pages, PowerPoint 8.5 X 11 | HC |
| -- | VC Summer Nuclear Station Units 2 and 3 Updated Final Safety Analysis Report , Chapter 1 (Rev 3) 8.5 X 11 (Large packet) | HC |
| -- | VC Summer – Site Specific Engineering Schedule – Remaining (Sorted by System /Major Sequence) Data Date: 28-Sep-15, CB&I – 200 pages, 11X17 | HC |
| -- | AP1000 Domestic Design Finalization – CBI Std Plant – DOM DF – To GO Engineering, 157 pages, 11X17 | HC |
| -- | E&DCR Title: Requalification of KOPEC conduit supports at Elevation 66'-6" Area 2, E&DCR No. APP-1212-GEF-087, Rev 0., 25 pages, 8.5 X 11 | HC |
| -- | VC Summer Nuclear Station Units 2 and 3 Updated Final Safety Analysis Report , Chapter 3 (Rev 3) , 8.5 X 11 (Large packet) | HC |
| -- | VCS Schedule - WEC PM Milestones, 4 pages | E |
| -- | VCS Schedule - WEC PM Milestones, 6 pages | E |
| -- | VCS Schedule - Module Assembly Summary, 1 page | E |
| -- | VCS Schedule – Licensing, 44 page | E |
| -- | VCS Schedule - ITAAC Detail, 137 pages | E |
| -- | VCS Level 1 - Construction Schedule, 3 pages | E |
| -- | VCS Schedule - Module Procurement Detail, 8/25/15,55 pages | E |
| -- | VCS Schedule - Module Procurement Summary, 8/25/15, 6 pages | E |
| -- | VCS Schedule - Module Procurement, 51 pages | E |
| -- | VCS Schedule - NAC Detail, 8/30/15,40 pages | E |
| -- | VCS Schedule - NAC Summary, 2 pages | E |
| -- | VCS Schedule – NAC, 8/30/15,53 pages | E |
| -- | VCS Schedule - Panel Delivery Detail, 26 pages | E |
| -- | VCS Schedule - Panel Delivery Summary, 8/25/15,2 pages | E |
| -- | VCS Schedule - Panel Delivery, 8/25/15,26 pages | E |
| -- | VCS Schedule - Procurement Detail, 8/25/15,323 pages | E |
| -- | VCS Schedule - Procurement Summary, 8/25/15, 9 pages | E |
| -- | VCS Schedule - Procurement WES Detail, 8/25/15,158 pages | E |

| Table A-1. Documents Reviewed During the Assessment | | |
|---|---|---|
| No. | Description | Hard Copy (HC) or Electronic (E) |
| -- | VCS Schedule - Procurement WES Summary, 8/25/15, 12 pages | E |
| -- | VCS Schedule - Procurement WES, 127 pages | E |
| -- | VCS Schedule – Procurement, 261 pages | E |
| -- | VC Summer EPC Agreement, 5/23/15,176 pages | E |
| -- | Meeting Sign in, Consortium 9-9-15 Presentation , 3 pages | E |
| -- | September 9 Presentation Draft Agenda, 2 pages | E |
| -- | CBI Meeting Schedule – 9-9-1515, 3 pages | E |
| -- | Weekly Site Safety Units 2 and 3 Report 9-21-15 28 pages | E |
| -- | VCSummer Supply Chain Management Org Chart 9-21-15, 1 page | E |
| -- | VCSumer Plan of the Day 9-21-15, 26 pages | E |
| -- | Turbine Building Pipe Summary - Large and Small Bore 1-3-12, 1 page | E |
| -- | Backfill Plan for Nuclear Island, 2 pages | E |
| -- | Aux Building Elevations, 20 pages | E |
| -- | 9-21-15 Module Discussion Attendance Sheet, 9/21/15,1 page | E |
| -- | VCS Modules Meeting - 9-15-154 pages | E |
| -- | 4-Box Report - Modules - 9-15-15, 42 pages | E |
| -- | VC Summer Plan of the Day 9-22-15, 36 pages | E |
| -- | VC Summer P6 database structure, 1 page | E |
| -- | VC Summer P6 Info, 12 pages | E |
| -- | SCEG Personnel Reporting Up Through Ron Jones, 2 pages | E |
| -- | Construction Performance Meeting 9-13-15, 31 pages | E |
| -- | Org Chart - Confidential - Do Not Share Outside Bechtel, 1 page | E |
| -- | 9-14-15 LAR 30 & LAR 111 Schedule, 4 pages | E |
| -- | 9-15-15 McIntyre Email on CAP and DCP Status, 2 pages | E |
| -- | 9-15-15 ITAAC Letter, 3 pages | E |
| -- | 9-17-15 U3 Overview Schedule, 1 page | E |
| -- | 9-17-15 U2 Overview Schedule, 1 page | E |
| -- | 9-17-15 Monthly Meeting Action Items List, 19 pages | E |
| -- | 9-17-15 Monthly Meeting Agenda, 1 page | E |
| -- | 2015 09 22 - Bechtel Assessment - Document Request - Tracking Document, 17 pages | E |
| -- | 2015 09 22 - Bechtel Assessment - Document Request - Tracking Document (3), 17 pages | E |
| -- | 2015 09 04 - Bechtel Assessment - Document Request - Tracking Document-Rev 1 – SG, 17 pages | E |
| -- | 2015 08 24 - Bechtel Assessment - Document Request - Tracking Document, 12 pages | E |