

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**1.1 Is the program purpose clear?**

Answer: YES

Question Weight: 20%

**Explanation:** The mission of the High Energy Physics (HEP) program is to understand the universe at a more basic level by investigating the elementary particles that are the fundamental constituents of matter and the forces between them.

**Evidence:** FY 2004 Budget Request ([www.mbe.doe.gov/budget/04budget/index.htm](http://www.mbe.doe.gov/budget/04budget/index.htm)). Public Law 95-91 that established the Department of Energy (DOE).

**1.2 Does the program address a specific and existing problem, interest or need?**

Answer: YES

Question Weight: 20%

**Explanation:** The HEP program addresses several key questions: Can we realize Einstein's dream of a unified description of fundamental particles and forces in the universe?Where is the fundamental particle that endows all other particles with their masses?Are there additional or hidden dimensions of space-time?What are the masses of the neutrinos, and what is their role in the universe?Why is there more matter than anti-matter in the universe?What is the nature of the dark matter and the dark energy, which together make up more than 95% of the universe?

**Evidence:** FY04 Budget Request/Annual Performance Plan. High Energy Physics Advisory Panel (HEPAP) Long-Range Plan ([doe-hep.hep.net/hepap\\_reports.html](http://doe-hep.hep.net/hepap_reports.html)). Portions of the HEP program address: the National Research Council (NRC) reports "Physics in a New Era: An Overview"; "Connecting Quarks with the Cosmos: Eleven Science Questions for the New Century"; and "Astronomy & Astrophysics in the New Millennium" ([www7.nationalacademies.org/bpa/BPA\\_Reports.html](http://www7.nationalacademies.org/bpa/BPA_Reports.html)).

**1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort?**

Answer: YES

Question Weight: 20%

**Explanation:** The Office of Science (SC) HEP program is the principal source of federal funding for basic, long-term High Energy Physics research and much of particle astrophysics and cosmology research.

**Evidence:** About 90% of U.S. High Energy Physics research is supported by the HEP program. Much of the remaining portion is supported by the National Science Foundation and is coordinated through HEPAP, a joint advisory committee.

**1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency?**

Answer: YES

Question Weight: 20%

**Explanation:** The HEP program is based on competitive, merit-review, independent expert advice, and community planning. However, a COV has yet to validate the merit review system.

**Evidence:** HEPAP reviews and reports. ([doe-hep.hep.net/hepap\\_reports.html](http://doe-hep.hep.net/hepap_reports.html)). Program files.

**1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly?**

Answer: YES

Question Weight: 20%

**Explanation:** HEPAP ensure that input from the high energy physics research community is regularly gathered to assess the priorities, projects, and progress of the program. Peer review is used to assess the relevance and quality of each project.

**Evidence:** HEPAP reviews and reports. ([doe-hep.hep.net/hepap\\_reports.html](http://doe-hep.hep.net/hepap_reports.html)). Program files.

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**2.1 Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program?**      Answer: YES      Question Weight: 10%

**Explanation:** The six long-term measures, listed in priority order, reflect the key scientific drivers that the U.S. high energy physics community has outlined for the field for roughly the next decade. The program has defined "successful" and "minimally effective" performance milestones for each measure, and an external panel will assess interim program performance on a triennial basis, and update the measures as necessary. It is inappropriate for a basic research program such as this one to have a quantitative long-term efficiency measure.

**Evidence:** HEPAP Long-Range Plan ([doe-hep.hep.net/hepap\\_reports.html](http://doe-hep.hep.net/hepap_reports.html)). National Research Council (NRC) reports "Physics in a New Era: An Overview"; "Connecting Quarks with the Cosmos: Eleven Science Questions for the New Century"; and "Astronomy & Astrophysics in the New Millennium" ([www7.nationalacademies.org/bpa/BPA\\_Reports.html](http://www7.nationalacademies.org/bpa/BPA_Reports.html)). A description of the "successful" and "minimally effective" milestones, and an explanation of the relevance of these measures to the field can be found on the SC Web site ([www.sc.doe.gov/measures](http://www.sc.doe.gov/measures)).

**2.2 Does the program have ambitious targets and timeframes for its long-term measures?**      Answer: YES      Question Weight: 10%

**Explanation:** HEPAP has reviewed the long-term measures for this program and found them to be ambitious and meaningful indicators of progress in the field. The external reviews described in 2.1 will update the measures, targets, and timeframes on an interim basis.

