UT-BATTELLE

High Power Hg Target Conceptual Design Review

Hg Target System Cost Estimate

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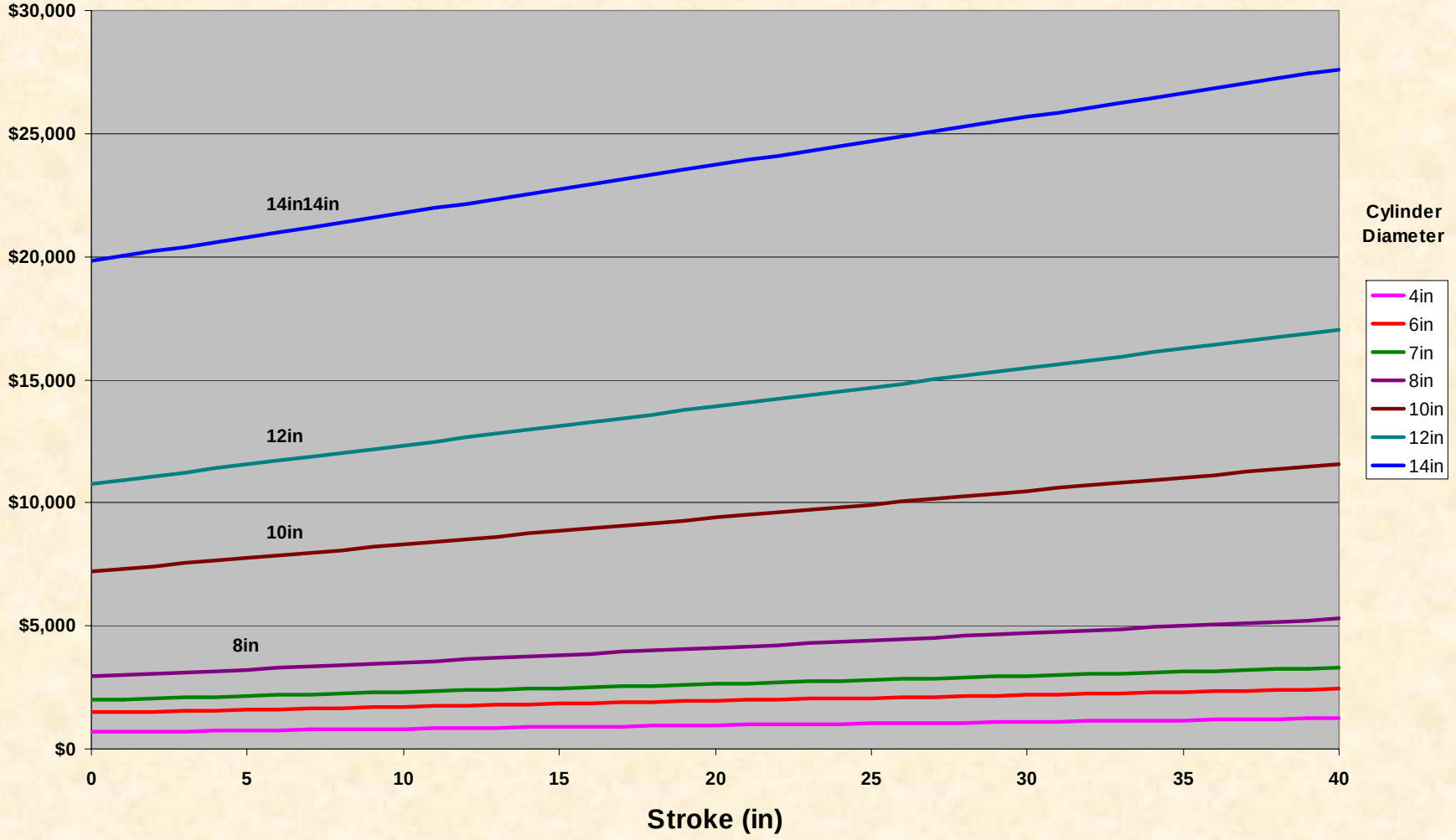
Outline

- **Procured systems**
  - **Syringe hydraulics**
  - **Instrumentation & controls**
- **Fabricated systems**
  - **Target module**
  - **Secondary containment**
  - **Support structures**
- **Mercury**

Cost estimate does not include items provided by others (beam windows, diagnostics)

Baseline Hydraulic Cylinder Costs



Syringe System Quotation

- **Hydraulic Power Unit**
  - **40gal reservoir**
  - **20hp elect motor w/ 12gpm variable displacement pump**
  - **Proportional directional control valve**
  - **Control panel**
- **Cylinder assembly**
  - **Two 4" bore, 40" stroke cylinders**
  - **One 8" bore, 40" stroke cylinder**
  - **Position sensor**
  - **Checkvalve & manual ball valve**
  - **Integrated on common baseplate**
- **Assembled and tested with water**
- **No hydraulic fluid supplied**
- **Total Cost: $37K**

DISCLAIMER – 8” cylinder operating on mercury: This cylinder is excluded from any warranty by Bosch Rexroth Corporation and L&H. No expressed or implied statements shall be applicable or considered. The recipient/user indemnifies and holds harmless Bosch Rexroth and L&H relative to usage, or otherwise, and under no circumstances hold Bosch Rexroth or L&H liable for incidental or consequential claim’s or damages, if such should arise from the above designated part number. No liability for delay of work for any cause whatsoever is considered and time is not of essence.

Instrumentation & Controls

Sensors	**$1000**
Control box (power supplies, housing for CompactPCI modules, etc)	**$500**
LabView control system (software & hardware)	**$5500**
Hg Vapor Monitor	**$5000**
Total	**$12000**

Material Costs

- **Material costs are experiencing almost daily fluctuations**
- **Per local fabricator, these are hopefully conservative numbers (today)**
  - **Aluminum: $4 / lb**
  - **Carbon Steel: $1.25 / lb**
  - **Stainless Steel: $4 / lb**

Estimated Materials Cost

Subsystem	*Material*	*Cost*
Sump	**SS**	**$1700**
Primary Containment	**SS**	**$800**
Secondary Containment	**SS**	**$5700**
Base Support	**AL**	**$4800**
	Total	**$13000**

Values based on 2X weight calculated in Solidworks

Estimated Labor Costs

Subsystem	*Hours*	*Cost*
Sump	**50**	**$2750**
Primary Containment	**120**	**$6600**
Secondary Containment	**60**	**$3300**
Base Support	**40**	**$2200**
	Total	**$17850**

Hours estimated by VBG, labor rate of $55/hr per local fab shop

Hg Cost

- **Quote obtained from Hg supplier for two different volumes**
  - **12 liters for centrifugal pump system**
  - **53 liters for 30sec jet syringe system**
- **Cost**
  - **12 liters: 368 lb @ $22.50/lb = $8280**
  - **53 liters: 1600 lb @ $18.90/lb = $30240**
- **20sec jet requires 36 liters (@ $20/lb = $21600)**
- **Hg provided in 16-lb bottles packaged for ground/ocean transport only**

System Cost Estimate

Component	*Est. Cost ($K)*
Syringe System	**$37**
Instruments & Controls	**$12**
Fabricated Components	**$31**
Mercury	**$22**
Total	**$102**