

Task Order Plan (TOP)

Contract Number: NNM05AB50C
TO Title: ER43 Support
TO Number: 33-040312 **Revision:** 15

Period of Performance: 10/02/2010 to 9/30/2011

MSFC Initiator: Melissa Van Dyke

(b)(4)

Emergency: No

Revision 15:

The purpose of this revision is to extend this task into Contract Year 6 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October, 2, 2010 through September 30, 2011. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This revision affects the following: The Ares V Subelement AA and the Launch Abort System subelement EC are the same Subelements as in CY5. The Shuttle Subelement SA is a new Subelement. The other work Subelement 01 continues the work performed on CY5 Subelement XA. Subelements XA, XC and XD are closed with revision 15.

Subelement AA (WBS 206518.08.03.20)

Estimates (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement EC (WBS 644423.06.34.03.10.08)

Estimates (b)(4) labor hours of an (b)(4) Cost Category and 2 trips to support meetings for a total cost estimate of (b)(4)

Subelement SA (WBS 522094.08.01.01.03.01)

Estimates (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) labor hours of an (b)(4) cost category and 2 trips to support meetings for a total cost estimate of (b)(4)

Subelement 01 (WBS 725932.08.01.02.07)

Estimates (b)(4) labor hours of an (b)(4) Cost Category and 2 trips to support meetings for a total cost estimate of (b)(4)

Subelement XA (WBS 725932.08.01.02.01)

This subelement is closed and the work performed will continue on Subelement 01.

Subelement XC (WBS 522094.08.01.01.01)

This subelement is closed.

Subelement XD (WBS 411011.01.01.01.02)

This subelement is closed.

The total cost estimate for this Task Order is (b)(4)

Revision 14:

This Revision aligns scope, schedule and resources with current expectations for the remainder of the contract year. Changes by subelement are as follows:

Subelements CC, CD, CE, CF, CJ, CK, CL, CM, CN, and CO are administratively closed as of 7/3/2010.

Subelement AA (WBS 206518.08.03.20)

Removes (b)(4) of not needed travel and converts (b)(4) of travel to labor to support increased scope with the Ares V Core Stage thermal analysis.

Subelement EC (WBS 644423.06.34.03.10.08)

Converts travel estimate for two trips to ODC because the travel will not be needed and recruiting costs were incurred. Removes (b)(4) hours of an (b)(4) Cost Category, (b)(4) hours of an (b)(4) Cost Category, and (b)(4) hours of an (b)(4) Cost Category due to reprioritization of work by the analysts, and a decreased scope with the Launch Abort System solid motor thermal modeling.

Subelement XA (WBS 725932.08.01.02.01)

Adds (b)(4) hours of an (b)(4) Cost Category to support increase scope with the GFSSP program upgrade effort.

Subelement XD (WBS 411011.01.01.01.02)

Adds (b)(4) hours of an (b)(4) Cost Category to support increased scope with the GFSSP code development effort.

The total cost estimate for this Task Order is (b)(4)

Revision 13:

This revision modifies scope, schedule, and resources to support immediate additional work, not included in the previous revision. Additionally, the schedule and Performance Plan have been revised to reflect changes in task activities and requirements. This revision affects the Upper Stage Subelements CC, CF and CO, the First Stage Subelement CJ, and the Constellation subelement XD as follows:

Subelement CC (WBS 136905.08.04.01.08.08)

Converted (b)(4) labor hours of an (b)(4) Cost Category to ODC for training, which is required to assist in the support of task activities, for an unchanged cost estimate of (b)(4)

Subelement CF (WBS 136905.08.04.01.08.11)

Removed (b)(4) labor hours of an (b)(4) Cost Category due to a reduction of insight work required for the J-2X Nozzle. This reduction in scope is reflected in Section 1, Subelement CF, part (b). The cost estimate is decreased by (b)(4) for a total cost estimate of (b)(4)

Subelement CJ (WBS 136905.08.01.11)

Converted (b)(4) labor hours of an (b)(4) Cost Category to (b)(4) addition labor hours of an (b)(4) Cost Category and (b)(4) labor hours of an (b)(4) Cost Category and converted (b)(4) hours of an (b)(4) Cost Category to ODC for training. The labor conversion is required to accommodate work as stated in Section 9.0 and training is required to assist in the support of task activities. The cost estimate remains unchanged at a total cost estimate of (b)(4)

Subelement CO (WBS 136905.08.05.04.04.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip for a total cost estimate of (b)(4) for new work to support the Upper Stage Main Propulsion System. This is a new subelement.

Subelement XD (WBS 411011.01.01.01.02)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and training to support labor for a total cost estimate of (b)(4) for new work to support GFSSP Code Development. This is a new subelement.

The total cost estimate for this Task Order is (b)(4)

Revision 12:

This revision modifies scope, and resources to align with customer requests for immediate additional work, not included in the previous revision. Additionally, the Performance Plan has been revised to reflect changes in task activities. This revision modifies the Constellation subelement XA. Changes for subelement XA are as follows:

Subelement XA (WBS 725932.08.01.02.01)

Estimated 1 trip to support meetings and (b)(4) labor hours of an (b)(4) Cost Category to support the travel for a total cost estimate of (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 11:

The purpose of this revision is to extend this task into Contract Year 5 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October, 3, 2009 through October 14, 2010. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This revision affects the Ares V Subelement AA, the Upper Stage Engine Subelements CC, CD, CE, CF, CJ, CK, CL, CM, CN, the First Stage Subelement CJ, the Launch Abort System subelement EC, and the other Constellation work Subelement XC. Subelements XA and XB were closed under revision 11.

