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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.1.1** | | **WBS Title: Produce 68 inner staves** | |
| **WBS Dictionary Definition:**  Produce 68 inner staves. | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_X\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):**  **MAPS detector cost and schedule workshop: Santa Fe, 03/30-4/1, 2016**  https://indico.bnl.gov/conferenceOtherViews.py?view=standard&confId=1741 | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim and Dave Lee

**Assumptions Used in Developing Estimate:**

ALICE cost and schedule. Similar specs.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | 445,670 | **x** | **X** | 139,680 | **x** | **x** |
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|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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| Rev. 3 |  |  |
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| Rev. 5 |  |  |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.1.2** | | **WBS Title: Stave production full cost recovery of CERN manpower** | |
| **WBS Dictionary Definition:**  Stave production full cost recovery of CERN production. | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_\_X\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim and Dave Lee

Estimation from ALICE cost and schedule.

**Assumptions Used in Developing Estimate:**

Similar specs to sPHENIX.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **x** | **x** | **X** | 500,000 | **x** | **x** |
|  | | |  |  |  |  |  |  |
|  | | |  |  |  |  |  |  |
|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.1** | | **WBS Title: Procure 68 Readout/RDO Units** | |
| **WBS Dictionary Definition:**  Procure 68 Readout/RDO units | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_X\_\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Mark Prokop and Dave Lee

Estimation from ALICE cost and schedule and experience from FVTX/PHENIX project.

**Assumptions Used in Developing Estimate:**

Similar specs to sPHENIX.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **265,740** | **x** | **X** | 15,520 | **x** | **x** |
|  | | |  |  |  |  |  |  |
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|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| --- | --- | --- | --- |
|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.4** | | **WBS Title: Procure 34 Common Readout Units** | |
| **WBS Dictionary Definition:**  Procure 34 common readout units. | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_\_X\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_\_X\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Mark Prokop and Dave Lee

Estimation from ALICE cost and schedule and FVTX/PHENIX experience

**Assumptions Used in Developing Estimate:**

Similar specs to sPHENIX.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **181,700** | **x** | **X** | 1,520 | **x** | **x** |
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|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.4** | | **WBS Title: sPHENIX CRU production contingency** | |
| **WBS Dictionary Definition:**  sPHENIX CRU production contingency. | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_\_X\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_\_X\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Mark Prokop.

Estimation from ALICE cost and schedule and FVTX experience.

**Assumptions Used in Developing Estimate:**

Needed in case ALICE CRU is not compatible with sPHENIX DAQ.

**Cost Summary**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **x** | **x** | **X** | 90,000 | **x** | **x** |
|  | | |  |  |  |  |  |  |
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**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.6** | | **WBS Title: Procure Auxiliary Material (LVPS, cables, etc)** | |
| **WBS Dictionary Definition:**  Procure Auxiliary Material (LVPS, cables, etc ) | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_X\_\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim and Dave Lee

Estimation from ALICE cost and schedule and FVTX/PHENIX experience

**Assumptions Used in Developing Estimate:**

Similar specs to sPHENIX.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **100,000** | **x** | **X** | 1,552 | **x** | **x** |
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**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.8** | | **WBS Title: Procure Assembly Fixtures and Jigs** | |
| **WBS Dictionary Definition:**  Procure Assembly Fixtures and Jigs | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_\_X\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_\_X\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim.

Estimation from ALICE cost and schedule and FVTX experience.

**Assumptions Used in Developing Estimate:**

Similar specs to sPHENIX.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **100,000** | **x** | **X** | 1,552 | **x** | **x** |
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**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.12** | | **WBS Title: Procure service half barrel** | |
| **WBS Dictionary Definition:**  Procure service half barrel. | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_X\_\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim.

Estimation from ALICE cost and schedule and FVTX experience.

**Assumptions Used in Developing Estimate:**

Similar specs to sPHENIX.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **120,000** | **x** | **X** | 1,552 | **x** | **x** |
|  | | |  |  |  |  |  |  |
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|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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| Rev. 3 |  |  |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.5.2.2.14** | | **WBS Title: Procure two half support structures** | |
| **WBS Dictionary Definition:**  Procure two half support structures. | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_X\_\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim.

Estimation from ALICE cost and schedule.

**Assumptions Used in Developing Estimate:**

Similar specs.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **50,000** | **x** | **X** | **1,552** | **x** | **x** |
|  | | |  |  |  |  |  |  |
|  | | |  |  |  |  |  |  |
|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

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| **Revision No.** | **Description of Change** | **Change Date** |
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|  | **sPHENIX/MAPS Detector**  **Relativistic Heavy Ion Collider**  **BASIS of ESTIMATE (BoE)** | | **Date of Est:  08/26/2016** |
| **Prepared by:**  **Ming Liu** |
| **DocNo. (refer Rev. Log):** |
| **WBS number: 1.5.6.2** | | **WBS Title: Installation** | |
| **WBS Dictionary Definition:**  Installation | | | |
| **Estimate Type (check all that apply):**  \_\_\_ Work Complete  \_\_\_ Existing Purchase Order  \_\_\_ Catalog Listing or Industrial Construction Database  \_\_\_ Documented Vendor Quotation based on Drawings/ Sketches/ Specifications  \_\_\_ Budgetary Estimate by Vendor/Fabricator based on Sketches, Drawings, or other Written Correspondence  \_X\_\_ Engineering Estimate based on Similar Items or Procedures  \_\_\_ Engineering Estimate based on Analysis  \_X\_\_ Expert Opinion | | | |
| **Supporting Documents (including but not limited to):** | | | |

**Details of the Base Estimate (explanation of the Work)**

Expert: Walter Sondheim and Dave Lee

Estimation from FVTX experience and ALICE cost and schedule.

**Assumptions Used in Developing Estimate:**

Similar specs.

**Cost Summary**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | **Material**  **[$]** | **Designer**  **[d]** | **Engineer**  **[d]** | **Tech [$]** | **Physicist**  **[d]** | **Student**  **[d]** | |
| **Subsystem:** | | | **x** | **x** | **X** | 186,240 | **x** | **x** |
|  | | |  |  |  |  |  |  |
|  | | |  |  |  |  |  |  |
|  | | |  |  |  |  |  |  |

**Contingency**

M&S Contingency Rules Applied

NO

Labor Contingency Rules Applied

NO

**Comments:**

Will apply a global 40% contingency to the cost

**Risk Analysis:** **–** (To Be Completed by Subsystem Manager )

**Subsystem Manager: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Change Log**

|  |  |  |
| --- | --- | --- |
| **Revision No.** | **Description of Change** | **Change Date** |
| Rev. 1 |  |  |
| Rev. 2 |  |  |
| Rev. 3 |  |  |
| Rev. 4 |  |  |
| Rev. 5 |  |  |
|  |  |  |