# NATIONAL SPHERICAL TORUS EXPERIMENT UPGRADE PROJECT
## Engineering Change Proposal (ECP)
**Part I To be Completed by Originator**

Main Menu | Log | Print PDF

**ECP-099**

## COVER PAGE

Top

**Originator (CAM)** Chrzanowski

**Date Submitted** 9/16/2013

**ECP No.** 099

**ECP Title** The results of a bottom-up estimate and job review for Control Account 1305 added additional scope/budget per attached .pdf.

**Required Reviewers (Change Control Board)**
- ☒ Williams
- ☒ Strykowsky
- ☒ Dudek
- ☒ Stevenson
- ☒ Langish
- ☐ Other...

**Change Level** 2 Federal Project Director

# Approvals

| Change Level | Approving Official | Approval | Signature |
|---|---|---|---|
| 3 | NSTXU Project Manager | ■ Yes ☐ No | Ron Strykowsky — Digitally signed by Ron Strykowsky DN: cn=Ron Strykowsky, o, ou=PPPL, email=rstrykow@pppl.gov, c=US Date: 2013.09.30 09:31:41 -04'00' |
| 3a Expedited ECP | NSTXU Engineering Lead | ☐ Yes ☐ No | |
| 2 | NSTXU Federal Project Dir. | ■ Yes ☐ No | Anthony Indelicato — Digitally signed by Anthony Indelicato DN: cn=Anthony Indelicato, o=Princeton Site Office, ou=DOE-PSO, email=aindelicato@pppl.gov, c=US Date: 2013.09.30 13:22:12 -04'00' |
| 1 | Associated Director OFES | ☐ Yes ☐ No | |
| 0 | Deputy Secretary of Energy | ☐ Yes ☐ No | |

**Approval Date** 9/30/2013

- **Primavera Updated** ☐
- **Cobra Updated** ☐
- **WAD Updated** ☐
- **RAM Updated** ☐

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## PART I

**Originator (CAM)** Chrzanowski

**Date Submitted** 9/16/2013

**Type of ECP** ☒ Standard ☐ Expedited

**Type of Change** (Check all that apply) ☐ Technical ☒ Cost ☒ Schedule ☐ Editorial ☐ Other

**Reason for Change** The results of a bottom-up estimate and job review for Control Account 1305 added additional scope/budget per attached .pdf.

**Impacted WBS Elements**

☒ 1.1
☐ 1.2
☐ 1.3
☐ 1.4
☐ 1.5
☐ 1.6
☐ 1.7
☐ 1.8
☐ PEP
☐ Milestone
☐ Other...

**Control Accounts**

| | | | | |
|---|---|---|---|---|
| ☐ 1000 | ☐ 1306 | ☐ 2470 | ☐ 5000 | ☐ 8200 |
| ☐ 1001 | ☐ 1307 | ☐ 2475 | ☐ 5200 | ☐ 8210 |
| ☐ 1002 | ☐ 1310 | ☐ 2480 | ☐ 5501 | ☐ 8250 |
| ☐ 1200 | ☐ 2300 | ☐ 2485 | ☐ 6100 | ☐ Other... |
| ☐ 1300 | ☐ 2420 | ☐ 2490 | ☐ 7200 | |
| ☐ 1301 | ☐ 2425 | ☐ 3200 | ☐ 7300 | |
| ☐ 1302 | ☐ 2430 | ☐ 3300 | ☐ 7400 | |
| ☐ 1303 | ☐ 2440 | ☐ 3400 | ☐ 7100 | |
| ☐ 1304 | ☐ 2450 | ☐ 4100 | ☐ 7710 | |
| ☒ 1305 | ☐ 2460 | ☐ 4500 | ☐ 7900 | |

**Impacts of Change** (Briefly Describe) **Additional cost/schedule**

**Impact on Materials Parts Already Manuf.** ○ Yes ◉ No

**If yes, what is recommended disposition**

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Main Menu

Log

Print PDF

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## Detailed Description of Change

**Description of Change**

**The results of a bottom-up estimate and job review for Control Account 1305 added additional scope/budget per attached .pdf.**

**Contingency draw: $206,814.36**

**Submitted by:**

James H. Chrzanowski

Digitally signed by James H. Chrzanowski
DN: cn=James H. Chrzanowski, o=PPPL, ou=Mech Engineering, email=jchrzano@pppl.gov, c=US
Date: 2013.09.24 14:14:13 -04'00'

