

| Activity ID | Activity Description | Work Days | Early Start | Early Finish | Total Float | Fiscal Year |      |      |      |      |      |  |  |  |  |  |  |
|-------------|----------------------|-----------|-------------|--------------|-------------|-------------|------|------|------|------|------|--|--|--|--|--|--|
|             |                      |           |             |              |             | FY10        | FY11 | FY12 | FY13 | FY14 | FY15 |  |  |  |  |  |  |

## NSTX Upgrade Project

### Critical Decisions

| LEVEL I |                                 |   |  |          |   |
|---------|---------------------------------|---|--|----------|---|
| SD-3    | RESUME OPERATIONS (Early Start) | 0 |  | 29JUL14  | 2 |
| CD4     | CD4                             | 0 |  | 31MAR15* | 0 |

### Job: 1304 - Inner TF Bundle (Ds/Fab)-CHRZANOWSKI

#### Manufacture Inner TF Conductor

|            |  |     |          |         |    |
|------------|--|-----|----------|---------|----|
| 1304-0460  | Generate SOW for TF Conductor                    | 20  | 01OCT10* | 28OCT10 | 32 |
| 1304-0480  | Prep Req for TF Conductor & Submit to Proc       | 5   | 29OCT10  | 04NOV10 | 32 |
| 1304-0500  | Bid & Award TF Conductor-Copper Extrusions       | 30  | 05NOV10  | 20DEC10 | 32 |
| 1304-0600  | Manufacture TF Conductor-Copper Extrusions (80)  | 90  | 21DEC10  | 03MAY11 | 32 |
| 1304-0730  | Prep Req to Mach Conductors & Submit to Proc     | 5   | 16MAR11  | 22MAR11 | 32 |
| 1304-0740  | Bid & Award Contract to Machine Conductors       | 30  | 23MAR11  | 03MAY11 | 32 |
| 1304-0750  | Machine TF Conductors (Cng Grooves, Lead         | 65  | 04MAY11  | 04AUG11 | 32 |
| 1304-0750B | Deliver 2nd 20 Machined Conductors               | 1   | 05AUG11  | 05AUG11 | 32 |
| 1304-0770  | Prep Req for Cu-Cr-Zr TF Lead Extensions         | 10  | 20JAN11  | 02FEB11 | 32 |
| 1304-0780  | Bid & Award TF Lead Extensions                   | 30  | 03FEB11  | 16MAR11 | 32 |
| 1304-0790  | Fab & Del TF Lead Extensions                     | 100 | 17MAR11  | 05AUG11 | 32 |
| 1304-0830  | Prep Req for Friction Stir Welding               | 5   | 17JUN11  | 23JUN11 | 32 |
| 1304-0840  | Bid & Award Friction Stir Welding                | 30  | 24JUN11  | 05AUG11 | 32 |
| 1304-0850  | Friction Stir-Weld Coil Leads to Conductors      | 60  | 08AUG11  | 31OCT11 | 32 |
| 1304-0850B | Deliver 2nd 25 FSW conductors                    | 1   | 01NOV11  | 01NOV11 | 32 |
| 1304-0950  | Machine TF Conductors (Fnl Lead Areas & Inserts) | 40  | 02NOV11  | 06JAN12 | 32 |
| 1304-0950B | Receive Balance ofFinal Machined TF Cond         | 1   | 09JAN12  | 09JAN12 | 32 |

### Job: 1305 - OHMIC Heating Coil (OH)-CHRZANOWSKI

#### Inner TF Conductor Receipt/Inspection/Prep

|           |  |    |         |         |    |
|-----------|--|----|---------|---------|----|
| 1304-1310 | Inspect Machined TF Conductors           | 20 | 10JAN12 | 06FEB12 | 32 |
| 1304-1330 | Solder TF cooling tubes [40 conductors]  | 72 | 07FEB12 | 16MAY12 | 32 |
| 1304-1340 | Cleanup TF conductors- post solder       | 60 | 22MAR12 | 14JUN12 | 32 |
| 1304-1350 | Sandblast TF conductor length for primer | 40 | 15JUN12 | 10AUG12 | 32 |
| 1304-1360 | Apply primer [40 TF conductors]          | 5  | 13AUG12 | 17AUG12 | 32 |

