

| WBS 5 | Cryogenic Hydrogen Target | start date | end date | M&S or Labor | M & S & E Cost | External Skilled Paid Labor | Employee / Student | BOE (labor is max estimated requirement for task) | Funding Source | Cost to Sponsor | Contingency | Reason for Contingency | Total | |
|--------|--|------------|------------|-----------------|----------------|-----------------------------|--------------------|--|----------------|-----------------|-------------|---------------------------------------|---|-----------|
| 5.1 | Bring Cryolab to Safe Operating State | 1-Mar-2014 | 1-Jun-2014 | Both | \$18,000 | \$5,000 | \$2,000 | Internal University Proposal | GWU | \$0 | \$25,000 | Internal Funding Not Approved | \$25,000 | |
| 5.1.1 | Design Drawings | 1-Mar-2014 | 1-Jul-2014 | Labor | \$0 | \$20,000 | \$0 | Average Cost to Other Projects | PSI | \$0 | \$25,000 | Need to use another designer | \$25,000 | |
| 5.1.2 | Order Instrumentation, Hardware, and Monitoring Devices | 1-Jul-2014 | 1-Sep-2014 | Both | \$135,000 | \$0 | | Adjusted Cost based on other recent projects | NSF/DOE | \$135,000 | \$31,050 | price fluctuations | \$166,050 | |
| 5.1.3 | Order Cryopump - Cold Head | 1-Jul-2014 | 1-Sep-2014 | Equipment | \$30,000 | \$0 | | Internet Price Listings and adjusted cost to other recent projects - asking for quotes | NSF/DOE | \$30,000 | \$6,900 | price fluctuations - design variation | \$36,900 | |
| 5.1.4 | Order Components of Motion System | 1-Jul-2014 | 1-Sep-2014 | Equipment | \$35,000 | \$0 | | Adjusted costs from other recent projects | NSF/DOE | \$35,000 | \$8,050 | price fluctuations - design variation | \$43,050 | |
| 5.1.5 | Order Material/Supplies for Scattering Chamber, Cell, Target Ladder, Holders and Railings | 1-Jul-2014 | 1-Sep-2014 | M&S | \$14,000 | \$0 | | Adjusted costs from other recent projects | NSF/DOE | \$14,000 | \$3,220 | price fluctuations - design variation | \$17,220 | |
| 5.1.6 | Prototype Cells and Cell Holders Machining and Assembly | 1-Sep-2014 | 1-Nov-2014 | Labor | \$0 | \$10,000 | | 200 hrs \$50/hrs = \$10,000 Machinist -- two months each Tech and Students | NSF/DOE | \$10,000 | \$2,300 | price fluctuations - design variation | \$12,300 | |
| 5.1.7 | Build Test Stand Chameber | 1-Sep-2014 | 1-Nov-2014 | Labor | \$0 | \$5,000 | | 100 hrs \$50/hrs = \$5,000 Machinist --- two months each Tech and Students | NSF/DOE | \$5,000 | \$1,150 | price fluctuations - design variation | \$6,150 | |
| 5.1.8 | Pressure, Vacuum, Destructive Tests of Cell Prototypes | 1-Nov-2014 | 1-Jan-2015 | Labor | \$0 | \$0 | | Two months each for Tech, Postdoc, Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| 5.1.9 | Evaluation - Design Modification | 1-Jan-2014 | 1-Feb-2015 | Labor | \$0 | \$0 | | One month each for Tech, Postdoc, Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| 5.1.10 | Prototype of Modified Cells | 1-Feb-2015 | 1-Mar-2015 | Labor | \$0 | \$5,000 | | 100 hrs \$50/hrs = \$5,000 Machinist --- one month each Tech, Post Doc and Students | NSF/DOE | \$5,000 | \$1,150 | | \$6,150 | |
| 5.1.11 | Second Round of Tests - Cold Test of Cells | 1-Mar-2015 | 1-Apr-2015 | Labor | \$0 | \$0 | | One month each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| 5.1.13 | Final Review of Design and Modifications | 1-Apr-2015 | 1-May-2015 | Labor | \$0 | \$2,000 | | 40 hrs \$50/hrs = \$2000 Machinist --- one month each Tech, Post Doc and Students | NSF/DOE | \$2,000 | \$460 | | \$2,460 | |
| 5.1.14 | Construction of Scattering Chamber | 1-May-2015 | 1-Jul-2015 | Labor | \$0 | \$10,000 | | 200 hrs \$50/hrs = \$10,000 Machinist -- one month each Tech and Students | NSF/DOE | \$10,000 | \$2,300 | price fluctuations - design variation | \$12,300 | |
| 5.2.1 | Construction of Cells | 1-May-2015 | 1-Jul-2015 | Labor | \$0 | \$10,000 | | 200 hrs \$50/hrs = \$10,000 Machinist -- one month each Tech and Students | NSF/DOE | \$10,000 | \$2,300 | price fluctuations - design variation | \$12,300 | |
| 5.2.2 | Tests of Cells and Scattering Chamber | 1-Jul-2015 | 1-Sep-2015 | Labor | \$0 | \$0 | | Two months each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| 5.2.3 | Evaluation - Modifications | 1-Sep-2015 | 1-Oct-2015 | Labor | \$0 | \$5,000 | | 100 hrs \$50/hrs = \$5,000 Machinist --- one month each Tech, Post Doc and Students | NSF/DOE | \$5,000 | \$1,150 | | \$6,150 | |
| 5.2.4 | Second Round of Tests of Scattering Chamber and Cells Including motion test and test of emergency conditions | 1-Oct-2015 | 1-Dec-2015 | Labor | \$0 | \$0 | | One month each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| 5.2.5 | Evaluation and Readiness Review | 1-Dec-2015 | 1-Jan-2016 | Labor | \$0 | \$0 | | One month each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| 5.2.6 | Construct Boxes for Shipping and Packing | 1-Jan-2016 | 1-Feb-2016 | Both | \$1,000 | \$2,000 | | 40 hrs Carpentry Shop -- One month each Tech and Students | NSF/DOE | \$3,000 | \$690 | price fluctuations - design variation | \$3,690 | |
| 5.2.7 | Shipping, Receiving and Unpacking | 1-Feb-2016 | 1-Mar-2016 | Both | \$2,000 | \$0 | | One month each Tech and Students | NSF/DOE | \$2,000 | \$460 | price fluctuations | \$2,460 | |
| 5.2.8 | In Situ Assembly and Testing | 1-Mar-2016 | 1-Apr-2016 | Labor | \$0 | \$0 | | One month each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | design variation - unforeseen needs | \$0 | |
| 5.2.9 | PSI Safety Engineering Review and Modifications to Make Compliant | 1-Apr-2016 | 1-May-2016 | Labor | \$0 | \$0 | | One month each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | design variation - unforeseen needs | \$0 | |
| 5.3 | Turn over to PSI | 1-May-2016 | 1-Jun-2016 | Labor | \$0 | \$0 | | One month each Tech, Post Doc and Students | NSF/DOE | \$0 | \$0 | | \$0 | |
| | | | | cost to project | \$217,000 | \$49,000 | \$2,000 | | | | \$266,000 | \$111,180 | Does not include Travel, Fringe and indirects | \$377,180 |