**Jim Chrzanowski**

**Reviewed by:**

Lawrence E. Dudek

Digitally signed by Lawrence E. Dudek
DN: cn=Lawrence E. Dudek, o=PPPL, ou=Fabrtication and Operations, email=ldudek@pppl.gov, c=US
Date: 2013.09.24 16:25:10 -04'00'

**Larry Dudek**

SUBMIT ECP

Do not fill in information below this point

**List of Attachments** ☐ **Primavera Schedule (Before/After)** ☐ **Cobra (Before/After)** ☐ **Other...**

# TF/OH FABRICATION AND CS ASSEMBLY

| Acitvity ID | Current Budget | New Budget | Delta Budget | Activity |
|---|---|---|---|---|
| 1304-5400 | $ 1,667.68 | $ 12,931.20 | $ 11,263.52 | Perform Final electrical tests (FULL TF) |
| 1305-5700A | $ 3,335.36 | $ 10,776.00 | $ 7,440.64 | Reposition TF to vertical position |
| 1305-5700B/C | $ 28,350.56 | $ 34,483.20 | $ 6,132.64 | Install Aquapour mold, fill and cure |
| 1305-5800 | $ 40,024.32 | $ 16,164.00 | $ (23,860.32) | Remove mold,apply slip plane & wet layup |
| 1305-5800A | $ - | $ 4,310.40 | $ 4,310.40 | Lower TF bundle to horizontal position |
| 1305-5800A | $ - | $ 8,620.80 | $ 8,620.80 | Transport TF to OH winding station |
| 1305-5600 | $ - | $ 21,552.00 | $ 21,552.00 | Prepare TF for OH winding |
| 1305-5900 | $ 16,676.80 | $ 21,552.00 | $ 4,875.20 | Braze first lead and prepare for winding |
| 1305-6000 | $ 16,676.80 | $ 32,328.00 | $ 15,651.20 | Wind 1st quarter of layer #1 |
| 1305-6100 | $ 8,338.40 | $ 8,620.80 | $ 282.40 | Make [2] in-line brazes |
| 1305-6200 | $ 13,341.44 | $ 13,793.28 | $ 451.84 | Wind second quarter of layer #1 |
| 1305-6200A | $ 6,670.72 | $ 6,896.64 | $ 225.92 | Make [2] in-line brazes |
| 1305-6200B | $ 10,006.08 | $ 12,931.20 | $ 2,925.12 | Wind third quarter of layer #1 |
| 1305-6200C | $ 5,003.04 | $ 6,465.60 | $ 1,462.56 | Make [2] in-line brazes |
| 1305-6200D | $ 10,006.08 | $ 12,931.20 | $ 2,925.12 | Wind forth quarter of layer #1 |
| 1305-6300 | $ 1,667.68 | $ 2,155.20 | $ 487.52 | Perform prelim electrical tests |
| 1305-6400 | $ 7,504.56 | $ 10,344.96 | $ 2,840.40 | Braze layer to layer joint & fittings |
| PT OF 6300 | $ - | $ 1,724.16 | $ 1,724.16 | Leak check fittings |
| 1305-6500 | $ 13,341.44 | $ 17,241.60 | $ 3,900.16 | Wind 1st quarter of layer #2 |
| 1305-6600 | $ 10,006.08 | $ 12,931.20 | $ 2,925.12 | Make [2] in-line brazes |
| 1305-6700 | $ 10,006.08 | $ 12,931.20 | $ 2,925.12 | Wind second quarter of layer #2 |
| 1305-6700A | $ 5,003.04 | $ 6,465.60 | $ 1,462.56 | Make [2] in-line brazes |
| 1305-6700B | $ 10,006.08 | $ 12,931.20 | $ 2,925.12 | Wind third quarter of layer #2 |
| 1305-6700C | $ 5,003.00 | $ 6,465.60 | $ 1,462.60 | Make [2] in-line brazes |
| 1305-6700D | $ 10,006.08 | $ 12,931.20 | $ 2,925.12 | Wind forth quarter of layer #2 |
| 1305-6800 | $ 1,667.68 | $ 2,155.20 | $ 487.52 | Perform prelim electrical tests |
| 1305-6900 | $ 5,003.04 | $ 10,344.96 | $ 5,341.92 | Braze layer to layer joint & fittings |
| PT OF 6800 | $ - | $ 1,724.16 | $ 1,724.16 | Leak check fittings |
| 1305-7000 | $ 13,793.28 | $ 17,241.60 | $ 3,448.32 | Wind 1st quarter of layer #3 |
| 1305-7100 | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Make [2] in-line brazes |