**Evidence:** Letter from HEPAP chair regarding review of long-term measures.

**2.3 Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals?**      Answer: YES      Question Weight: 10%

**Explanation:** The quantitative annual output measures for facility construction and operations, and the data delivery goals for the two primary accelerators, serve as proxies for progress, because the efficient on-cost and on-schedule delivery of scientific data from these large facilities provides a critical resource necessary for continuing scientific discoveries that are directly connected to the long term goals of the program.

**Evidence:** FY04 Budget Request, previous GPRA reports. Website with further information, including explanation of units for data delivery measures ([www.sc.doe.gov/measures](http://www.sc.doe.gov/measures)).

**2.4 Does the program have baselines and ambitious targets for its annual measures?**      Answer: YES      Question Weight: 10%

**Explanation:** All of the annual measures have baseline data (FY01 and/or FY02) that demonstrate that the targets are ambitious, yet realistic. Based on past experience with the data delivery measures, a 20 percent tolerance is used to guard against facilities unwisely stressing hardware near the end of the fiscal year.

**Evidence:** FY04 Budget Request, previous GPRA reports. Construction variance target of <10% comes from OMB Circular A-11, especially Capital Programming Guide supplement.

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**2.5 Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program?** Answer: NO Question Weight: 10%

**Explanation:** A limited FY03 audit by the DOE Inspector General (IG) found that "performance expectations generally flowed down into the scope of work at the national laboratories." For individual grantees, HEP uses general solicitations that do not explicitly include program goals.

**Evidence:** Memo from the DOE IG to the Director of the Office of Science. M&O contract performance evaluation provisions (Fermilab, [www.fnal.gov/directorate/documents/DOE\\_Contract/appendixb.html](http://www.fnal.gov/directorate/documents/DOE_Contract/appendixb.html); SLAC, [www-group.slac.stanford.edu/bsd/contract/](http://www-group.slac.stanford.edu/bsd/contract/)). Most recent general renewal solicitation ([www.science.doe.gov/grants/Fr03-02.html](http://www.science.doe.gov/grants/Fr03-02.html)).

**2.6 Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?** Answer: NO Question Weight: 10%

**Explanation:** All research projects undergo merit review, ongoing grants are reviewed triennially, major facilities are reviewed annually, and construction projects are reviewed quarterly. While the program has a great number of reviews on its construction projects and facility operations in the case of the Tevatron at Fermilab, any portfolio-level reviews of the research program conducted by HEPAP have typically concerned the lab program only, and have lacked sufficient scope and depth. HEP is working to begin a Committee of Visitors (COV) review process for the program, and hopes to review the first program element in 2003.

**Evidence:** SC Merit Review guidelines ([www.sc.doe.gov/production/grants/merit.html](http://www.sc.doe.gov/production/grants/merit.html)) . Project reviews by advisory bodies ([doe-hep.hep.net/general\\_reports.htm](http://doe-hep.hep.net/general_reports.htm)). HEPAP reports ([doe-hep.hep.net/hepap\\_reports.html](http://doe-hep.hep.net/hepap_reports.html)). Program files, including Lehman review reports, and post-meeting summary letters from HEPAP chair to DOE and NSF.

**2.7 Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?** Answer: NO Question Weight: 10%

**Explanation:** DOE has not yet provided a budget request that adequately integrates performance information.

**Evidence:**

**2.8 Has the program taken meaningful steps to correct its strategic planning deficiencies?** Answer: YES Question Weight: 10%

**Explanation:** New long-term and annual performance goals and targets have been developed in coordination with OMB. A new COV process is being organized, with the first program element review to occur in 2003. The new Particle Physics Project Prioritization Panel ("P5") report is expected in September, 2003, though the Panel is only looking at a select number of new projects. HEP does not yet have independent reviews or a program strategic plan that considers new and ongoing projects, early project R&D, and facility operations within the context of the research program.

**Evidence:** COV charge letter from DOE to HEPAP chair. HEPAP Long-Range Plan and 20-year facilities plan ([doe-hep.hep.net/hepap.html](http://doe-hep.hep.net/hepap.html)). P5 Report due September, 2003 ([doe-hep.hep.net/p5/index.html](http://doe-hep.hep.net/p5/index.html)).

