

FY 2004 Year End Self-Evaluation Report

IDENTIFICATION:		
Critical Outcome: 1.0 Objective: 1.1 Performance Measure: 1.1.1 Metric: 1.1.1.1	Excellence In Science & Technology Quality of Research High Energy and Nuclear Physics Collider Accelerator Department	
Responsible: D. Lowenstein		
APPENDIX B DESCRIPTION:		
Depending on the nature of the Collider Accelerator Department of High Energy and Nuclear Physics Research performed, reviewers will consider the following:		
Science: Success in producing original, creative scientific output that advances fundamental science and opens important new areas of inquiry; success in achieving sustained progress and impact on the field, and recognition from the scientific community, including awards, peer-reviewed publications, citations, and invited talks.		
Technology: Whether there is a solid technical base for the work, the intrinsic technical novelty of the research, the importance of technical contributions made to the scientific and engineering knowledge base underpinning the technology program, and recognition from the technical community.		
ACCOMPLISHMENTS:		
Significant Accomplishments:		
<ol style="list-style-type: none"> 1. RHIC delivered Au-Au collisions at 100GeV /nucleon and 31 GeV/nucleon. Delivered luminosity increased by a factor of; 21 (STAR), 15 (PHENIX), 13 (BRAHMS) and 7 (PHOBOS) over the previous Au-Au run. The integrated luminosity exceeded the physics target by a factor of 5 and our maximum projection by a factor of 3. 2. Polarized proton collision operations had its full complement of Siberian Snakes and spin rotators installed and operational. Polarization was routinely delivered at 40% polarization and above peak design luminosity. Longitudinal polarized protons were routinely delivered to the STAR and PHOBOS detectors 3. The NASA Space Radiation Laboratory (NSRL) started routine research operations upon the completion of BAF. Beams of carbon, oxygen, iron, titanium, silicon and protons were delivered. 4. Joint operation of NSRL and RHIC was established. 5. Beam extinction studies for KOPIO yielded excellent result of $\approx 10^{-5}$ at 10^{12} ppp. 10^{-3} is required at 7×10^{13} ppp. 6. The BNL part of the SNS Project at ORNL continued to meet all construction milestones at or below estimated costs. FY2004 BNL activity for this project was significantly reduced from FY 2003, as the BNL part nears completion in FY 2005. 		
Significant Awards:		
<ul style="list-style-type: none"> • V. Litvinenko - APS Fellow • J. Wei - APS Fellow • E. Beebe - Ion Source Prize, "High Brightness" • Pikin - Ion Source Prize, "High Brightness" 		

- E. Lessard - BNL Brookhaven Award
- J. Tuozzolo - BNL Engineering Award
- A. Zelenski - BNL Science & Technology Award

Publications:

No. of Peer Reviewed Pubs: 12
 No. of Internal Reports: 43
 No. of Books: 0
 No. of Other Pubs: 1

No. of Refereed Pubs: 12
 No. of Invited Papers: 14
 No. of Conf. Proceedings: 88

Patents, Disclosures, Licenses and Royalties:

- Combined patent application: Zener-diode Voltage Divider for Low-Energy, High-Intensity Electrostatic Accelerators, P. Thieberger, BNL 03-02, 1/04 and Regulation of Low Energy Particle Accelerators by Using Resonances in Nuclear Reactions, P. Thieberger, BNL 03-01, 1/04.
- Disclosure: Gasless, Plasmaless Electrostatic and Radiofrequency Structures for Separation and Transportation of Intense Low Energy ion Beams; Low Energy Ion Beam Propagator for Ion Implantation. A. Hershcovitch, 3/04.

Significant New Hires:

- Three new hires into C-A.
 - One Research Associate
 - Two replacements for staff lost through attrition
- C-A also supporting four summer students in Physics/Engineering

Proposals

- RHIC - Collider-Accelerator Operation
- RHIC Experiment Operations (partial)
- Spallation Neutron Source Project
- NASA - NASA Space Radiation Laboratory (NSRL)
- Cleanup of accelerator and experimental facilities previously used for high energy physics.

LDRD Initiatives:

None

Editorial Activity and Major Book Articles

E.T. Lessard, R. Karol, J. Scott, D. Passarello, Editors, Collider-Accelerator Safety Assessment Document.

I. Ben-Zvi, Editorial Board, Physics Review Special Topics, Accelerators and Beams.

D. Raparia, Editor, The AGS-Based Super Neutrino Beam Facility Conceptual Design Report.

I. Ben-Zvi, book article in Femtosecond Beam Science, M. Uesaka, Editor, Imperial College

Press, section on "Laser Photocathode RF Gun".