#### Inner TF Quadrant 1

|           |                                   |    |         |         |    |
|-----------|-----------------------------------|----|---------|---------|----|
| 1304-1520 | Apply turn insulation Quadrant #1 | 5  | 06AUG12 | 10AUG12 | 32 |
| 1304-1530 | Assemble Quadrant #1              | 10 | 13AUG12 | 24AUG12 | 32 |
| 1304-1540 | Prepare VPI operation             | 3  | 27AUG12 | 29AUG12 | 32 |
| 1304-1550 | VPI- fill quadrant                | 2  | 30AUG12 | 31AUG12 | 32 |
| 1304-1560 | Cure VPI'd coil                   | 8  | 04SEP12 | 13SEP12 | 32 |
| 1304-1570 | Remove Quadrant #1 from mold      | 1  | 14SEP12 | 14SEP12 | 32 |
| 1304-1580 | Cleanup quadrant                  | 2  | 17SEP12 | 18SEP12 | 32 |
| 1304-1590 | Perform T/T electrical tests      | 1  | 19SEP12 | 19SEP12 | 32 |

#### Inner TF Quadrant 2

|           |                                   |   |         |         |    |
|-----------|-----------------------------------|---|---------|---------|----|
| 1304-1620 | Apply turn insulation Quadrant #2 | 5 | 20SEP12 | 26SEP12 | 32 |
| 1304-1630 | Assemble Quadrant #2              | 5 | 27SEP12 | 03OCT12 | 32 |
| 1304-1640 | Prepare VPI operation             | 3 | 04OCT12 | 08OCT12 | 32 |
| 1304-1650 | VPI- fill quadrant                | 2 | 09OCT12 | 10OCT12 | 32 |
| 1304-1660 | Cure VPI'd coil                   | 8 | 11OCT12 | 22OCT12 | 32 |
| 1304-1670 | Remove Quadrant #2 from mold      | 1 | 23OCT12 | 23OCT12 | 32 |
| 1304-1680 | Cleanup quadrant                  | 2 | 24OCT12 | 25OCT12 | 32 |
| 1304-1690 | Perform T/T electrical tests      | 1 | 26OCT12 | 26OCT12 | 32 |

#### Inner TF Quadrant 3

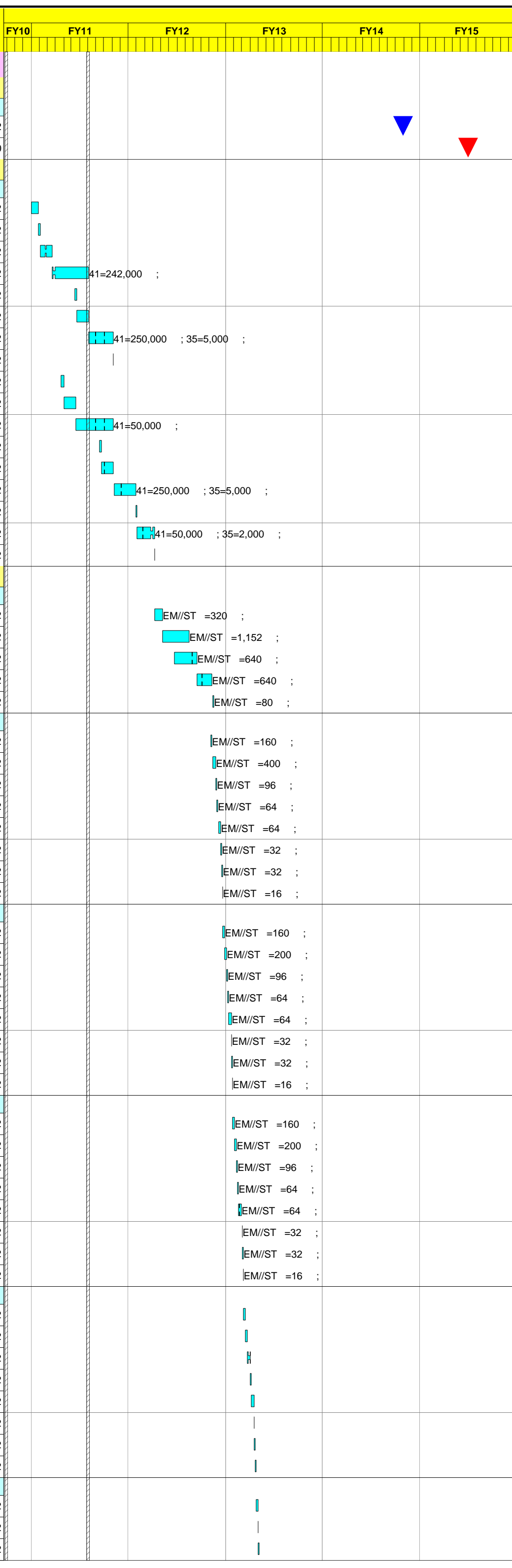
|           |                                   |   |         |         |    |
|-----------|-----------------------------------|---|---------|---------|----|
| 1304-1720 | Apply turn insulation Quadrant #3 | 5 | 29OCT12 | 02NOV12 | 32 |
| 1304-1730 | Assemble Quadrant #3              | 5 | 05NOV12 | 09NOV12 | 32 |
| 1304-1740 | Prepare VPI operation             | 3 | 12NOV12 | 14NOV12 | 32 |
| 1304-1750 | VPI- fill quadrant                | 2 | 15NOV12 | 16NOV12 | 32 |
| 1304-1760 | Cure VPI'd coil                   | 8 | 19NOV12 | 30NOV12 | 32 |
| 1304-1770 | Remove Quadrant #3 from mold      | 1 | 03DEC12 | 03DEC12 | 32 |
| 1304-1780 | Cleanup quadrant                  | 2 | 04DEC12 | 05DEC12 | 32 |
| 1304-1790 | Perform T/T electrical tests #4   | 1 | 06DEC12 | 06DEC12 | 32 |

