

# Special Specification Section 01311S Project Schedule

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U.S. DEPARTMENT OF  
**ENERGY**





**SPECIAL SPECIFICATION**

**SECTION 01311S**

**PROJECT SCHEDULE**

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**PART 1 - GENERAL**

## 1.01 SUMMARY

### A. Section Includes:

1. The development and submission of all project schedules, updates, recovery plan schedules, changes, and Schedule of Values.

### B. Related Sections:

1. Section 01330 – Descriptive Submittals
2. Section 01453S – Construction Inspection Requirements
3. Section 01700 – Project Closeout

### C. Basis of Design

1. Primavera P6, version 7.0.

### D. Substitutions

1. Microsoft Project 2010 may be used on this project upon written approval from SNL. Items identified in the specification that Microsoft Project cannot support shall be identified by the Contractor and a suitable substitution shall be identified and mutually agreed upon.

## 1.02 QUALIFICATIONS

Furnish a Project Scheduler to perform all of the scheduling, invoicing and project controls management listed herein.

The Scheduler shall have at a minimum 3 years of verifiable construction scheduling experience. The Project Scheduler shall have a certificate of training in Primavera P6, version 7.0

The Project Scheduler is considered a member of the Contractor's Key Personnel.

## 1.03 DESCRIPTION

Sandia National Laboratories (SNL) reports Planned Value (PV) and Earned Value (EV) data based on Early Start/Early Finish dates. This is the key schedule progress measurement tool utilized by SNL in evaluating the Contractor's performance. The Contractor shall develop, implement and status for SNL a reasonable and achievable schedule that supports the SNL Earned Value Management System.

The Contractor shall prepare and maintain a detailed resource loaded Baseline schedule utilizing Critical Path Method (CPM). This schedule shall be the Contractor's Baseline (target) schedule that shall be used to plan, organize and execute the entire scope of work. The Contractor shall maintain a statused copy of the resource loaded Baseline schedule that shall be used to record the Contractor's actual performance and report the critical path to contract completion. The Contractor shall be extensively familiar with the schedule and shall be able to discuss the development, the progress and the logic to great detail.

The Contractor shall prepare a Schedule of Values (SOV) structured in the Construction Specifications Institute (CSI) format. A budgeted cost for each activity in the resource loaded schedule will be coded to the CSI category in the Schedule of Values, which will be used for monthly payment applications. The Schedule of Values shall be developed, generated and produced from the scheduling software. Associated WBS elements shall be provided by SNL.

#### 1.04 SUBMITTALS

A. The Contractor shall furnish the following items for SNL approval:

1. Copies of the Project Scheduler's scheduling software training certification(s), as listed above.
2. A copy of the Project Scheduler's resume, with reference phone numbers.
3. A minimum of (3) previously developed schedules that were utilized on a similar project.

B. The Contractor shall submit both electronic and hard copies of the Statused Schedule with the assigned Baseline weekly to the Owner. A revised Baseline Schedule shall be submitted only when there is an approved change in the Baseline scope or work, contract cost, or schedule that has been enacted via Contract Revision (Imposed Finish date, Original Duration and / or Logic) or upon SNL request.

1. Electronic Copies:

The Contractor shall include Status and Baseline schedule files (.xer format) in the weekly submission. The following electronic media formats are acceptable for submittals:

- a. Email (.zip format)
- b. CD (RW)

2. Hard Copies:

The Contractor shall print and submit two color hard copies of the schedule formatted to landscape on 11" x 17" sheets. The font size shall be a minimum of 8pt.

C. Format:

1. The Contractor shall submit different layouts for the two weekly schedule submittals:

- a. 3 Week Look-Ahead:

Identify the week of actual progress up to the Data Date and 3 weeks of projected activities based on ES / EF, as per the SNL furnished schedule shell.

- b. Longest Path:

Utilize a LONGEST PATH filter, select and sort by ES / EF.