Changes by subelement are as follows:

Subelement AA (WBS 206518.08.03.20)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CC (WBS 136905.08.04.01.08.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CD (WBS 136905.08.04.01.08.09)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 2 trips to support meetings for a total cost estimate of (b)(4)

Subelement CE (WBS 136905.08.04.01.08.10)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CF (WBS 136905.08.04.01.08.11)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CJ (WBS 136905.08.01.11)

Estimated (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) hours of an (b)(4) Cost Category, 2 trips to support meetings, and recruiting costs for a total cost estimate of (b)(4)

Subelement CK (WBS 136905.08.05.13.05.01.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CL (WBS 136905.08.05.05.02.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CM (WBS 136905.08.05.06.06.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CN (WBS 136905.08.04.01.08.06)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement EC (WBS 644423.06.34.03.10.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) labor hours of an (b)(4) Cost Category, and 2 trips to support meetings for a total cost estimate of (b)(4)

Subelement XA (WBS 725932.08.01.02.01)

This subelement is closed.

Subelement XB (WBS 182306.06.01.08)

This subelement is closed.

Subelement XC (WBS 522094.08.01.01.01)

Estimated (b)(4) labor hours of an (b)(4) Cost Category for a total cost estimate of (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 10:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities. This revision modifies the Ares V subelement AA, the Upperstage subelements CC, CD, CE, CF, CK, CL, CM, CN, the Launch Abort System subelement EC, and the Constellation subelements XA, XB, and XC. Changes by subelement are as follows:

Subelement AA (WBS 206518.02.10)

Removes travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CC (WBS 136905.08.04.01.08.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate and removes all travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CD (WBS 136905.08.04.01.08.09)

Removes travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CE (WBS 136905.08.04.01.08.10)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CF (WBS 136905.08.04.01.08.11)

Removes travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CK (WBS 136905.08.05.04.06.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate and removes all travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CL (WBS 136905.08.05.05.02.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate and removes all travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CM (WBS 136905.08.05.06.06.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CN (WBS 136905.08.04.01.08.06)

Removes travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement EC (WBS 644423.06.34.03.10.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement XA (WBS 725932.08.01.02.01)

Removes travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement XB (WBS 182306.06.01.08)

Increases (b)(4) hours of an (b)(4) Cost Category labor estimate and removes all travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement XC (WBS 522094.08.01.01.01)

Adds (b)(4) labor hours of an (b)(4) Cost Category to accommodate new work for a cost increase of (b)(4)

The total estimate for this Task Order is (b)(4) which is a decrease of (b)(4) from the previous revision.

Revision 9:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities. This revision modifies the Upperstage subelements CE, CM, and the Launch Abort System subelement EC. Changes by subelement are as follows:

Subelement CE (WBS 136905.08.04.01.08.10)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate, moves (b)(4) hours of an (b)(4) Cost Category labor estimate from July, and August to September and removes all travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement CM (WBS 136905.08.05.06.06.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate and removes all travel costs due to reprioritization of the project needs for a cost decrease of (b)(4)

Subelement EC (WBS 644423.06.34.03.10.08)

Removes (b)(4) hours of an (b)(4) Cost Category labor estimate and moves (b)(4) hours of an (b)(4) Cost Category labor estimate from July, and August to September due to reprioritization of the project needs for a cost decrease of (b)(4)

The total estimate for this Task Order is (b)(4) which is a decrease of (b)(4) from the previous revision.

Revision 8:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities. This revision modifies the Upperstage subelements CK, CL, CM, the Launch Abort System subelement EC, and the Constellation subelements XB and XC. Changes by subelement are as follows:

Subelement CK (WBS 136905.08.05.04.06.08)

Convert (b)(4) hours of an (b)(4) Cost Category labor estimate to ODC to accommodate recruiting costs and moves (b)(4) of an (b)(4) Cost Category labor estimate from March, April, and May to September due to reprioritization of the project needs for an unchanged total cost estimate of (b)(4)

Subelement CL (WBS 136905.08.05.05.02.08)

Converts (b)(4) hours of an (b)(4) Cost Category labor estimate to ODC to accommodate recruiting costs and moves (b)(4) hours of an (b)(4) Cost Category labor estimate from March and April to September due to reprioritization of the project needs for an unchanged total cost estimate of (b)(4)

Subelement CM (WBS 136905.08.05.06.06.08)

Converts (b)(4) hours of an (b)(4) Cost Category labor estimate to ODC to accommodate recruiting costs and moves (b)(4) hours of an (b)(4) Cost Category labor estimate from March and April to September due to reprioritization of the project needs for an unchanged total cost estimate of (b)(4)

Subelement EC (WBS 644423.06.34.03.10.08)

Adds (b)(4) labor hours of an (b)(4) Cost Category to accommodate new work for a cost increase of (b)(4)

Subelement XB (WBS 182306.06.01.08)

Removes (b)(4) hours of an (b)(4) cost category labor to align with a reduced budget for this subelement, for a cost reduction of (b)(4)