| 1305-7200 | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Wind second quarter of layer #3 |
| 1305-7200A | $ 5,172.48 | $ 6,465.60 | $ 1,293.12 | Make [2] in-line brazes |
| 1305-7200B | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Wind third quarter of layer #3 |
| 1305-7200C | $ 5,172.48 | $ 6,465.60 | $ 1,293.12 | Make [2] in-line brazes |
| 1305-7200D | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Wind forth quarter of layer #3 |
| 1305-7300 | $ 1,724.16 | $ 2,155.20 | $ 431.04 | Perform prelim electrical tests |
| 1304-7400 | $ 5,172.48 | $ 10,344.96 | $ 5,172.48 | Braze layer to layer joint & fittings |
| PT OF 7300 | $ - | $ 1,724.16 | $ 1,724.16 | Leak check fittings |
| 1305-7500 | $ 13,793.28 | $ 17,241.60 | $ 3,448.32 | Wind 1st quarter of layer #4 |
| 1305-7600 | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Make [2] in-line brazes |
| 1305-7700 | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Wind second quarter of layer #4 |
| 1305-7700A | $ 5,172.48 | $ 6,465.60 | $ 1,293.12 | Make [2] in-line brazes |
| 1305-7700B | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Wind third quarter of layer #4 |
| 1305-7700C | $ 5,172.48 | $ 6,465.60 | $ 1,293.12 | Make [2] in-line brazes |
| 1305-7700D | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Wind forth quarter of layer #4 |
| 1305-7700F | $ 5,172.48 | $ 6,465.60 | $ 1,293.12 | Make final lead brazes and fittings |
| PT OF 7700E | $ - | $ 1,724.16 | $ 1,724.16 | Leak test fittings |
| 1305-7700E | $ 1,724.16 | $ 3,448.32 | $ 1,724.16 | Perform prelim electrical tests |
| 1305-7800 | $ 10,344.96 | $ 21,552.00 | $ 11,207.04 | Apply groundwrap insulation |
| 1305-7900 | $ 34,483.20 | $ 21,552.00 | $ (12,931.20) | Mount OH mold around coil |
| 1305-8000 | $ 10,344.96 | $ 12,931.20 | $ 2,586.24 | Prepare VPI operation |
| 1305-8100 | $ 10,344.96 | $ 19,396.80 | $ 9,051.84 | VPI-OH Coil |
| 1305-8200 | $ 6,896.64 | $ 23,276.16 | $ 16,379.52 | Cure VPI'd coil |
| 1305-8300 | $ 3,448.32 | $ 12,931.20 | $ 9,482.88 | Remove mold from OH coil |
| 1305-8400 | $ 3,448.32 | $ 16,164.00 | $ 12,715.68 | Cleanup OH coil |
| 1305-8500 | $ 2,586.24 | $ 2,586.24 | $ - | Silverplate all electrical surfaces [OH/TF] |
| | | | | |
| 1305-8800 | $ 5,172.48 | $ 4,310.40 | $ (862.08) | Perform hydrostat and flow tests- OH/TF coils |
| 1305-8800C | $ - | $ 3,448.32 | $ 3,448.32 | Install temporary OH support structure |
| 1305-8800D | $ - | $ 8,620.80 | $ 8,620.80 | Position OH/TF in vertical position |
| 1305-8700 | $ 25,862.40 | $ 31,034.88 | $ 5,172.48 | Remove Aquapour between OH and TF bundles and dry |
| 1305-8600 | $ 1,724.16 | $ 3,448.32 | $ 1,724.16 | Perform Final electrical tests |
| 1305-8900 | $ 4,310.40 | $ 4,310.40 | $ - | Transport to CS Assembly Station |
| | | | $ 206,814.36 | |

# WAF/Change Control Board
# (ECP-097, -099)

## Date: September 23, 2013

**Attendees:**

| | Print | Signature |
|---|---|---|
| 1. | S.W. LANGISH | |
| 2. | T.N. STEVENSON | |
| 3. | L. DUDEK | |
| 4. | Jim Chrzanowski | |
| 5. | STRYKOWSKY | |
| 6. | THOMAS EGEBO | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| 11. | | |
| 12. | | |
| 13. | | |
| 14. | | |