2. The Contractor shall format all hardcopy and electronic submissions per the following details:

- a. Each submission shall have the following information provided in a clear concise format: Project start date, Project Finish date, Data date, and Run date, file name, Contractor Name, Project Title, a brief title describing the schedule (i.e.: "3 Week Look Ahead"), and the "Page # of #" number
- b. The submission shall have, at a minimum, the following required columns (in order from left to right): Responsible Subcontractor, Activity ID, Activity Description, Original Duration (OD), Remaining Duration (RD), Actual Duration (AD), Percent Complete, Early Start (ES), Early Finish (EF), Late Start (LS), Late Finish (LF), Start, Finish, Total Float (TF), and Variance to Target 1 EF (Target 1 = Baseline Schedule). All activity bars for the two weekly schedule submittals must be visible on the balance of the paper schedule. Requests for modifications to this format shall be submitted to SNL in writing for approval.

## PART 2 - PRODUCTS

### 2.01 SOFTWARE

- A. All Schedules shall be developed in Primavera P6, version 7.

## PART 3 - DEVELOPMENT AND IMPLEMENTATION

### 3.01 SCHEDULE DEVELOPMENT

- A. Schedule Criteria: The schedule shall identify and show all activities required to complete the project and their dependency relationships. All schedule submittals shall have a well defined and continuous Critical Path from the Data date to the final milestone "Contract Complete".
- B. SNL shall provide [via P6 version 7.0.xer file] the approved schedule shell. The Contractor shall use the shell to build their Baseline and subsequent Status schedules. The shell shall contain the WBS, the activity codes (sort fields), the CSI codes, the calendars, and the resource table. The Contractor shall maintain the integrity of the

structure provided by SNL. The Contractor may add to, but shall not modify the existing structure. Except for resource loading, all coding shall be completed for the first schedule submittal.

C. Milestones:

1. All Schedules shall initiate with a milestone identified as “Contract Award” and terminate with a milestone identified as “Contract Complete”
2. Include the major and intermediate milestones necessary to track important events in each Structure (and critical Structure Areas) and as listed in Appendix A.
3. Do not Resource Load Milestones

D. Required Activities:

1. Include activities in the schedule that will be identified in the Schedule of Values and for monitoring purposes as listed in Appendix A.
  - a. The schedule shall identify General Conditions as a separate, individual activity by month, for each work package.
2. The activities shall meet the following criteria:
  - a. Activities shall be broken out by subcontractor. No activity shall be co-owned by more than one Contractor, to include GC and or subcontractors. Activities shall be broken down through all subcontractor tier levels. General Contractor cannot be identified as a subcontractor unless they self-perform the work.
  - b. Each activity shall have a unique identification number.
  - c. Each activity shall have a unique description.
  - d. Each activity shall have a Work Breakdown Structure (WBS) number that correlates its scope with the WBS in the Integrated Project Schedule provided in the schedule shell.
  - e. Each activity shall be coded as required using the SNL codes identified in the schedule shell. Activities that are added via Change Order will be coded with the Contract Revision number in the “CHANGE ORDER” code.
  - f. All activities with more than (zero) 0% complete must have an Actual Start date. All activities that are 100% complete must have an Actual Finish date.
  - g. Each activity shall have Total Float measured against the Contract Completion or Target completion date as agreed to by the Project Manager through an unobstructed logic string (no constraint dates other than the contract complete milestone).

- h. With the exception of the two key milestones “Contract Award” and “Contract Complete”, all activities and milestones shall have a minimum of one predecessor and one successor within the schedule logic.
- i. Finish-to-Start relationship lags are limited to 5 days or less. Additionally, a Start to Start (SS) relationship cannot be the only successor tie for any single activity -there shall be at least a Finish to Finish (FF) relationship as well.
- j. Finish to Finish lags shall not be longer than the successor’s original duration.
- k. Activity durations shall be in whole day units based on the SNL Standard Work Hour Calendar and shall not exceed 21 calendar days, unless otherwise agreed to by the Project Manager *except for the following*:
  - (1) Non-resource loaded activities for fabrication, manufacture and delivery of equipment or materials.
  - (2) Any SNL activities including, but not limited to: inspections, reviews, approvals, Sandia Furnished Equipment (SFE) and Materials (SFM).
  - (3) General Conditions monthly activity.
- l. Each activity shall be Cost loaded (DOLLARS) to represent its value and correlate with the Schedule of Values.