#### Inner TF Quadrant 4

|           |                                   |   |         |         |    |
|-----------|-----------------------------------|---|---------|---------|----|
| 1304-1820 | Apply turn insulation Quadrant #4 | 5 | 07DEC12 | 13DEC12 | 32 |
| 1304-1830 | Assemble Quadrant #4              | 5 | 14DEC12 | 20DEC12 | 32 |
| 1304-1840 | Prepare VPI operation             | 3 | 21DEC12 | 02JAN13 | 32 |
| 1304-1850 | VPI- fill quadrant                | 2 | 03JAN13 | 04JAN13 | 32 |
| 1304-1860 | Cure VPI'd coil                   | 8 | 07JAN13 | 16JAN13 | 32 |
| 1304-1870 | Remove Quadrant #4 from mold      | 1 | 17JAN13 | 17JAN13 | 32 |
| 1304-1880 | Cleanup quadrant                  | 2 | 18JAN13 | 21JAN13 | 32 |
| 1304-1890 | Perform T/T electrical tests      | 1 | 22JAN13 | 22JAN13 | 32 |

#### Inner TF Coil Assemble Quadrants

|           |                             |   |         |         |    |
|-----------|-----------------------------|---|---------|---------|----|
| 1304-4800 | Assemble quadrants together | 5 | 23JAN13 | 29JAN13 | 32 |
| 1304-4900 | Apply groundwrap insulation | 2 | 30JAN13 | 31JAN13 | 32 |
| 1304-5000 | Prepare VPI operation       | 3 | 01FEB13 | 05FEB13 | 32 |