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**2.CA1**    **Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity?**    Answer: YES    Question Weight: 10%

**Explanation:** One of a kind research facilities are not amenable to the same type of alternatives analysis as other captial asset investments. Recent Lehman review of Tevatron complex considered cost, schedule, risk, and performance issues within the effort. The analysis provided to OMB in the predecisional Exhibit 300s is frequently not meaningful.

**Evidence:** Program files, including Lehman reviews and Exhibit 300s. Summary of recent Tevatron review ([doe-hep.hep.net/HEPAP/Jul2003/Lehman\\_HEPAP.pdf](http://doe-hep.hep.net/HEPAP/Jul2003/Lehman_HEPAP.pdf)).

**2.RD1**    **If applicable, does the program assess and compare the potential benefits of efforts within the program to other efforts that have similar goals?**    Answer: NA    Question Weight: 0%

**Explanation:** This is a basic R&D program, and the question is intended for industry-related R&D programs.

**Evidence:**

**2.RD2**    **Does the program use a prioritization process to guide budget requests and funding decisions?**    Answer: YES    Question Weight: 10%

**Explanation:** Although not visible outside DOE, internal SC budget formulation practices include a priority ranking process. The HEPAP long range plan identified strategic priorities for the U.S. particle physics community. Priorities for specific large projects will be independently evaluated by the Particle Physics Project Prioritization Panel ("P5"). HEPAP recommened a 20-year facilities plan for DOE as a part of the SC strategic planning process.

**Evidence:** HEPAP Long-Range Plan and 20-year facilities plan ([doe-hep.hep.net/hepap.html](http://doe-hep.hep.net/hepap.html)). P5 Report due September, 2003 ([doe-hep.hep.net/p5/index.html](http://doe-hep.hep.net/p5/index.html)).

**3.1**    **Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?**    Answer: NO    Question Weight: 8%

**Explanation:** A great deal of project performance information collected via Lehman facility construction and operations reviews, annual lab reviews, etc., and management changes are made in response to these reviews. The program collects performance data from individual grantees and national labs, and uses peer review as a type of standardized quality control at the individual grant level. However, there is not yet a systematic process, such as regular COV evaluations, that conducts research portfolio quality and process validations. While DOE IG contracts with an outside auditor to check internal controls for performance reporting, and the IG periodically conducts limited reviews of performance measurement in SC, it is not clear that these audits check the credibility of performance data reported by DOE contractors.

**Evidence:** Program files, including Lehman reviews and subprogram reviews. Reporting requirements for grants ([www.science.doe.gov/production/grants/605-19.html](http://www.science.doe.gov/production/grants/605-19.html)).

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**3.2 Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?** Answer: YES Question Weight: 8%

**Explanation:** Senior Executive Service (SES) and Program Manager Performance Plans are directly linked to program goals, and several high level management changes were recently carried out, partially in response to ongoing problems at the Tevatron. The Management and Operations contracts for the Labs and Facilities include performance measures linked to program goals. Research funding requirements ensure consideration of past performance.

**Evidence:** 10 CFR 605 ([www.science.doe.gov/production/grants/605index.html](http://www.science.doe.gov/production/grants/605index.html)). Program and personnel files, including consequences for underperforming lab and university research, grant renewal statistics, and implications for performance-based fee for the Fermilab contractor.

**3.3 Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose?** Answer: YES Question Weight: 8%

**Explanation:** Using DOE's monthly accounting reports, SC personnel monitor progress toward obligating funds consistent with an annual plan that is prepared at the beginning of the fiscal year to ensure alignment with appropriated purposes.

**Evidence:** SC programs consistently obligate more than 99.5% of available funds. Program files. Audit reports.

**3.4 Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution?** Answer: YES Question Weight: 8%

**Explanation:** SC is currently undergoing a reengineering exercise aimed at flattening organizational structure and improving program effectiveness. The program collects the data necessary to track the two "efficiency" measures for facility construction and operations management.

**Evidence:** SC reengineering information ([www.screstruct.doe.gov](http://www.screstruct.doe.gov)).

**3.5 Does the program collaborate and coordinate effectively with related programs?** Answer: YES Question Weight: 8%

**Explanation:** The HEP program is well coordinated with similar programs at NSF and NASA through joint advisory and assessment groups (HEPAP and SAGENAP) and joint oversight groups (JOGs) for specific projects. The program jointly funds a range of international and interagency projects.