### 3.02 RESOURCE LOADED BASELINE SCHEDULE DEVELOPMENT

- A. Non- Resource Loaded Baseline Schedule Submission: Within 21 calendar days after award of the contract, the Contractor shall submit the non-resource loaded schedule logic, which shall include activities for the entire scope of the Contract.
  - 1. Prior to submission to SNL, the schedule must be reviewed, agreed to and signed off by the Prime Contractor’s on-site superintendent and a representative from each Subcontractor performing at least twenty (20) percent of the contracted work. Schedules not meeting this requirement will be rejected without review by SNL. Any delay to Notice to Proceed (NTP) or Contract Completion Date due to failure of the Contractor to secure and produce the subcontractor signatures with the schedule submittal is the sole responsibility of the Contractor.
- B. SNL shall review and provide comments on the non-resource loaded logic within 7 calendar days of the submittal. At the Contractor’s request, a meeting will be held after the 7<sup>th</sup> day of the SNL review to issue and discuss those comments with the Contractor.
- C. Resource Loaded Baseline Schedule Submission: Within the next 7 calendar days after the SNL review comments have been received, the Contractor shall complete resource loading the schedule and resolve SNL’s initial comments. The Contractor shall then submit the resource loaded schedule to SNL.

1. Resource loading of the schedule shall not be constrained by logic development.
2. The following resources shall be required to be loaded into the schedule:
  - a. Budgeted Cost (Resource ID: DOLLARS)
- D. SNL shall review and provide comments on the non-resource loaded logic within 7 calendar days of the submittal.
- E. The Contractor shall resolve all comments and issue the *non-stated* resource loaded Baseline (target) Schedule within 7 calendar days of receiving final comments from SNL. Once approved by SNL, this schedule shall become the Baseline Schedule. Changes to this schedule shall be made via approved Contract Change Orders only.
- F. If, at any time during the above review process, the Contractor is late with any phase of the submittals, SNL is not obligated to expedite or cut short the review process. Any delay to NTP due to failure of the Contractor to submit the schedule for review on time is the sole responsibility of the Contractor.
- G. Notice to Proceed shall not be issued until the resource loaded schedule has been approved by SNL.

### 3.03 NOTICE TO PROCEED (NTP) SCHEDULE DEVELOPMENT:

- A. Upon award of the contract, the Contractor shall develop a schedule that identifies and includes all necessary documents required by SNL and other permitting authorities to issue a Notice to Proceed (NTP).
  1. NTP's may be issued separately for different locations and work packages.
- B. The NTP schedule may be a stand-alone schedule separate from the Project Schedule.
- C. The list of NTP activities includes, but is not limited to: ES&H permits, Construction permits issued by SNL and the City of Albuquerque, Site Specific Safety Plan, Quality Assurance Plan, Other pre-construction Submittals, General Contractor bond payment, training and badging of initial contract personnel (i.e.: Project Manager, Office Engineer, Design Team Members, Safety Engineer, Field Superintendents, Scheduler, Earthwork and Surveying Subcontractors), Site Fencing, SWPPP systems, Waste Management Plan, the approved resource loaded Baseline schedule submittal, bond and permit payments, and key personnel identification. Additional NTP items may be identified in the Contract Documents and during the Pre-Construction meeting.
- D. The NTP Schedule shall be submitted within 7 days of Contract Award.
- E. The NTP schedule shall be stated and submitted weekly to SNL by the Contractor until NTP is authorized.

## PART 4 - SCHEDULE SUBMITTAL AND MAINTENANCE REQUIREMENTS

#### 4.01 BASELINE SCHEDULE

- A. The Baseline Schedule shall contain no status.
- B. Changes to the Baseline Schedule shall only be made via approved Contract Change Orders.
- C. The resource loaded Baseline Schedule budgeted cost shall always match the base value of the Contract plus all approved Change Orders.

#### 4.02 STATUSED SCHEDULE

- A. The Contractor shall submit a statused schedule weekly for the Owner's Construction Progress Meeting and monthly as backup for the Pay Application / Contractor Invoice (Status Schedule).
- B. Unless otherwise indicated by SNL, the Data Date for the Status Schedule shall be the Monday after each reporting week, and the Monday after the 2nd to last Friday of each month for the Invoice schedule.
- C. The Statused Schedule budgeted cost shall always match the base value of the Contract plus all approved Change Orders.