Subelement XC (WBS 522094.08.01.01.01)

Adds (b)(4) labor hours of an (b)(4) Cost Category to accommodate new work for a cost increase of (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 7:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities. This revision adds the Launch Abort System subelement EC. The details for subelement EC are as follows:

Subelement EC (WBS 644423.06.34.03.10.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category for a total cost estimate of (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 6:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This revision modifies the First Stage subelement CF, adds the First Stage subelements CK, CL, CM, and CN, and adds other Constellation work (Subelement XC). Changes by subelement are as follows:

Subelement CF (WBS 136905.08.04.01.08.11)

Reduces (b)(4) hours of an (b)(4) cost category labor because the analyst scope of work has been reduced on this subelement to accommodate new work that is discussed in new subelement CN for a cost reduction of (b)(4)

Subelement CK (WBS 136905.08.05.04.06.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) in trip costs to support meetings, and recruiting costs for a total cost estimate of (b)(4)

Subelement CL (WBS 136905.08.05.05.02.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category, (b)(4) in trip costs to support meetings, and recruiting costs for a total cost estimate of (b)(4)

Subelement CM (WBS 136905.08.05.06.06.08)

Estimated (b)(4) hours of an (b)(4) Cost Category, (b)(4) in trip costs to support meetings, and recruiting costs for a total cost estimate of (b)(4)

Subelement CN (WBS 136905.08.04.01.08.06)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement XC (WBS 522094.08.01.01.01)

Estimated (b)(4) labor hours of an (b)(4) Cost Category for a total cost estimate of (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 5:

The purpose of this revision is to extend this task into Contract Year 4 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period September, 27, 2008 through October 2, 2009. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This revision affects the Upper Stage Engine (Subelements CC, CD, CE, and CF), the First Stage (Subelement CJ), Ares V (Subelement AA), and other Constellation work (Subelement XA and XB). Subelements 00, 01, CA, CB, CG, CH, CI, EA, and EB were closed under revision 5. Changes by subelement are as follows:

Subelement 00 (WBS 197009.10.02.01.02)

This subelement is closed. Work performed on this subelement will be continued under Task Order 33-040222-02, Shuttle Debris Transport Modeling and Analysis.

Subelement 01 (WBS 520871.08.01.01.02)

This subelement is closed. Work performed on this subelement will be continued under Task Order 33-040215-CA, Fluid Dynamics Support for Ares I First Stage CFD Analysis of Unsteady Flows.

Subelement AA (WBS 206518.02.10)

Estimated (b)(4) hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CA (WBS 136905.08.04.01.08.05)

This subelement is closed.

Subelement CB (WBS 136905.08.04.01.08.06)

This subelement is closed.

Subelement CC (WBS 136905.08.04.01.08.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CD (WBS 136905.08.04.01.08.09)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 2 trips to support meetings for a total cost estimate of (b)(4)

Subelement CE (WBS 136905.08.04.01.08.10)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement CF (WBS 136905.08.04.01.08.11)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 4 trips to support meetings for a total cost estimate of (b)(4)

Subelement CG (WBS 136905.08.01.11)

This subelement is closed. Work performed on this subelement will be continued under Task Order 33-040215-CA, Fluid Dynamics Support for Ares I First Stage CFD Analysis of Unsteady Flows and Task Order 33-040219-CC, Fluid Dynamics Support for Small Motors CFD Support for Ullage Settling Motors.

Subelement CH (WBS 253225.04.01.03.04)

This subelement is closed.

Subelement CI (WBS 136905.08.05.13.02.01.08)

This subelement is closed.

Subelement CJ (WBS 136905.08.01.11)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement EA (WBS 644423.06.34.03.10.08)

This subelement is closed. Work performed on this subelement will be continued under Task Order 33-040220-ED, Fluid Dynamics Support for Crew Exploration Vehicle CFD Support for Launch Abort System Motors.

Subelement EB (WBS 644423.06.34.03.10.08)

This subelement is closed.

Subelement XA (WBS 725932.08.01.02.01)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

Subelement XB (WBS 182306.06.01.08)

Estimated (b)(4) labor hours of an (b)(4) Cost Category and 1 trip to support meetings for a total cost estimate of (b)(4)

The total estimate for this Task Order is (b)(4)

Revision 04:

This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. Changes by subelement are as follows:

Subelement 00

Removes (b)(4) hours of an (b)(4) cost category labor estimate because the work has been performed with fewer than originally estimated hours, adds 1 trip to support a debris summit at the KSC, and adds relocation estimate to subelement 00.

Subelement CA

Converts (b)(4) hours of an (b)(4) cost category labor estimate to ODC to accommodate recruiting costs and removes (b)(4) hours of an (b)(4) Cost Category estimate because the work was performed with less than originally planned hours.

Subelement CB

Removes 1 trip on because the trip was not needed, converts (b)(4) hours of an (b)(4) cost category estimate to ODC for recruiting costs incurred, and removes (b)(4) hours of an (b)(4) cost category estimate because the work was performed with less than originally planned hours.

Subelement CC

Converts (b)(4) hours of an (b)(4) cost category labor estimate to ODC to accommodate recruiting costs and removes (b)(4) hours of an (b)(4) Cost Category estimate because the work was performed with less than originally planned hours.

Subelement CD

Adds 1 trip to support meetings.

