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| **Project Name:** | **sPHENIX Electromagnetic Calorimeter** | **Date Issued:** | **12/09/2022** |
| **WBS/Control Account Number:** | **WBS 1.3** | | |
| **Control Account Manager Name (CAM):** | **Craig Woody** | | |
| **Control Account Title:** | **EMCal** | | |

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| **Purpose:** |
| The purpose of this form is to document acknowledgement by authorized Control Account Manager and Project Manager that work has been completed as defined in the WBS Dictionary for the above Control Account and the corresponding system KPPs (defined in PEP/PMP) are met.  By answering YES to the following questions, you acknowledge all work has been completed and reconciles with the WBS Dictionary. Sign, date and return this form to Project Controls attention Chris Herbst, Bldg 490.  If NO is checked, please use the space below to provide details on all required modifications (additions and deletions) to the WBS Dictionary. Sign, date and return this form to Project Management Center (attention Chris Herbst, Bldg 490.) |

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| **Scope Baseline:** |
| WBS Dictionary (as per latest baseline): The Electromagnetic Calorimeter (EMCAL) For The sPHENIX Experiment At RHIC  The EMCal is organized into 64 sectors, each of which spans 11.25 degrees of azimuth. Twelve sectors (full-sized) cover pseudorapidity from 0 to 1.1 and the remaining 52 (3/4 size) cover pseudorapidity from 0 to 0.85. Two similar sectors are paired to cover positive and negative pseudorapidity for the same azimuthal angle range. The full-sized sectors are made of 24 rows of 4 physical blocks each (1152 total blocks) and the ¾ sized sectors are made of 18 rows of 4 blocks each (3744 total blocks), for a grand total of 4896 blocks. Each trapezoidal-shaped block is made of tungsten powder threaded by 2688 optical fibers each of 0.47 mm diameter, bound by epoxy and optically separated into 4 functional “towers”, for a total of 19,584 towers, with each tower viewed by 4 Silicon photomultipliers which in turn are read out by associated custom-designed fast front-end electronics with their associated low-voltage power, bias voltage for the silicon photomultipliers, cabling, control electronics, and digitizing electronics. |
| System KPPs (Objective and Threshold; as per latest baseline)  Live channels:  Threshold: ≥90% live channels based on LED, cosmics  Objective: ≥95% live channels based on LED, cosmics  Precalibration:  Threshold: Each sector w/ an absolute energy precalibration of ≤ 35% RMS  Objective: Same |

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| **KPPs achieved:** |
| Explain the KPPs achieved and how it is demonstrated. (Attach test results/ reports where applicable)  (See attached report) |

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| **Cost Baseline:** | | | | | | | | |
| Control Account Baseline Cost: $6,275,614 | | | | | | | | |
| Control Account Actual Cost: $7,112,533 | | | | | | | | |
| Control Account CPI: 0.88 | | | | | | | | |
| Estimate to Complete: $0 | | | | | | | | |
| Summary of cost overrun/ underrun:  There are two sources of negative CV of -$836,919  The first occurred when the MIE Project was baselined in September 2019. At this point all completed activities were removed from the baseline and actual costs to the date of the baselining substituted. However, invoices came in from a contractor for the EMCal blocks after this time, resulting in $300K of negative CV. In effect this is a false negative because the activities removed totaled about this amount, but due to the break in the accounting and EVMS indices at the time of baselining, it will persist.  The second amount, about $400K comes from extending the efforts of three technicians added to the effort in the middle of FY2021 to regain the schedule for the EMCal sectors in light of various delays incurred with COVID-19 absences, inability to procure epoxies at both the block factory and the sector factory in light of the slowdown in the national chemical industry due to the freeze during February 2021, and increased effort needed to produce the sectors compared to the baseline.  There are also some $83K of unpaid invoices that will further reduce the CV and CPI, to about CV = -$920K and CPI = 0.87. The work involved is complete. | | | | | | | | |
| **Questions: [*Check Yes or No]*** | | | | | | | |
| 1. Is all work scope for this Control Account complete (all activities per the project baseline attached to this form) | | | | | | | |
|  | Yes | | |  | | No | [If NO, indicate required actions in the below table] |
| 2. Does the WBS Dictionary accurately represent the work completed? | | | | | | | |
|  | Yes | |  | | No | | [If NO, explain in the below table] |
| 3. Any scope (affecting system KPPs) removed from project baseline after necessary approvals? | | | | | | | |
|  | Yes |  | | | No | | [If NO, reference the baseline change document in the table below] |
| 4. Any scope (not affecting the system KPPs) removed from project baseline after necessary approvals? | | | | | | | |
|  | Yes |  | | | No | | [If NO, reference the baseline change document in the table below] |

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| **Notes and Required Actions:** |
| 1. Activities required to complete all work in this Control Account, with expected finish dates: All activities are complete. |
| 1. WBS Dictionary requires the following changes: None |
| 1. The following scope (affecting system KPPs) has been removed from project baseline (Note: Prior approval required, refer baseline change documentation): None |
| 1. The following scope (not affecting system KPPs) has been removed from project baseline (Note: Prior approval required, refer baseline change documentation): None |

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| **Acknowledgements:** | | | | |
| I acknowledge all work is complete as defined in the WBS Dictionary and the system KPPs have been met for this Control Account.  Any remaining cost on this Control Account has been estimated thoroughly and documented in this report. | | | | |
| **Acknowledgement by CAM** | |  | **Acknowledgement by Project Manager** | |
| **CAM Name:** | **Craig Woody** | **Project Manager:** | **Glenn Young** |
| **Signature:** |  | **Signature:** |  |
| **Date:** | **12/9/2022** | **Date:** | **12/9/2022** |

Attachments:

1. P6 baseline
2. Current working file (with baseline attached)
3. Test results/ reports (if applicable)