#### 4.03 WEEKLY SCHEDULE UPDATE REQUIREMENTS

- A. The first schedule update shall occur no sooner than (7) calendar days after SNL review of the first resource loaded schedule submittal.
- B. Updates shall be submitted *weekly* thereafter and shall be used as the basis of percent complete for evaluating weekly earned value. The updates shall be accompanied by the following information as required:
  - 1. When progress or changes impact the Contract Complete milestone date more than 4 days and less than 10 days, a written narrative explaining the reasons for the impact shall accompany the schedule submittal.
    - a. The narrative shall explain in clear terms what activities are causing the impact and identify the subcontractor responsible.
    - b. An analysis by the General Contractor as to whether the trend will improve or will continue to impact the end date is required.
  - 2. A detailed recovery schedule submittal developed in a *copy from the last status file (.xer format)* and narrative recovery plan shall be submitted to SNL within 7 calendar days of identification of a delay to the Contract Complete milestone date where the impact is 14 or more calendar days.

- a. Manhour information and crew size shall be provided by the Contractor to justify any duration changes. The Contractor shall identify existing information, as well as, planned information so that the changes can easily be identified.
  - b. The Contractor shall identify any required changes to the logic and be prepared to furnish justification for the proposed changes.
  - c. Details in the narrative describing actions to be taken by the Contractor to implement the recovery must be clear, quantifiable, reasonable and achievable. The details shall include the following items:
    - (1) A description of what the proposed changes will accomplish, as well as their affect on the critical path.
    - (2) Identification of the subcontractors that will be involved with the recovery plan.
    - (3) For all activities that overtime is identified as a recovery plan, identify the subcontractor and amount of overtime.
    - (4) Additional resources, changes in working time, etc. that are required for schedule recovery shall be at no cost to SNL.
  - d. The schedule submittal and recovery plan shall be reviewed and commented on by Sandia within 7 calendar days of receipt.
3. Weekly Update Submittals (Schedule Status with approved Baseline) shall include the following data:
- a. Actual start and finish dates.
  - b. Activity percent complete.
  - c. Remaining duration for started activities.
  - d. Forecasted Early Finish Dates for activities that have started.
  - e. Forecasted Start dates that were scheduled to start, but have not yet started (including their Durations).
  - f. Planned Value [PV] through the data date.
  - g. Earned Value [EV], based on the percent complete of work accomplished through the data date.
4. Weekly Progress Reviews: SNL and the Contractor shall jointly review the schedule status weekly in the Construction Progress Meeting.
- a. The Contractor shall be responsible to furnish color 11" x 17" copies of the schedules to all meeting attendees at the meeting.

- b. The two schedule layouts to be reviewed are the 3 Week Look Ahead and the Longest Path.
- c. The Contractor shall lead a discussion about progress in areas of interest and the Longest Path.
- d. The Contractor shall discuss specific schedule activity delays and/or improvements that represent the general progress of their subcontractors.
- e. The Contractor shall report the number of personnel on Site, Planned Value (PV) and Earned Value (EV) for the week.
- f. SNL, at their request, may require attendance by the Contractor's subcontractors.

#### 4.04 MONTHLY SCHEDULE UPDATE REQUIREMENTS

An electronic copy of the Baseline and Status schedule source files shall be submitted to SNL according to the Contractor Month End Status and Invoice Schedule in support of each Pay Application. The monthly updates shall contain the same information required for the Weekly Submissions.

### PART 5 - SCHEDULE EVALUATION AND CHANGE INCORPORATION

#### 5.01 SCHEDULE EVALUATION

- A. SNL shall review each schedule submission and evaluate the Contractor's project status based on Earned Value obtained from the Planned Value (PV) and Earned Value (EV) and Total Float (TF). SNL determines a project to be "On Schedule" when the Contractor meets the following two conditions:
  - 1. The Earned Value (EV) equals the Planned Value (PV).
  - 2. The Critical Path Total Float to the contract completion date equals 0 (Zero).
- B. The Longest Path (usually the path with the least Total Float) determines the Critical Path to the Contract Complete milestone.