Subelement CF

Removes (b)(4) hours of an (b)(4) Cost Category estimate because the work was performed with less than originally planned hours and increases the travel estimate by (b)(4)

Subelement CG

Adds ODC estimate for recruiting, removes (b)(4) hours of an (b)(4) Cost Category estimate because the work was performed with less than originally planned hours for, and removed (b)(4) of the subcontractor estimate because the work was performed with less than originally planned dollars.

Subelement CI

Converts (b)(4) hours of an (b)(4) cost category estimate to ODC for recruiting costs incurred, adds 1 trip to support the Thermal Fluids Analysis Workshop, and removes (b)(4) hours of an (b)(4) Cost Category estimate because the work was performed with less than originally planned hours.

Subelement EB

Decreases the labor estimate by (b)(4) hours of an (b)(4) cost category and added ODC estimate for recruiting and removes (b)(4) hours of an (b)(4) Cost Category estimate because the work was performed with less than originally planned hours.

The total increase in resources is (b)(4)

Revision 03: This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. In particular it removes (b)(4) hours of an (b)(4) cost category labor estimate for subelement CH, adds (b)(4) to the ODC estimate for subelement CI for recruiting costs, and increases the scope of subelement 00.

The total decrease in resources is (b)(4)

Revision 02: This revision modifies scope, schedule and resources to align with expectations for the remainder of the contract year. In particular it converts labor estimate to recruiting cost estimate for subelements CA and CF. Resource estimates are modified as follows:

Subelement – CA; Converted (b)(4) hours of labor estimate to recruiting estimate
Subelement – CC; Converted (b)(4) hours of labor estimate to recruiting estimate.

The total increase in resources is (b)(4)

The purposes of this revision (01) are to;

- 1) reduce the labor estimate for subelements CA and CC by (b)(4) hours each for an (b)(4) cost category due to recruiting for the thermal analyst position taking longer than originally estimated,
- 2) add one trip to subelement 00 to support a shuttle launch in February 2008,
- 3) reduce the scope of subelement 01 to align with a reduced budget for this subelement,
- 4) add 1 trip to support meetings for subelement CF,
- 5) Increased the estimate for subelement CG to include a one week training course in Solid Propellant Program (SPP),

- 6) Add subelement CH, Computational Fluid Dynamics Support for Propulsion and Cryogenic Advanced Development (PCAD).
- 7) Add subelement EB, Thermal Support for Launch Abort System (LAS), and
- 8) Add subelement CI, Thermal Support for Small Motors.

1.0 Task Order Description & Objectives

Subelement – 00 Shuttle Debris Transport Modeling and Analysis

This Subelement was closed under revision 5.

Subelement 01 - Code Development Support for Kennedy Space Center Launch Services

- (a) Develop code to assist in the modeling of thermo-fluid models created by the Generalized Fluid System Simulation Program (GFSSP) as required for the Kennedy Space Center (KSC) GFSSP program upgrade.
- (b) Perform model verification.
- (c) Develop supporting documentation.

Subelement AA – Thermal Support for Ares V

- (a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Ares V Trade Studies.
- (b) Support Ares V requirements reviews, interface definition and design reviews.
- (c) Participate in status meetings/presentations.
- (d) Perform model verification.
- (e) Develop supporting documentation.

Subelement CA – J-2X Engine Systems Hardware Thermal Support

This Subelement was closed under revision 5.

Subelement CB – J-2X Valves and Actuators Thermal Support

This Subelement was closed under revision 5.

Subelement CC – J-2X Turbopumps Thermal Support

This Subelement was closed under revision 14.

Subelement CD – J-2X Turbine Drive and Injectors Thermal Support

This Subelement was closed under revision 14.

Subelement CE – J-2X Main Combustion Chamber Thermal Support

This Subelement was closed under revision 14.

Subelement CF – J-2X Nozzle Thermal Support

This Subelement was closed under revision 14.

Subelement CG – Computational Fluid Dynamics Support for Crew Launch Vehicle

This Subelement was closed under revision 5.

Subelement CH – Computational Fluid Dynamics Support for Propulsion and Cryogenic Advanced Development

This Subelement was closed under revision 5.

Subelement CI - Thermal Support for Small Motors

This Subelement was closed under revision 5.

Subelement CJ – Thermal Support for First Stage Booster Reusable Solid Rocket Motor 5 Segment

This Subelement was closed under revision 14.

Subelement CK – Aero-thermal Support for Ullage Settling Motor Pod Structure

This Subelement was closed under revision 14.

Subelement CL –Thermal Support for Reaction Control System

This Subelement was closed under revision 14.

Subelement CM – Thermal Support for Roll Control System

This Subelement was closed under revision 14.

Subelement CN – Thermal Support for Electronic Control Unit

This Subelement was closed under revision 14.

Subelement CO – Thermal Support for Main Propulsion System

This Subelement was closed under revision 14.

Subelement EA – Computational Fluid Dynamics Support for the Launch Abort System This Subelement was closed under revision 5.

Subelement EB – Thermal Support for Launch Abort System

This Subelement was closed under revision 5.

Subelement EC – Thermal Support for Launch Abort System

(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Launch Abort System.

(b) Perform model verification.

(c) Develop supporting documentation.

Subelement SA – Thermal Support for Space Shuttle Main Engine

(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Space Shuttle Main Engine.