**Evidence:** HEPAP ([doe-hep.hep.net/hepap.html](http://doe-hep.hep.net/hepap.html)) and SAGENAP ([doe-hep.hep.net/general\\_reports.htm](http://doe-hep.hep.net/general_reports.htm)). JOG Minutes. International agreements with Europe, Japan, and China. MOU with National Science Foundation for HEPAP and the Large Hadron Collider in Europe. Implementing agreement with NASA for primary instrument on the GLAST mission. Early planning process for a potential joint dark energy mission.

**3.6 Does the program use strong financial management practices?** Answer: YES Question Weight: 8%

**Explanation:** SC staff execute the HEP program consistent with established DOE budget and accounting policies and practices. These policies have been reviewed by external groups and modified as required to reflect the latest government standards.

**Evidence:** Various Departmental manuals. Program files. Audit reports.

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**3.7 Has the program taken meaningful steps to address its management deficiencies?** Answer: YES Question Weight: 8%

Explanation: SC is currently reengineering to improve program management efficiency. A Committee of Visitors (COV) process is being implemented. A layer of management above HEP was removed. Several management changes were recently made, partially in response to ongoing problems at the program's largest facility.

Evidence: SC reengineering information ([www.screstruct.doe.gov](http://www.screstruct.doe.gov)). SC reorganization memoranda.

**3.CA1 Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals?** Answer: YES Question Weight: 8%

Explanation: Facility critical decision points are documented and reviewed an independent Lehman review, and occasionally via an assessment by HEPAP or SAGENAP. Progress for ongoing efforts is tracked quarterly through program and Lehman reviews. The Tevatron luminosity upgrade was not "projectized," and this was a key problem that is finally being addressed.

Evidence: Program files, including Lehman reports and program peer reviews. SAGENAP reviews ([doe-hep.hep.net/general\\_reports.htm](http://doe-hep.hep.net/general_reports.htm)). Exhibit 300s.

**3.CO1 Are grants awarded based on a clear competitive process that includes a qualified assessment of merit?** Answer: NO Question Weight: 8%

Explanation: First time grant applications are encouraged in all Requests For Proposals. In addition, new or first-time scientists apply for funding through the Outstanding Junior Investigator award program. "Merit Review" guides all funding decisions. However, the award and merit review process has not yet been validated by a COV.

Evidence: In FY 2002, the HEP program funded 15 new research grants out of a total of 160 grants. Several of the new grants for junior investigators are incorporated as new "tasks" within existing grants.

**3.CO2 Does the program have oversight practices that provide sufficient knowledge of grantee activities?** Answer: YES Question Weight: 8%

Explanation: In addition to grantee reports, program managers stay in contact with grantees through email and telephone, conduct program reviews, video conferences and site visits, and have grantees participate in independent reviews of other projects.

Evidence: HEPAP and SAGENAP reports ([doe-hep.hep.net/general\\_reports.htm](http://doe-hep.hep.net/general_reports.htm)). Program files, including site visits and reviews.

**3.CO3 Does the program collect grantee performance data on an annual basis and make it available to the public in a transparent and meaningful manner?** Answer: NO Question Weight: 8%

Explanation: In accordance with DOE Order 241.1A, the final and annual technical reports of program grantees are made publicly available on the web through the Office of Scientific and Technical Information's "Information Bridge". However, program-level aggregate data on the impact of the grants program is not adequately communicated in the annual DOE Performance and Accountability report.

Evidence: DOE Order 241.1A. Information Bridge ([www.osti.gov/bridge/](http://www.osti.gov/bridge/)). FY02 Performance and Accountability Report ([www.mbe.doe.gov/stratmgt/doe02rpt.pdf](http://www.mbe.doe.gov/stratmgt/doe02rpt.pdf)).