#### 5.02 BASELINE CHANGE PROPOSALS

- A. Any major restructuring, original duration changes, re-logic or splitting of activities into additional area detail at any point in the progress of the project shall be accompanied by a written Baseline Change Proposal (BCP) from the Contractor. The proposed changes shall be reviewed by SNL within 10 days. SNL may reject the request for any reason at their discretion.

#### 5.03 CHANGE ORDERS

- A. For any Change Order requested, the Contractor shall indicate if the requested change impacts the schedule – individually or in aggregate. Under no circumstances will aggregate changes to the schedule be accepted unless the Contractor has submitted the change to the SDR for review.
- B. The Contractor shall create at least one new resource loaded activity for each approved Change Order.
  - 1. A new resource activity shall be created for each subcontractor’s scope that is affected by the change order.
  - 2. This activity(s) shall accurately represent the approved, cost and scope to be performed.
  - 3. The activity(s) shall be added in the schedule sequence at the logical point the work should be performed.
  - 4. Added Change Order Activities shall be identified with the Change Order number followed by the Change Order description.
  - 5. Adding Change Order activities to the end of the base activity the new scope is derived from does not constitute thoughtful planning and may not be accepted by SNL. (The new scope may be required to complete before the base scope can continue, or it may be required to be performed in parallel with the base scope.) This type of analysis is encouraged to be performed prior to placing the activity(s) into the logic.
- C. All time extension requests or changes that may affect the Contract End Date shall be accompanied by a written time impact analysis illustrating the influence of each change or delay on the current contract schedule completion date.
  - 1. The written impact analysis shall be accompanied by a fragmented schedule network using the Baseline Schedule. The fragmented schedule network shall be evaluated in the Baseline Schedule with no consideration given to the Stated Schedule.
  - 2. This narrative shall be included with each Change Order submitted that affects the Project Schedule and shall meet the details of the schedule information listed herein.
- D. Negotiations for contract extensions shall be considered only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining float along the path of activities at the time of actual delay.

1. Past performance on activities by the Contractor and the subcontractors along the completed and in-progress portion of the critical path shall be evaluated and included in any analysis to determine ownership of the delay.
2. Poor performance by the Contractor shall not warrant a contract extension.
3. Concurrent delays by the Contractor shall be subtracted from any proposed Owner delays.

## PART 6 - SCHEDULE OF VALUES AND PAYMENT PROCESS

### 6.01 Schedule of Values Development

- A. Within 30 calendar days of contract award, the Contractor shall submit a Schedule of Values for review. SNL shall review the Schedule of Values and provide comments to the Contractor within 5 days.
- B. The Schedule of Values shall be aligned with the SNL WBS and generated as a report from the scheduling software (P6).
- C. The Contractor shall resolve SNL's comments.
- D. The approved Schedule of Values shall be submitted with the invoice.
- E. The Schedule of Values shall be organized and based upon CSI Division 16 format with work package and subcontractors identified and sorted.

### 6.02 Payment Process and Invoice Verification

- A. The Contractor's invoice shall report costs at the subproject level consistent with the project WBS provided by Sandia in the Schedule Shell.
- B. At the time of close out for each invoicing period, the SNL SDR shall review and accept progress status, prior to invoicing. SNL will review the proposed Pay Application with the Contractor and verify any variations from the Contractor's record of progress.
  1. Invoice progress shall be recorded as "Percent Complete" (% Complete) in the Contractor's Schedule of Values at the Activity Level, as per the following definitions:
    - a. 0% - Physical work has not started; submittals have been returned to the Contractor; layout is complete
    - b. 30% - Physical work has started; if required, demolition has started and any portion of existing construction has been removed from the project location related to that activity; material is on site and being installed; equipment and manpower is being used to modify the site with respect to that activity; noticeable changes to the existing condition of the area being worked

- c. 60% - All physical work is ready for follow-up construction activity (i.e. – drywall installation is complete, but not taped or textured; underground trenches have been dug, but utility has not been installed, etc.).
  - d. 100% - All physical work is complete; all inspection deficiencies have been corrected; no further action is required, except for punchlist review; material and equipment is operationally ready for use; all finish and trim work is complete for that item, equipment, or system
- C. The Contractor shall furnish copies of the proposed invoice, Schedule of Values and requested percent complete to each party of the invoice review team.
- D. The earned value dollar amount [EV] in the month end statused schedule shall match the dollar amount being submitted in the Payment Invoice by the Contractor for that period.
- E. In such case that agreement between the SNL SDR and Contractor cannot be reached for any activity, the SNL SCR will make the final determination. Thereafter, the Contractor shall submit the Payment Invoice for the agreed upon progress to the SDR, adjust the earned value [status] in the schedule accordingly, and resubmit the month end status file.