Technical Reviewer of IEEE Transaction of Plasma Science, Special Edition - A. Zhang.

Technical Reviewer of R&D Proposal for Advanced Technology R&D, DOE - A. Zhang.

Technical Committees:

Review of BNL:

- RHIC Detector Advisory Committee, November 22, 2004 - T. Roser.
- DOE Review of the RSVP Activities at BNL, January 27-28, 2004 - L. Ahrens, K. Brown, W. Fischer, C. Gardner, T. Roser, D. Lowenstein, P. Pile, J. Hauser, A. Pendzick.
- C-AD Machine Advisory Committee, March 10-11, 2004 - T. Roser, D. Lowenstein, W. Fischer, J. Alessi, E. Beebe, S. Pikin, D. Raparia, I. Ben-Zvi, A. Fedotov, J. Kewisch, V. Litvinenko, R. Calaga, M. Brennan, M. Blaskiewicz.
- DOE High-Energy Physics Review, April 22-23, 2004 - D. Lowenstein, T. Roser, P. Pile, J. Hauser.
- NSAC Heavy Ion Review, June 2-4, 2004 - T. Roser.
- DOE RHIC Program Review, June 30-July 1, 2004 - D. Lowenstein, T. Roser, P. Pile, J. Hauser, W. Fischer.

Service Activity for DOE Program and/or National/Regional Level:

- USPAS Governing Board - D. Lowenstein
- US/Russia Joint Coordinating Committee on Fundamental Properties of Matter - D. Lowenstein.
- US/Japan Committee for Cooperation in the Field of High Energy Physics - D. Lowenstein.
- Organizing Committee for the 2004 Beam Instrumentation Workshop - T. Russo.
- DOE Review of Argonne Tandem-Linac Accelerator Systems Operations, December 8-10, 2003, Argonne - D. Lowenstein.
- DOE SNS Review, May 11-13, 2004, ORNL - J. Wei, D. Lowenstein.
- National Superconducting Cyclotron Laboratory Operations Review, Michigan State University, June 13-15, 2004 - D. Lowenstein.
- SNS Accelerator Readiness Review, DTL Tanks 1-3 Commissioning, March 30-April 1, 2004 - E. Lessard, Chair.
- SNS Accelerator Readiness Review, DTL Tanks 4-6 and CCL 1-3 Commissioning, August 23-27, 2004 - E. Lessard, Chair.
- SNS Accelerator Readiness Review Committee - A. Etkin.
- American Physical Society Division of Particle Beams Executive Committee - F. Pilat.
- American Physical Society Division of Particle Beams Membership Committee - F. Pilat.
- LHC Reference Magnetic System Review Committee, July 27-28, 2004, CERN - F. Pilat.
- LHC Collimation System Review Committee, June 30-July 2, 2004, CERN - A. Drees.
- PAC 2005 Program Committee - F. Pilat, A. Zhang.
- Accelerator Technical Advisory Committee for the Japan Proton Accelerator Complex (J-PARC) - J. Wei
- Fermilab Director's Review Committee for the B-TeV Project - J. Wei.

- Guest Scientist for the Cooler Storage Ring (CSR) Project, Institute of Modern Physics, China - J. Wei.
- NSF Review Panel of EPP Accelerator Physics, July 12-13, 2004 - I. Ben-Zvi.
- DOE Review of UCLA/USC, May 18-20, 2004 - I. Ben-Zvi.
- DOE Review Panel of RIA R&D, December 15-16, 2004 - I. Ben-Zvi.
- DOE Review of the Linac Coherent Light Source, August 10-12, 2004 - I. Ben-Zvi.
- Member Stony brook University WISE Advisory Committee - A. Zhang.
- CSR Kicker Power Supply Test Team, Chinese Academy of Science, Institute of Modern Physics - A. Zhang.
- FNAL Run II DOE Mini-Review, October 8, 2003 - T. Roser.
- DOE SNS Review, November 4-6, 2003 - T. Roser, J. Wei.
- Fermilab Accelerator Advisory Committee Meeting, November 19-21, 2003 - T. Roser.
- FNAL Run II DOE Review, February 24-26, 2004 - T. Roser.
- J-PARC Accelerator-Technical Advisory , March 4-6, 2004 - T. Roser.
- Fermilab Accelerator Advisory Committee Meeting, May 10-12, 2004 - T. Roser.
- Jefferson Laboratory Science and Technology DOE NP Review, June 14-16, 2004 - T. Roser.
- BTeV CD-1 Reviews, April 27-29, 2004; May, 2004 - W. Fischer.
- SBIR Phase I, February 24, 2004 - W. Fischer.
- SBIR Phase II, April 5, 2004 - W. Fischer.
- LHC Machine Advisory Committee, CERN, July 12-14, 2004 - W. Fischer.