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

- 3.RD1 For R&D programs other than competitive grants programs, does the program allocate funds and use management processes that maintain program quality?** Answer: NO Question Weight: 8%
- Explanation: Priorities are determined in accord with guidance from the HEPAP Long-Range Plan, and construction projects are reviewed regularly. Unsolicited field work proposals from the Federal Labs are merit reviewed, but not competed. The funds for research programs and scientific user facilities at the Federal Labs are allocated through a limited competition analogous process to the unlimited process outlined in 10 CFR 605. However, the quality of the research funded via this process has not yet been validated by a COV.
- Evidence: HEPAP long range plan ([doe-hep.hep.net/lrp\\_panel/index.html](http://doe-hep.hep.net/lrp_panel/index.html)). SC Merit Review procedures ([www.sc.doe.gov/production/grants/merit.html](http://www.sc.doe.gov/production/grants/merit.html), [www.science.doe.gov/production/grants/605index.html](http://www.science.doe.gov/production/grants/605index.html)) Program files, including example of merit review for lab work.
- 4.1 Has the program demonstrated adequate progress in achieving its long-term performance goals?** Answer: LARGE EXTENT Question Weight: 20%
- Explanation: HEPAP will evaluate progress toward the new long term performance measures every three to five years. HEPAP reports discuss exciting recent discoveries in several areas of particle physics. Ongoing challenges and uncertainties in reaching expected luminosity levels at the Tevatron (currently the world's highest energy particle accelerator) may continue to present barriers to the mid-term scientific progress for much of the program.
- Evidence: HEPAP long range plan ([doe-hep.hep.net/lrp\\_panel/index.html](http://doe-hep.hep.net/lrp_panel/index.html)). Post-meeting summary letters from HEPAP chair to DOE/NSF managers. Summary of recent Tevatron review ([doe-hep.hep.net/HEPAP/Jul2003/Lehman\\_HEPAP.pdf](http://doe-hep.hep.net/HEPAP/Jul2003/Lehman_HEPAP.pdf)).
- 4.2 Does the program (including program partners) achieve its annual performance goals?** Answer: YES Question Weight: 20%
- Explanation: HEP has met most of its annual performance goals in FY02, with the one schedule slip on the Large Hadron Collider project due to international partners. It appears that BABAR detector at SLAC's B-Factory might miss its luminosity goal for FY03.
- Evidence: FY02 Performance and Accountability Report ([www.mbe.doe.gov/stratmgt/doe02rpt.pdf](http://www.mbe.doe.gov/stratmgt/doe02rpt.pdf)). FY04 Annual Performance Plan ([www.mbe.doe.gov/budget/04budget/content/perfplan/perfplan.pdf](http://www.mbe.doe.gov/budget/04budget/content/perfplan/perfplan.pdf)).
- 4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year?** Answer: YES Question Weight: 20%
- Explanation: The recent history of tracking the two "efficiency" measures for facility construction and operation management shows that, on average, the program continues to meet expectations.
- Evidence: Program files.
- 4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals?** Answer: NA Question Weight: 0%
- Explanation: High energy physics is, by its very nature, an integrated worldwide effort, which makes comparison to similar programs in other countries questionable at best. An international benchmarking study has not been done, due in large part to its questionable value.
- Evidence: 50% of collaborators at BaBar, CDF, and D-Zero experiments in U.S. are foreign. Half of collaborators on SuperK experiment in Japan are from the U.S. The U.S. has a significant stake in the Large Hadron Collider being built in Europe.

## Program Assessment Rating Tool (PART)

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science  
**Type(s):** Research and Development

Competitive Grant

Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Moderately
100%	70%	67%	87%	Effective

**4.5 Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?**      Answer: YES      Question Weight: 20%

**Explanation:** Somewhat superficial HEPAP reviews of scientific progress in the program have found good research performance except for the Tevatron, though this was in part to mismanaged expectations by HQ and FNAL. Recent performance of the Tevatron accelerator (Run-II) has been a concern, and a recent Lehman review found decent progress, with many key hurdles for the project stretching through 2004. DOE-run reviews of laboratory programs include outside researchers, and have generally found good results.

**Evidence:** HEPAP reports ([doe-hep.hep.net/hepap.html](http://doe-hep.hep.net/hepap.html)). Post-meeting summary letters from HEPAP chair to DOE/NSF managers. Program files, including lab peer reviews. Summary of recent Tevatron review ([doe-hep.hep.net/HEPAP/Jul2003/Lehman\\_HEPAP.pdf](http://doe-hep.hep.net/HEPAP/Jul2003/Lehman_HEPAP.pdf)).

**4.CA1 Were program goals achieved within budgeted costs and established schedules?**      Answer: LARGE EXTENT      Question Weight: 20%

**Explanation:** NuMI/MINOS has maintained its new baseline cost and schedule since 2001 rebaselining. All three components of the US contribution to the LHC project have maintained cost and schedule, though CERN has delayed the official completion of the LHC project. The Gamma-ray Large Area Space Telescope (GLAST/LAT) project, a collaborative venture with NASA, has maintained its baseline cost and schedule, though the recent departure of France as a partner causes concern. There are positive signs for the Tevatron complex, but there are significant technical and managerial hurdles remaining in order to meet cost and schedule "baselines" once the effort is finally "projectized" in early 2004. Since "finding the Higgs" was a major driver for the program in the past several HEP budget requests, the program should be held to this standard until they advance more realistic expectations.