END OF SECTION

## APPENDIX A

### SCHEDULE MILESTONES:

The schedule shall incorporate (but not be limited to) the following milestones as represent the scope of this contract:

1. Contract Award.
2. Design Notice To Proceed.
3. Design Package 1 Complete (SNL Proposes CIVIL/SITE, D/B may modify with SNL Written Approval)
4. Design Package 2 Complete (SNL Proposes STRUCTURAL/SHELL/ROOF, D/B may modify with SNL Written Approval)
5. Design Package 3 Complete (SNL Proposes MEP/FINISHES D/B may modify with SNL Written Approval)
6. Design Package 4 Complete (Optional)
7. Construction Field Offices Complete
8. Construction NTP
9. Grub/Rough Grade Complete
10. Over Excavation Complete
11. SOG Complete
12. Level 1 Structural Steel Complete
13. Level 2 Structural Steel Complete
14. Level 3 Structural Steel Complete
15. Roof Complete
16. Exterior Skin/Glazing Complete
17. Building Dry-In Complete
18. MEP Rough-In Complete
19. MEP Equipment Installed
20. Level 1 Office Above Ceiling Work Complete
21. Level 2 Office Above Ceiling Work Complete
22. Level 3 Office Above Ceiling Work Complete
23. Level 1 Office Finishes Complete
24. Level 2 Office Finishes Complete
25. Level 3 Office Finishes Complete
26. Landscape/Hardscape Complete
27. Electrical System Start-Up
28. Building Permanent Power Operational
29. HVAC Systems Start-Up
30. SFE Required – Transformer and Switch
31. SFE Required – Lighting Inverter
32. SFE Required – Communications Racks
33. SFE Required – Controls Programming
34. HVAC System Commissioned
35. Electrical System Commissioned
36. Fire Protection/Fire Alarm Commissioned
37. Communications System Complete
38. Security System Complete
39. Communication Rough-In Complete

40. SNL Above Ceiling Inspection – Office Level 1
41. SNL Above Ceiling Inspection – Office Level 2
42. SNL Above Ceiling Inspection – Office Level 3
43. Fire Protection Hydrostatic Test Complete
44. Fire Alarm Acceptance Test Complete
45. Doors and Hardware Complete
46. Contractor Punchlist Complete
47. SNL Punchlist Complete
48. HVAC Test and Balance Complete
49. Substantial Completion
50. Request for SNL Final Inspection
51. SNL Final Inspection Punchlist Complete
52. All As-Builts Submitted and Accepted By SNL
53. All O&M Manuals and Warranties Submitted
54. SNL Training On New Equipment Complete

Schedule Activities:

The schedule shall incorporate (but not limited to) the following activities:

1. General Conditions by month.
  2. Construction activities broken out by Subcontractor. (Co-ownership of an activity by more than one subcontractor is not allowed.)
  3. Testing and Start-up
  4. Submittals and Shop drawings: Preparation, review, and approval.
  5. Purchase, manufacture, fabrication, and delivery of major equipment.
  6. Pay Bill [Payment] activities for off-site vendors manufactured and/or fabricated equipment and/or materials delivered to the site.
  7. Critical inspection activities to be performed by SNL (i.e. Above Ceiling)
  8. SNL operated utilities or equipment shutdowns [outages].
  9. Close-out (such as O&M Manual Submittals).
  10. As-Built Drawings submittals.
  11. Systems Commissioning.
  12. Sandia Furnished Equipment (SFE) and Material (SFM).
- All items as specified in "Other Conditions" of the Contract

COMMODITIES:

Commodities are not required to be monitored for this contract.