BNL Committees:

- C-A Department Committee Listing is on file in the Department Office.
- OPSEC - D. Lowenstein, P. Pile.
- SBMS Steering Committee - D. Lowenstein.
- PAAA Working Group - D. Lowenstein.
- Senior Neutrino Planning Committee - D. Lowenstein.
- Training & Qualifications Steering Committee - D. Lowenstein.
- BNL Reduction in Force Committee - D. Lowenstein.
- Contract Administration Committee – J. Hauser.
- Credit Card Committee- J. Hauser.
- E-Procurement Committee- J. Hauser
- SBMS Final Development Team - Family Medical leave, Medical Benefits, J. Hauser.
- Laboratory Environmental Safety and Health Committee - E. Lessard, Chair.
- BNL Radioactive Drug Research Committee - E. Lessard.
- BNL Radiological Control Working Group - E. Lessard.
- Laboratory Cryogenic Safety Subcommittee - E. Lessard, Chair.
- BNL OHSAS 18001 Implementation Team - E. Lessard
- BNL Institutional Review Board - E. Lessard.
- BNL Envoy Committee - J. Scott.
- BNL Central Shops Advisory Committee - J. Tuozzolo.
- Electrical Safety Committee - T. Nehring.
- Electrical Planning Committee - T. Nehring.
- ADS Review Committee - T. Nehring.

- Value Engineering Review Committee - T. Nehring.
- BNL Lecture Committee - F. Pilat, Vice-Chair.
- Brookhaven Council - J. Wei, J.M. Brennan.
- BNL Research Library Advisory Committee - M. Blaskiewicz.
- BNL Brookhaven Women in Science High School Career Days Committee - S. La Montagne, Chair.
- BNL Electronic Time Reporting Project Committee - S. La Montagne.
- BNL Physics Department Colloquium Committee - I. Ben-Zvi.
- BNL Women's Program Advisory Committee - A. Zhang.
- RHIC Planning Group - W. Fischer.
- BNL Laser Safety Committee - A. Etkin.
- SBMS Working with Chemicals Work Group - A. Etkin.
- SBMS Final Development Team on Radiation-Generating Devices Subject Area - A. Etkin.
- WOSH (Worker Occupational Safety and Health) Committee – Workers Only

Additional Comments: (Optional)

None

FY 2004 Year End Self-Evaluation Report

IDENTIFICATION:	
Critical Outcome: 1.0 Objective: 1.3 Performance Measure: 1.3.1 Metric: 1.3.1.1	Excellence In Science & Technology Success in Constructing and Operating Research Facilities High Energy and Nuclear Physics Collider Accelerator Department
Responsible: D. Lowenstein	
APPENDIX B DESCRIPTION:	
Determine whether the construction and commissioning of the Collider Accelerator Department of High Energy and Nuclear Physics new facilities is on-time and within budget, whether facility performance specifications and objectives are achieved, the reliability and safety of operations, adherence to planned schedules, and the cost-effectiveness of maintenance and facility improvements. Assess the quality, innovation and achievements in designing and developing new facilities that will provide the next generation of research tools. Consider whether the user access program is effective, efficient, and user-friendly, the quality of the proposal evaluation process, the strength and diversity of user participation, the productivity of the research supported, both in science and technology, and the level of satisfaction among user groups.	
ACCOMPLISHMENTS:	
Budget and Schedule Performance: C-A performance was outstanding. Financial performance was outstanding; all budgets were controlled and adhered to. Cost plans were on target.	
Facility Performance Assessment: C-A performance was outstanding. RHIC technical goals for FY 2004 were all either achieved or exceeded. Performance: <ul style="list-style-type: none"> • RHIC operational with gold-gold and polarized proton beams at experiment requested collision energy, all four experiments collecting data and publishing • Peak luminosity approx. $15 \times 10^{26} \text{cm}^{-2} \text{sec}^{-1}$ (Au-Au), $6 \times 10^{30} \text{cm}^{-2} \text{sec}^{-1}$ (p-p) • Average store luminosity $\sim 5 \times 10^{26} \text{cm}^{-2} \text{sec}^{-1}$ (Au-Au), $4 \times 10^{30} \text{cm}^{-2} \text{sec}^{-1}$ (p-p) • Au-Au integrated luminosity : 100GeV/u, $1370 \mu\text{b}^{-1}$ (Phenix), $1270 \mu\text{b}^{-1}$ (STAR), $560 \mu\text{b}^{-1}$ (Brahms), $540 \mu\text{b}^{-1}$ (Phobos) • AGS provided polarized protons with 50% polarization • RHIC polarized jet target commissioned and used to make first absolute polarization measurement of the proton beam in RHIC. • Acceleration of polarized protons to 100 GeV with average 40% polarization • RHIC routinely providing longitudinally polarized p-p collisions. • Time at store increased to 53% during collider running period • NASA Space Radiation Laboratory routinely operated with C, O, Fe, Ti, Si, and H beams 	