(b) Perform model verification.

(c) Develop supporting documentation.

Subelement XA – Thermal Support for Kennedy Space Center Launch Services

This subelement is closed and the work performed will continue on Subelement 01.

Subelement XB – Thermal Support for Altair

This Subelement was closed under revision 11.

Subelement XC – Thermal Support for Lunar Lander Descent Engine

This Subelement was closed under revision 15.

Subelement XD – Code Development Support for GFSSP

This Subelement was closed under revision 15.

2.0 Technical Approach (Including required input, guidelines & assumptions)

Subelement – 00 Shuttle Debris Transport Modeling and Analysis

This Subelement was closed under revision 5.

Subelement 01 – Code Development Support for Kennedy Space Center Launch Services

(a) Develop code to assist in the modeling of thermo-fluid models created by the Generalized Fluid System Simulation Program (GFSSP) as required for the Kennedy Space Center (KSC) GFSSP program upgrade.

(b) Perform model verification.

(c) Develop supporting documentation.

Subelement AA – Thermal Support for Ares V

(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Ares V Trade Studies.

(b) Support Ares V requirements reviews, interface definition and design reviews.

(c) Participate in status meetings/presentations.

(d) Perform model verification.

(e) Develop supporting documentation.-

Subelement CA – J-2X Engine Systems Hardware Thermal Support

This Subelement was closed under revision 5.

Subelement CB – J-2X Valves and Actuators Thermal Support

This Subelement was closed under revision 5.

Subelement CC – J-2X Turbopumps Thermal Support

This Subelement was closed under revision 14.

Subelement CD – J-2X Turbine Drive and Injectors Thermal Support

This Subelement was closed under revision 14.

Subelement CE – J-2X Main Combustion Chamber Thermal Support

This Subelement was closed under revision 14.

Subelement CF – J-2X Nozzle Thermal Support

This Subelement was closed under revision 14.

Subelement CG – Computational Fluid Dynamics Support for Crew Launch Vehicle

This Subelement was closed under revision 5.

Subelement CH – Computational Fluid Dynamics Support for Propulsion and Cryogenic Advanced Development

This Subelement was closed under revision 5.

Subelement CI - Thermal Support for Small Motors

This Subelement was closed under revision 5.

Subelement CJ – Thermal Support for First Stage Booster Reusable Solid Rocket Motor 5 Segment

This Subelement was closed under revision 14.

Subelement CK – Aero-thermal Support for Ullage Settling Motor Pod Structure

This Subelement was closed under revision 14.

Subelement CL – Thermal Support for Reaction Control System

This Subelement was closed under revision 14.

Subelement CM – Thermal Support for Roll Control System

This Subelement was closed under revision 14.

Subelement CN – Thermal Support for Electronic Control Unit

This Subelement was closed under revision 14.

Subelement CO – Thermal Support for Main Propulsion System

This Subelement was closed under revision 14.

Subelement EA – Computational Fluid Dynamics Support for the Launch Abort System This Subelement was closed under revision 5.

Subelement EB – Thermal Support for Launch Abort System

This Subelement was closed under revision 5.

Subelement EC – Thermal Support for Launch Abort System

(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Launch Abort System.

(b) Perform model verification.

(c) Develop supporting documentation.

Subelement SA – Thermal Support for Space Shuttle Main Engine

(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Space Shuttle Main Engine.

(b) Perform model verification.

(c) Develop supporting documentation.

Subelement XA – Thermal Support for Kennedy Space Center Launch Services

This subelement is closed and the work performed will continue on Subelement 01.

Subelement XB – Thermal Support for Altair

This Subelement was closed under revision 11.

Subelement XC – Thermal Support for Lunar Lander Descent Engine

This Subelement was closed under revision 15.

Subelement XD – Code Development Support for GFSSP

This Subelement was closed under revision 15.

3.0 Discussion of Skills Required

Engineers supporting this task should have a background in mechanical engineering and thermal analysis.

4.0 Special Tools Required

There are no special tools associated with this task.

5.0 Participating Subcontractors

Subelement – 00 Shuttle Debris Transport Modeling and Analysis

This Subelement was closed under revision 5.

Subelement 01 – Code Development Support for Kennedy Space Center Launch Services

There are no subcontractors associated with this task.

Subelement AA – Thermal Support for Ares V

There are no subcontractors associated with this task.

Subelement CA – J-2X Engine Systems Hardware Thermal Support

This Subelement was closed under revision 5.

Subelement CB – J-2X Valves and Actuators Thermal Support

This Subelement was closed under revision 5.

Subelement CC – J-2X Turbopumps Thermal Support

This Subelement was closed under revision 14.

Subelement CD – J-2X Turbine Drive and Injectors Thermal Support

This Subelement was closed under revision 14.

Subelement CE – J-2X Main Combustion Chamber Thermal Support

This Subelement was closed under revision 14.

Subelement CF – J-2X Nozzle Thermal Support

This Subelement was closed under revision 14.

Subelement CG – Computational Fluid Dynamics Support for Crew Launch Vehicle

This Subelement was closed under revision 5.

Subelement CH – Computational Fluid Dynamics Support for Propulsion and Cryogenic Advanced Development

This Subelement was closed under revision 5.

Subelement CI - Thermal Support for Small Motors

This Subelement was closed under revision 5.

