

# **RIA Cost Overview**

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# Topics

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- Total Estimated Cost (TEC) Summary
- History
- WBS Cost Breakdown
- Cost Book Format
- General Cost Basis
- Conclusion

# TEC Cost Summary

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- **ANL and MSU**
  - Independent site layouts and cost estimates were performed
    - ANL costs differ primarily by utilizing the existing elements of ATLAS for the RIB accelerator
    - Approach and details differ, yet **TEC the same** (within 2%)
    - MSU cost book used as basis for this presentation
- Both sites fund the office building separately

# TEC Cost Summary

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- ~ 695 M\$ Project “Total Estimated Cost” (TEC)
  - 2001 dollars – no escalation for inflation
  - Original 500 M\$ estimate concentrated on the Driver.
    - No in-flight capabilities
    - No multi-user capabilities
  - Detailed Target area and experimental facilities now included
    - Cost estimates have converged

# TEC Cost Summary

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- **Cost details will be presented in later talks**
- **Costs compare well with other similar projects (e.g. SNS)**
- **Experimental equipment trust fund (94 M\$ including contingency) based on white papers from LBL and NSCL.**
  - **Beam transport and utilities (e.g. LCW) paid for elsewhere.**
  - **Considered a trust fund of proper magnitude**
  - **Bottoms-up estimates consistent with fund**

# History

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- **NSAC (Sept. 98) Establishes an ISOL Task Force**
- **ISOL Instrumentation Paper (LBL March 99)**
  - “Experimental Equipment for an Advanced ISOL Facility”
  - Establishes ISOL equipment needs
- **ISOL Task Force (Sept. 99)**
  - “ISOL Task Force Report to NSAC”
  - 500 M\$ TEC includes some bottoms up support for the driver – no bottoms-up for post-driver accelerator

# History

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- **High Energy Instrumentation Paper (NSCL March 2000)**
  - “Scientific Opportunities with Fast Fragmentation Beams from RIA”
  - Establishes high energy equipment needs
- **RIA Cost Committee (today: Jan. 2001)**
  - First focus on entire facility.
  - Performed independently by ANL and MSU
  - Bottoms-Up estimate performed with existing staff.

# WBS Breakdown

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- **Level 0 – Project**  
(695M\$ TEC, TPC)
- **Level 1 – Systems**  
(e.g. Driver)
- **Level 2 – Components**  
(e.g. Low Beta Linac)
- **Level 3 - Elements**  
(e.g. Cryomodule)

# Cost Book

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- Overview, Site Layouts, Driver Layout, followed by tabulated WBS Levels 1, 2, 3 details, and white papers/reports.
- When available in greater detail, WBS Level 3 costs are tabulated by WBS index
- Last four sections include the “ISOL Task Force Report to NSAC”, the experimental facility white papers from LBL and NSCL, and the R&D Committee report.

# Cost Basis

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- Average **FTE** cost set at **150 K\$/MY** for ANL or MSU
- Project Contingency set at **20% for Civil and 35% for everything else** (~ 32% overall)
- Input solicited from ANL, Jlab, LBL, NSCL, Triumf(ISAC), ORNL(SNS), and others
- Recent NSCL CCP upgrade provided a detailed tracking database for materials and labor associated with magnetic and control elements

# Cost Basis

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- **Specific Sources**
  - **WBS 1 (Central Systems)**
    - Cryogenic Systems – Jlab estimate
    - Controls – Recent NSCL EPICS and PLC Upgrade
  - **WBS 2 (Civil Facilities)**
    - Civil – ANL and MSU architectural firms and contacts
  - **WBS 3 (Driver Systems)**
    - Front End – ANL, LBL estimate
    - Low Beta Linac – ANL and AES w/industry quotes
    - High Beta Linac – Jlab estimate / SNS elements

# Cost Basis

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- **Specific Sources (cont.)**
  - **WBS 4 (Experimental Systems)**
    - Magnetic Selection and Transport Elements – NSCL CCP Database
    - ISOL Selection and Transport Elements – ANL w/many catalog items
    - ISOL Detector Systems – Trust fund based on ISOL instrumentation white paper
    - High Energy Detector Systems – Trust fund based on High Energy instrumentation white paper

# WBS Level 1 Summary

	Experimental Facilities							Total
	Management, Computing, and Controls	Cryogenic Plant and Distribution	Driver	Exp. Safety and Control Systems	Target Systems	ISOL Facilities	High Energy Facilities	
<b>Central Facilities</b>	\$44.3	\$46.5						<b>\$90.8</b>
<b>Civil and Utilities</b>	\$28.1	\$4.7	\$27.0		\$18.9	\$26.2	\$21.6	<b>\$126.5</b>
<b>Driver</b>			\$213.5					<b>\$213.5</b>
<b>Experimental Facilities</b>				\$9.6	\$45.8	\$124.3	\$83.8	<b>\$263.5</b>
<b>MSU Total</b>	<b>\$72.5</b>	<b>\$51.2</b>	<b>\$240.4</b>	<b>\$9.6</b>	<b>\$64.6</b>	<b>\$150.5</b>	<b>\$105.4</b>	<b>\$694.3</b>
<b>- ANL Atlas</b>						-\$38.7		-38.7
<b>- ANL Other (e.g. civil)</b>								-15.6
<b>ANL Total</b>						<b>\$111.8</b>		<b>\$640.0</b>

# WBS Level 3

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- **Central Facilities**
- **Civil**
- **Driver**
- **Experimental**

# Conclusion

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- **Project TEC ~ 695 M\$**
  - Complete estimate (not just driver)
  - Includes ISOL and High Energy experimental facilities
  - Specifically – ANL = 640 M\$ and MSU = 694.3 M\$
- **Costs Converged**
  - Multiple cost exercises have yielded similar results
  - Independent cost exercises have yielded similar results
  - Costs compare with other institutions experience and/or projections (e.g. ISAC, SNS)