Facility Availability: HEP (AGS) = Not funded in FY2004 NP (RHIC) = 80.4%
User Survey Results: See T. Kirk
Additional Comments: (Optional) None

FY 2004 Year End Self-Evaluation Report

IDENTIFICATION:

Critical Outcome: 1.0 Objective: 1.3 Performance Measure: 1.3.6 Metric:	Excellence In Science & Technology Success in Constructing and Operating Research Facilities Spallation Neutron Source (SNS) Project
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Responsible: J. Wei

APPENDIX B DESCRIPTION:

Consider the extent to which BNL provides effective and efficient leadership in the development of the Spallation Neutron Source Project. In this project, the Laboratory will perform assigned tasks and produce scheduled deliverables for the Spallation Neutron Source in accordance with the Inter-Lab Memorandum of Agreement (MOA) and the approved annual work plans. Expectations for BNL performance in this area are reflected in the following Table.

Rating	Criteria
Outstanding	Deliver annual work plan elements below cost and ahead of schedule.
Excellent	Deliver annual work plan elements on cost and schedule, including up to 50% of contingency.
Good	Deliver annual work plan elements within BNL project cost and/or schedule, including greater than 50% but less than or equal to 100% of contingency.
Marginal	Delivery of annual work plan elements exceeding cost and/or schedule, including contingency, such that BNL project critical path is impacted.
Unsatisfactory	Delivery of annual work plan elements exceeding cost and/or schedule, including contingency, such that overall SNS project critical path is impacted.

ACCOMPLISHMENTS:

Progress on SNS:

The BNL part of the SNS Project at ORNL continued to meet all construction milestones at or below estimated costs. FY2004 BNL activity for this project was significantly reduced from FY 2003, as the BNL part nears completion in FY 2005.

Other Accomplishments:

None

Additional Comments: (Optional)

FY 2004 Year End Self-Evaluation Report

IDENTIFICATION:		
Critical Outcome: 1.0 Objective: 1.4 Performance Measure: 1.4.1 Metric: 1.4.1.1	Excellence In Science & Technology Effectiveness and Efficiency of Research Program Management High Energy and Nuclear Physics Collider Accelerator Department	
Responsible: D. Lowenstein		
APPENDIX B DESCRIPTION:		
Determine the effectiveness and efficiency of the Collider Accelerator Department of High Energy and Nuclear Physics research program management.		
ACCOMPLISHMENTS:		
Management Goals and Processes for Fiscal Year 2005: <ul style="list-style-type: none"> • Accelerator systems will continue to be improved to enhance research quality. • Accelerator operations will continue to be aligned with DOE mission. • Facility operations enhancements reviewed and approved by the DOE Division of Nuclear Physics • WFO planning to continue with NASA (AGS & NSRL) and with NSF for RSVP. • WFO planning to continue with SNS Project 		
New Associates Scientists (or Above) Hired: None		
New Research Associates Hired: One Research Associate		
Significant Improvements in Infrastructure and Management Systems that Support Research: <ul style="list-style-type: none"> • RHIC: cryogenic system, facility infrastructure, power supplies etc. have been repaired and implemented. Approx. 1 year at present funding left to go. • AGS: Warm helical partial Siberian Snake installed and commissioned. • RHIC Polarized Jet Target completed on schedule and on budget, successfully commissioned and operational. • LINAC: Polarized proton ion source is operational at record polarization • NSRL: successfully operated for FY 2004 running cycle • Proposal for EBIS/LINAC based preinjector for RHIC submitted. CD0 approved. 		
Safety Enhancements: <ul style="list-style-type: none"> • Implemented OHSAS 18001, Occupational Health and Safety Management Systems Specification. The Department is applying for third party registration in September 2004. • Completed update of Safety Assessment Document for the Collider –Accelerator Complex. • Completed risk assessment for all jobs and all facilities in the C-A Department. • Upgraded security for valuable materials at he Collider-Accelerator Complex. • Closed out 61% of OSHA non-compliances • Maintained ISO 14001 certification 		