| Activity ID   | Activity Description                             | Work Days | Early Start | Early Finish | Total Float | Fiscal Year |      |      |      |      |      |  |      |      |      |      |      |
|---|--|-----------|-------------|--------------|-------------|-------------|------|------|------|------|------|--|------|------|------|------|------|
|   |  |           |             |              |             | FY10        | FY11 | FY12 | FY13 | FY14 | FY15 | FY10   | FY11 | FY12 | FY13 | FY14 | FY15 |
| 1304-5100   | VPI full TF coil                                 | 2         | 06FEB13     | 07FEB13      | 32          |             |      |      |      |      |      | EM//ST =64 ;   |      |      |      |      |      |
| 1304-5200   | Cure VPI'd coil                                  | 8         | 08FEB13     | 19FEB13      | 32          |             |      |      |      |      |      | EM//ST =64 ;   |      |      |      |      |      |
| 1304-5300   | Remove full TF from mold and cleanup             | 1         | 20FEB13     | 20FEB13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1304-5400   | Perform Final electrical tests                   | 1         | 21FEB13     | 21FEB13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1304-5500   | Transfer TF to OH station                        | 1         | 22FEB13     | 22FEB13      | 32          |             |      |      |      |      |      | EM//ST =40 ;   |      |      |      |      |      |
| <b>TF/OH Fabrication</b>                              |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| 1305-5600   | Prepare TF for OH winding                        | 5         | 25FEB13     | 01MAR13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-5700   | Install intermediate spacer between OH/TF bundle | 8         | 04MAR13     | 13MAR13      | 32          |             |      |      |      |      |      | EM//ST =192 ;  |      |      |      |      |      |
| 1305-5800   | Apply slip plane, and inner groundwall insulatio | 2         | 14MAR13     | 15MAR13      | 32          |             |      |      |      |      |      | EM//ST =32 ;   |      |      |      |      |      |
| 1305-5900   | Braze first lead and prepare for winding         | 5         | 18MAR13     | 22MAR13      | 32          |             |      |      |      |      |      | EM//ST =80 ;   |      |      |      |      |      |
| 1305-6000   | Wind 1st half of layer #1                        | 5         | 25MAR13     | 29MAR13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-6100   | Make [2] in-line brazes                          | 1         | 01APR13     | 01APR13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-6200   | Wind second half of layer #1                     | 5         | 02APR13     | 08APR13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-6300   | Perform prelim electrical tests                  | 1         | 09APR13     | 09APR13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-6400   | Braze layer to layer joint                       | 1         | 10APR13     | 10APR13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-6500   | Wind 1st half of layer #2                        | 5         | 11APR13     | 17APR13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-6600   | Make [2] in-line brazes                          | 1         | 18APR13     | 18APR13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-6700   | Wind second half of layer #2                     | 5         | 19APR13     | 25APR13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-6800   | Perform prelim electrical tests                  | 1         | 26APR13     | 26APR13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-6900   | Braze layer to layer joint                       | 1         | 29APR13     | 29APR13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-7000   | Wind 1st half of layer #3                        | 5         | 30APR13     | 06MAY13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-7100   | Make [2] in-line brazes                          | 1         | 07MAY13     | 07MAY13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-7200   | Wind second half of layer #3                     | 5         | 08MAY13     | 14MAY13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-7300   | Perform prelim electrical tests                  | 1         | 15MAY13     | 15MAY13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-7400   | Braze layer to layer joint                       | 2         | 16MAY13     | 17MAY13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-7500   | Wind 1st half of layer #4                        | 5         | 20MAY13     | 24MAY13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-7600   | Make [2] in-line brazes                          | 1         | 27MAY13     | 27MAY13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-7700   | Wind second half of layer #4                     | 5         | 28MAY13     | 03JUN13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-7800   | Apply groundwrap insulation                      | 1         | 04JUN13     | 04JUN13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-7900   | Mount OH mold around coil                        | 5         | 05JUN13     | 11JUN13      | 32          |             |      |      |      |      |      | EM//ST =160 ;  |      |      |      |      |      |
| 1305-8000   | Prepare VPI operation                            | 3         | 12JUN13     | 14JUN13      | 32          |             |      |      |      |      |      | EM//ST =96 ;   |      |      |      |      |      |
| 1305-8100   | VPI- mold  | 2         | 17JUN13     | 18JUN13      | 32          |             |      |      |      |      |      | EM//ST =64 ;   |      |      |      |      |      |
| 1305-8200   | Cure VPI'd coil                                  | 8         | 19JUN13     | 28JUN13      | 32          |             |      |      |      |      |      | EM//ST =64 ;   |      |      |      |      |      |
| 1305-8300   | Remove mold from OH coil                         | 1         | 01JUL13     | 01JUL13      | 32          |             |      |      |      |      |      | EM//ST =32 ;   |      |      |      |      |      |