**Evidence:** Lehman review reports for NuMI/MINOS, GLAST/LAT and US LHC projects ([doe-hep.hep.net/general\\_reports.htm](http://doe-hep.hep.net/general_reports.htm)). Program files. Exhibit 300s. Summary of recent Tevatron review ([doe-hep.hep.net/HEPAP/Jul2003/Lehman\\_HEPAP.pdf](http://doe-hep.hep.net/HEPAP/Jul2003/Lehman_HEPAP.pdf)).

## PART Performance Measurements

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science

---

**Measure:** Progress (excellent, adequate, poor) in measuring the properties and interactions of the heaviest known particle (the top quark) in order to understand its particular role in the so-called "Standard Model" of particle physics. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2006	Excellent		
2009	Excellent		
2012	Excellent		
2015	Excellent		

**Measure:** Average achieved operation time of the scientific user facilities as a percentage of the total scheduled annual operation time. (Scheduled annual operating time is roughly 8,770 hours in 2004 and 8,740 hours in 2005. The ambitiousness and appropriateness of the 80% target level is currently under review by OMB.)

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Annual (Efficiency Measure)
2002	>80%	87%	
2003	>80%	83%	
2004	>80%		
2005	>80%		

**Measure:** Progress in measuring the matter-antimatter asymmetry in many particle decay modes with high precision. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2006	Excellent		

## PART Performance Measurements

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science

---

**Measure:** Progress in measuring the matter-antimatter asymmetry in many particle decay modes with high precision. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2009	Excellent		
2012	Excellent		
2015	Excellent		

**Measure:** Progress in discovering or ruling out the Standard Model Higgs particle, thought to be responsible for generating mass of elementary particles. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2006	Excellent		
2009	Excellent		
2012	Excellent		
2015	Excellent		

**Measure:** Progress in determining the pattern of the neutrino masses and the details of their mixing parameters. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2006	Excellent		
2009	Excellent		
2012	Excellent		

## PART Performance Measurements

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science

---

**Measure:** Progress in determining the pattern of the neutrino masses and the details of their mixing parameters. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2015	Excellent		

**Measure:** Progress in confirming the existence of new supersymmetric (SUSY) particles, or ruling out the minimal SUSY "Standard Model" of new physics. An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2006	Excellent		
2009	Excellent		
2012	Excellent		
2015	Excellent		

**Measure:** Progress in directly discovering, or ruling out the existence of, new particles which could explain the cosmological "dark matter." An independent expert panel will conduct a review and rate progress (excellent, adequate, poor) on a triennial basis.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Long-term
2006	Excellent		
2009	Excellent		
2012	Excellent		
2015	Excellent		

## PART Performance Measurements

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science

---

**Measure:** Total integrated amount of data (within 20%; measured in inverse picobarns) delivered to the CDF and D-Zero detectors at the Tevatron. (Targets are set in part by the funding requested/appropriated during that fiscal year. The ambitiousness of the target error bar of 20% is currently under review by OMB.)

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Annual
2002	80	83	
2003	225	240	
2004	240		
2005	390		

**Measure:** Total integrated amount of data (within 20%; measured in inverse femtobarns) delivered to the BABAR detector at the SLAC B-factory. (Targets are set in part by the funding requested/appropriated during that fiscal year. The ambitiousness of the target error bar of 20% is currently under review by OMB.)

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Annual
2001	25	25	
2002	35	42	
2003	45	40	
2004	45		
2005	50		

## PART Performance Measurements

**Program:** High Energy Physics  
**Agency:** Department of Energy  
**Bureau:** Office of Science

---

**Measure:** Cost-weighted mean percentage variance from established cost and schedule baselines for major construction, upgrade, or equipment procurement projects.

**Additional Information:** See [www.sc.doe.gov/measures](http://www.sc.doe.gov/measures) for more information.

<u>Year</u>	<u>Target</u>	<u>Actual</u>	<b>Measure Term:</b> Annual (Efficiency Measure)
2002	<10%	1.4%, -2.1%	
2003	<10%	3.1%, -3.4%	
2004	<10%		
2005	<10%		