Subelement CJ – Thermal Support for First Stage Booster Reusable Solid Rocket Motor 5 Segment

This Subelement was closed under revision 14.

Subelement CK – Aero-thermal Support for Ullage Settling Motor Pod Structure

This Subelement was closed under revision 14.

Subelement CL –Thermal Support for Reaction Control System

This Subelement was closed under revision 14.

Subelement CM – Thermal Support for Roll Control System

This Subelement was closed under revision 14.

Subelement CN – Thermal Support for Electronic Control Unit

This Subelement was closed under revision 14.

Subelement CO – Thermal Support for Main Propulsion System

This Subelement was closed under revision 14.

Subelement EA – Computational Fluid Dynamics Support for the Launch Abort System

This Subelement was closed under revision 5.

Subelement EB – Thermal Support for Launch Abort System

This Subelement was closed under revision 5.

Subelement EC – Thermal Support for Launch Abort System

There are no subcontractors associated with this task.

Subelement SA – Thermal Support for Space Shuttle Main Engine

There are no subcontractors associated with this task.

Subelement XA – Thermal Support for Kennedy Space Center Launch Services

This Subelement was closed under revision 15.

Subelement XB – Thermal Support for Altair

This Subelement was closed under revision 11.

Subelement XC – Thermal Support for Lunar Lander Descent Engine

This Subelement was closed under revision 15.

Subelement XD – Code Development Support for GFSSP

This Subelement was closed under revision 15.

6.0 Milestones & Deliverables

Subelement – 00 Shuttle Debris Transport Modeling and Analysis

This Subelement was closed under revision 5.

Subelement 01 – Code Development Support for Kennedy Space Center Launch Services

Monthly Activity Reports

Subelement AA – Thermal Support for Ares V

Monthly Activity Reports

Thermal Reports

Subelement CA – J-2X Engine Systems Hardware Thermal Support

This Subelement was closed under revision 5.

Subelement CB – J-2X Valves and Actuators Thermal Support

This Subelement was closed under revision 5.

Subelement CC – J-2X Turbopumps Thermal Support

This Subelement was closed under revision 14.

Subelement CD – J-2X Turbine Drive and Injectors Thermal Support

This Subelement was closed under revision 14.

Subelement CE – J-2X Main Combustion Chamber Thermal Support

This Subelement was closed under revision 14.

Subelement CF – J-2X Nozzle Thermal Support

This Subelement was closed under revision 14.

Subelement CG – Computational Fluid Dynamics Support for Crew Launch Vehicle

This Subelement was closed under revision 5.

Subelement CH – Computational Fluid Dynamics Support for Propulsion and Cryogenic Advanced Development

This Subelement was closed under revision 5.

Subelement CI - Thermal Support for Small Motors

This Subelement was closed under revision 5.

Subelement CJ – Thermal Support for First Stage Booster Reusable Solid Rocket Motor 5 Segment

This Subelement was closed under revision 14.

Subelement CK – Aero-thermal Support for Ullage Settling Motor Pod Structure

This Subelement was closed under revision 14.

Subelement CL –Thermal Support for Reaction Control System

This Subelement was closed under revision 14.

Subelement CM – Thermal Support for Roll Control System

This Subelement was closed under revision 14.

Subelement CN – Thermal Support for Electronic Control Unit

This Subelement was closed under revision 14.

Subelement CO – Thermal Support for Main Propulsion System

This Subelement was closed under revision 14.

Subelement EA – Computational Fluid Dynamics Support for the Launch Abort System

This Subelement was closed under revision 5.

Subelement EB – Thermal Support for Launch Abort System

This Subelement was closed under revision 5.

Subelement EC – Thermal Support for Launch Abort System

Monthly Activity Reports

Thermal Reports

Subelement SA – Thermal Support for Space Shuttle Main Engine

Monthly Activity Reports

Thermal Reports

Subelement XA – Thermal Support for Kennedy Space Center Launch Services

This Subelement was closed under revision 15.

Subelement XB – Thermal Support for Altair

This Subelement was closed under revision 11.

Subelement XC – Thermal Support for Lunar Lander Descent Engine

This Subelement was closed under revision 15.

Subelement XD – Code Development Support for GFSSP

This Subelement was closed under revision 15.

7.0 Special Considerations (Recruiting, Special Equipment / Material, Safety, etc.)

Subelement -00 Shuttle Debris Transport Modeling and Analysis

This Subelement was closed under revision 5.

Subelement 01 - Code Development Support for Kennedy Space Center Launch Services

Two trips will be needed to support meetings. The travel estimate is (b)(4)

Subelement AA – Thermal Support for Ares V

One trip will be needed to support meetings. The travel estimate is (b)(4)

Subelement CA – J-2X Engine Systems Hardware Thermal Support

This Subelement was closed under revision 5.

Subelement CB – J-2X Valves and Actuators Thermal Support

This Subelement was closed under revision 5.

Subelement CC – J-2X Turbopumps Thermal Support

This Subelement was closed under revision 14.

Subelement CD – J-2X Turbine Drive and Injectors Thermal Support

This Subelement was closed under revision 14.

Subelement CE – J-2X Main Combustion Chamber Thermal Support

This Subelement was closed under revision 14.

Subelement CF – J-2X Nozzle Thermal Support

This Subelement was closed under revision 14.

