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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** |
| Rev. 1 |   |   |
| Rev. 2 |   |   |
| 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** |
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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. 2 |   |   |
| 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: 1.5.5.2.2.1** | **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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| **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: 1.5.5.2.2.4** | **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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| Rev. 4 |   |   |
| 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: 1.5.5.2.2.4** | **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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| **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: 1.5.5.2.2.6** | **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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| Rev. 2 |   |   |
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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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|  | **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** |
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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: 1.5.6.2** | **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**

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