Steps Toward Development of Next Generation Facilities and Research Tools:

- RHIC II: Electron cooling R&D vigorously underway with DOE support, including JLAB and BINP
- eRHIC: Conceptual design in collaboration with Bates Lab and BINP. ZDR completed.
- Neutrino Source: Conceptual design was completed
- RSVP: Canadian funding assured. NSF funding set for possible FY 2005 start. (possibly sooner)
- EBIS: R&D successfully completed. CD0 approved.
- RHIC stochastic cooling R&D underway.

Discussion of Make up of the Facility User Community:

See T. Kirk

Steps toward Improvement of Proposal Quality and Opportunities:

Not Applicable

List the Number of International Collaborations:

There are seven International Collaborations:

- CERN (Switzerland): Collider Beam Dynamics
- KEK (Japan): High Intensity Proton Synchrotron Systems
- TRIUMF (Canada), KEK (Japan) INR (Moscow-Russia): Polarized Proton H-minus Source
- GSI COSY, CELSIUS: Electron cooling simulation and benchmarking
- ITEP: Polarized Jet
- BINP (Novosibirsk-Russia): EBIS Ion Source Electron Gun
- BINP (Novosibirsk-Russia), AES, JINR (Dubna-Russia), JLAB: RHIC Electron Cooling

List of Projects/Programs Involving Collaborations with Others:

Non-DOE Funded Programs That Connect To DOE:

- NASA radiobiology at AGS and NSRL
- NSF High-Energy Physics RSVP experiments (R&D funding, construction possibly begins in FY 2005) TRIUMF etc.

Collaborations with Other Laboratories or Universities:

- SNS Project (ORNL)
- KEK (Japan) High Intensity Proton Synchrotron Systems
- TRIUMF (Canada), KEK (Japan) INR (Moscow-Russia) Polarized Proton H-minus Source
- ITEP Polarized Jet
- BINP (Novosibirsk-Russia) EBIS Ion Source Electron Gun
- BINP (Novosibirsk-Russia) AES, JINR (Dubna-Russia), TJNAF, RHIC Electron Cooling (RHIC II)
- ORNL, ANL, LANL, LBNL, JLAB on SNS Project
- CERN (Switzerland) Collider Beam Dynamics
- Bates (MIT) eRHIC R&D

Number of Users by Facility:

The number of users that were administered through the RHIC & AGS User's Center are as follows:

Experimental Facility	Users
AGS	213
ATF	26
NSRL	134
BRAHMS	44
e-RHIC	9
PHENIX	395
PHOBOS	61
PP2PP	8
RIKEN	9
STAR	439
TANDEM	115
Total	1453

List of WFO Projects and Sponsors:

- NASA Space Radiation Laboratory: NASA (operations begun FY 2003)
- RSVP: NSF

Staff Profile:	Tenured:	8	Professional:	105
	Continuing:	25	Technical:	222
	Term:	9	Administrative:	26
	Research Associates :	5	Management:	16
	Scientific Total:	47	Information Tech:	42
			Total:	458

*Note: Riken Fellows, Goldhaber Fellows, and Visiting Scientists included with Research Associates.

Funding Profile for the Last Seven (7) Years	2004:	\$115.4M
	2003:	\$134.3M
	2002:	\$133.1M
	2001:	\$127.8M
	2000:	\$116.5M
	1999:	N/A
	1998:	N/A

Other Awards:
None

Other Publications, Citations, Press Releases for this Fiscal Year::
None

Number of Co-Authored Papers, CRADS, etc.:

- CRADA # BNL-C-01-03, Non-Vacuum Electron Beam Welding with Accelaron Inc.
- CRADA # BNL-C-03-09, Highly Stripped Ion Sources for MeV Ion Implanters

Co-Authored Papers:

The majority of C-A publications have co-authors. As stated in Metric 1.1.1.1, Publications for FY 2004, C-A has a total of 170 publications that include peer reviewed and refereed publications, internal reports, invited papers, conference proceedings and other publications. The list of published documents is available from the C-A Department Chairman's Office

Additional Comments: (Optional)

None