Subelement CG – Computational Fluid Dynamics Support for Crew Launch Vehicle

This Subelement was closed under revision 5.

Subelement CH – Computational Fluid Dynamics Support for Propulsion and Cryogenic Advanced Development

This Subelement was closed under revision 5.

Subelement CI - Thermal Support for Small Motors

This Subelement was closed under revision 5.

Subelement CJ – Thermal Support for First Stage Booster Reusable Solid Rocket Motor 5 Segment

This Subelement was closed under revision 14.

Subelement CK – Aero-thermal Support for Ullage Settling Motor Pod Structure

This Subelement was closed under revision 14.

Subelement CL –Thermal Support for Reaction Control System

This Subelement was closed under revision 14.

Subelement CM – Thermal Support for Roll Control System

This Subelement was closed under revision 14.

Subelement CN – Thermal Support for Electronic Control Unit

This Subelement was closed under revision 14.

Subelement CO – Thermal Support for Main Propulsion System

This Subelement was closed under revision 14.

Subelement EA – Computational Fluid Dynamics Support for the Launch Abort System

This Subelement was closed under revision 5.

Subelement EB – Thermal Support for Launch Abort System

This Subelement was closed under revision 5.

Subelement EC – Thermal Support for Launch Abort System

Two trips will be needed to support meetings. The travel estimate is (b)(4)

Subelement SA – Thermal Support for Space Shuttle Main Engine

Two trips will be needed to support meetings. The travel estimate is (b)(4)

Subelement XA – Thermal Support for Kennedy Space Center Launch Services

This Subelement was closed under revision 15.

Subelement XB – Thermal Support for Altair

This Subelement was closed under revision 11.

Subelement XC – Thermal Support for Lunar Lander Descent Engine

This Subelement was closed under revision 15.

Subelement XD – Code Development Support for GFSSP

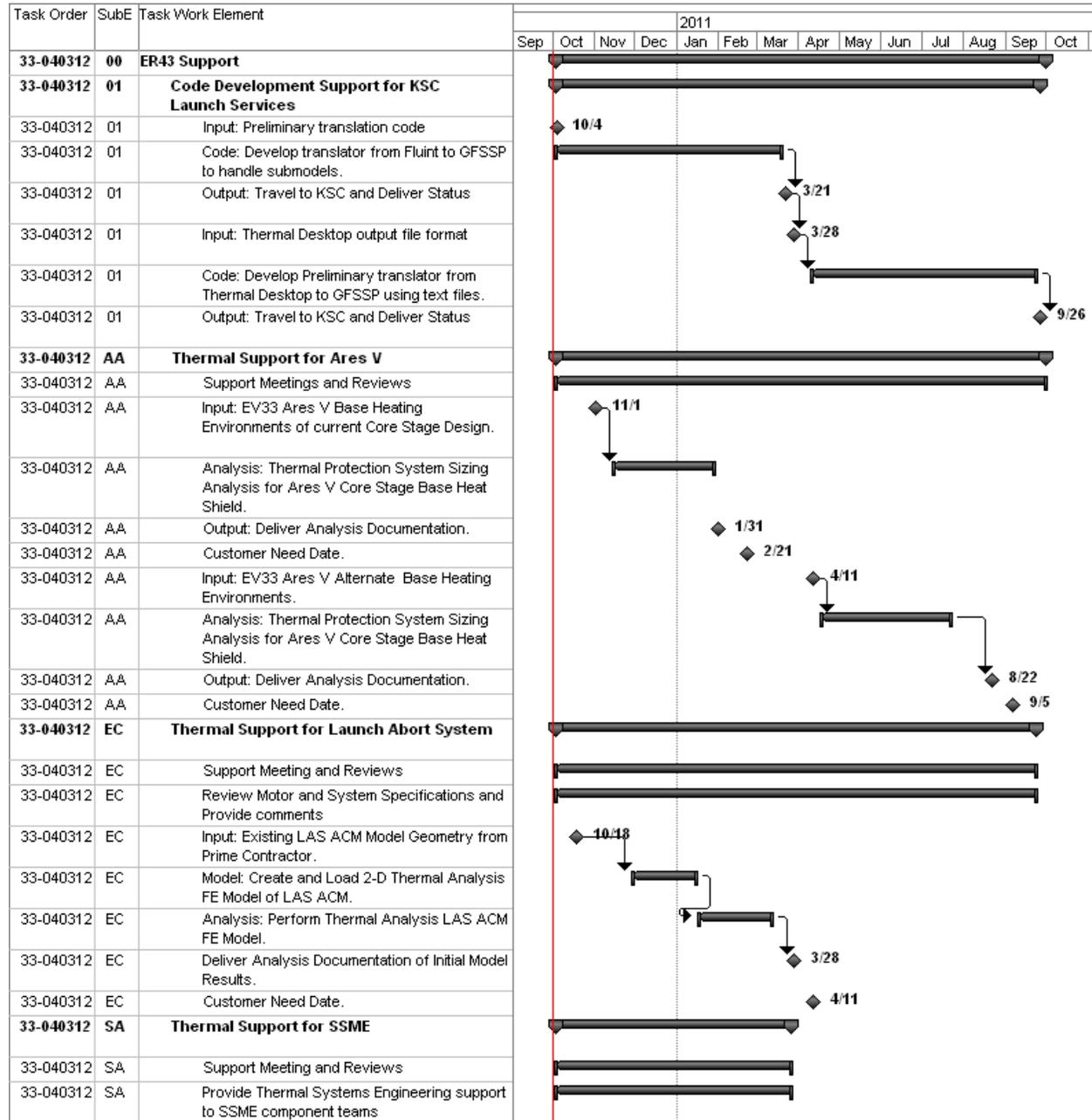
This Subelement was closed under revision 15.