| 1305-8400   | Cleanup OH coil                                  | 2         | 02JUL13     | 03JUL13      | 32          |             |      |      |      |      |      | EM//ST =32 ;   |      |      |      |      |      |
| 1305-8500   | Silverplate all electrical surfaces [OH/TF]      | 3         | 04JUL13     | 08JUL13      | 32          |             |      |      |      |      |      | EM//ST =24 ;   |      |      |      |      |      |
| 1305-8600   | Perform Final OH electrical tests                | 1         | 09JUL13     | 09JUL13      | 32          |             |      |      |      |      |      | EM//ST =16 ;   |      |      |      |      |      |
| 1305-8700   | Remove intermediate spacer between OH and TF     | 5         | 10JUL13     | 16JUL13      | 32          |             |      |      |      |      |      | EM//ST =120 ;  |      |      |      |      |      |
| 1305-8800   | Perform hydrostat and flow tests- OH/TF coils    | 3         | 17JUL13     | 19JUL13      | 32          |             |      |      |      |      |      | EM//ST =48 ;   |      |      |      |      |      |
| 1305-8900   | Transport to CS assembly station                 | 1         | 22JUL13     | 22JUL13      | 32          |             |      |      |      |      |      | EM//ST =40 ;   |      |      |      |      |      |
| <b>Job: 1302 - Center Stack Assembly-CHRZANOWSKI</b>  |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| 1302-0150   | Receive OH/TF Assembly                           | 1         | 23JUL13     | 23JUL13      | 32          |             |      |      |      |      |      |  |      |      |      |      |      |
| 1302-1500   | Assemble CS (OH Diag, Microtherm, Casing PFCs)   | 120       | 30AUG13*    | 13FEB14      | 5           |             |      |      |      |      |      | EM//SM =690 ; EM//ST =4,320 ;<br>41=20,000 ; 37=10,000 ; |      |      |      |      |      |
| 1302-1550   | Deliver CS to NTC                                | 1         | 14FEB14     | 14FEB14      | 5           |             |      |      |      |      |      |  |      |      |      |      |      |
| <b>Job: 8250 - Remove/Install Centerstack-PERRY</b>   |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| <b>Install New Centerstack</b>                        |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| 8250-129  | Lift in new centerstack (2 times)                | 4         | 17FEB14     | 20FEB14      | 5           |             |      |      |      |      |      | EM//ST =192 ; EM//SM =32 ;                               |      |      |      |      |      |
| 8250-133  | Check vacuum seals                               | 5         | 21FEB14     | 27FEB14      | 7           |             |      |      |      |      |      | EM//ST =120 ; EM//SM =40 ;                               |      |      |      |      |      |
| 8250-137  | Install new flex bus (3 times w/2 re-machinings) | 27        | 28FEB14     | 07APR14      | 7           |             |      |      |      |      |      | EM//ST =1,296 ; EM//SM =216 ;<br>41=2,000 ;              |      |      |      |      |      |
| 8250-141  | Install new umbrella (3 times w/2 re-machinings) | 6         | 08APR14     | 15APR14      | 7           |             |      |      |      |      |      | EM//ST =288 ; EM//SM =48 ;                               |      |      |      |      |      |
| <b>Close Vessel and Pumpdown</b>                      |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| 8250-145  | Clean, Photo, Close VV                           | 9         | 16APR14     | 28APR14      | 7           |             |      |      |      |      |      | EM//ST =576 ; EM//SM =72 ;                               |      |      |      |      |      |
| 8250-149  | Pumpdown   | 1         | 29APR14     | 29APR14      | 7           |             |      |      |      |      |      | EM//ST =48 ; EM//SM =08 ;                                |      |      |      |      |      |
| 8250-153  | Leak check                                       | 12        | 30APR14     | 15MAY14      | 7           |             |      |      |      |      |      | EM//ST =576 ; EM//SM =96 ;                               |      |      |      |      |      |
| 8250-157  | Setup for Bakeout                                | 5         | 16MAY14     | 22MAY14      | 7           |             |      |      |      |      |      | EM//ST =240 ; EM//SM =40 ;                               |      |      |      |      |      |
| 8250-161  | Rayleigh/Raman Scattering                        | 5         | 23MAY14     | 29MAY14      | 7           |             |      |      |      |      |      | EM//ST =80 ; EM//SM =40 ;                                |      |      |      |      |      |
| 8250-165  | Bakeout  | 16        | 30MAY14     | 20JUN14      | 7           |             |      |      |      |      |      |  |      |      |      |      |      |
| 8250-169  | Recover from bakeout & scrub                     | 7         | 23JUN14     | 01JUL14      | 7           |             |      |      |      |      |      |  |      |      |      |      |      |
| 8250-173  | Ready for ISTP                                   | 0         |             | 03JUL14      | 5           |             |      |      |      |      |      |  |      |      |      |      |      |
| <b>Job: 7900 - Integrated System Test-GENTILE</b>     |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| <b>Integrated System Testing (WBS 1.7 / Job 7900)</b> |  |           |             |              |             |             |      |      |      |      |      |  |      |      |      |      |      |
| 7900-140  | Perform ISTP                                     | 15        | 04JUL14     | 24JUL14      | 5           |             |      |      |      |      |      |  |      |      |      |      |      |
| 7900-999  | NSTX RESUME OPERATIONS                           | 0         |             | 24JUL14      | 5           |             |      |      |      |      |      |  |      |      |      |      |      |

Data Date 01OCT09  
Run Date 22JUL10 09:29

 Early Bar  
 Progress Bar  
 Critical Activity