8.0 Work Shelf

The following activities could be accomplished as part of the Task Order performance by personnel that are temporarily available due to program or funding delays on other Tasks. Specific assignments will be coordinated with the Task Initiator to ensure appropriate skills and experience.

TO/Subelement	Description	Due Date	Skill
None			

9.0 Schedule



ESTS Contract Task Order Request Performance Plan

Task Order Title: [ER43 Support](#)

Task Order Number: [33-040312](#) Revision: 15

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X <u>65%</u> = Justification
<p>Subelement 01 - Code Development Support for Kennedy Space Center Launch Services (WBS 725932.08.01.02.07)</p> <p>(a) Develop code to assist in the modeling of thermo-fluid models created by the Gene-ralized Fluid System Simulation Program (GFSSP) as required for the Kennedy Space Center (KSC) GFSSP program upgrade.</p> <p>(b) Perform model verification.</p> <p>(c) Develop supporting documentation.</p> <p>Subelement AA – Thermal Support for Ares V (WBS 206518.08.03.20)</p> <p>(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Ares V Trade Studies.</p> <p>(b) Support Ares V requirements reviews, interface definition and design reviews.</p> <p>(c) Participate in status meetings/presentations.</p> <p>(d) Perform model verification.</p> <p>(e) Develop supporting documentation.</p> <p>Subelement EC – Thermal Support for Launch Abort System (WBS 644423.06.34.03.10.08)</p> <p>(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as required for the Launch Abort System.</p> <p>(b) Perform model verification.</p> <p>(c) Develop supporting documentation.</p> <p>Subelement SA – Thermal Support for Space Shuttle Main Engine (WBS 522094.08.01.01.03.01)</p> <p>(a) Develop thermal mathematical models, using SINDA (preferably MSC SINDA) and any other appropriate thermal programs, as</p>		

ESTS Contract Task Order Request Performance Plan

Task Order Title: [ER43 Support](#)

Task Order Number: [33-040312](#) Revision: 15

<p>required for the Space Shuttle Main Engine. (b) Perform model verification. (c) Develop supporting documentation.</p>		
<p>Schedule Objectives (Milestones)</p>	<p>Weighting Schedule % <u>10%</u> (min 10%)</p>	<p>Schedule Score X <u>10%</u> = Justification</p>
<p>Subelement 01 - Code Development Support for Kennedy Space Center Launch Services (WBS 725932.08.01.02.07) Monthly Activity Reports</p> <p>Subelement AA – Thermal Support for Ares V (WBS 206518.08.03.20) Monthly Activity Reports Thermal Reports</p> <p>Subelement EC – Thermal Support for Launch Abort System (WBS 644423.06.34.03.10.08) Monthly Activity Reports Thermal Reports</p> <p>Subelement SA – Thermal Support for Space Shuttle Main Engine (WBS 522094.08.01.01.03.01) Monthly Activity Reports Thermal Reports</p>		
<p>Cost (actual vs. negotiated)</p>	<p>Weighting Cost% <u>25%</u> (min.25%)</p>	<p>Cost Score X <u>25%</u> = Justification</p>
	<p>Weighting Total % <u>100.00%</u></p>	<p>Total Score</p>

ESTS Contract Task Order Request Performance Plan

Task Order Title: [ER43 Support](#)

Task Order Number: [33-040312](#) Revision: [15](#)

Technical, Schedule, and Cost Grading Scale

Score	Description
9.0-10.0	Exceeded TO Performance Plan objectives resulting in major benefit(s)
8.0-8.9	Exceeded TO Performance Plan objectives resulting in modest benefit(s)
7.0-7.9	Met TO Performance Plan objectives
3.0-6.9	Did not meet all TO Performance Plan objectives resulting in minimal impact or requiring additional agency funds
0.0-2.9	Did not meet TO Performance Plan objectives resulting in substantial impact and/or requiring additional agency funds

ESTS Contract Task Order Request Performance Plan

Task Order Number: [ER43 Support](#)

Task Order Number: [33-040312](#) Revision: [15](#)

Comments:

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *ER43 Support*
TO Number: *33-040312* Revision: *15*

Period of Performance: *10/02/2010 to 9/30/2011*

MSFC Initiator: *Melissa Van Dyke*

(b)(4)

Task Order Risk Assessment to Cost, Technical, and Schedule

List identified risk associated with Task Order performance as related to task cost, technical, and schedule. Classify the risk(s) according to probability of occurrence and impact as defined below and enter the risk into risk matrix.

Risk	Risk Type	Probability (1-4)	Impact (1-4)	Risk Description
Risk C1	Cost	1	1	No cost risks have been identified for this Task Order.
Risk T1	Technical	1	1	No technical risks have been identified for this Task Order.
Risk S1	Schedule	1	1	No schedule risks have been identified for this Task Order.

*Note: See page 2 for risk mitigation plan for those risks which are Primary Risk Drivers.

