Approved by:

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Physics Department Chair Date

8/15/05
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8/15/05
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Physics Department, BNL
ESSH Self-Assessment Program
Department Summary
Fiscal Year 2005

The Physics Department at Brookhaven National Laboratory performs basic research targeted at advancing the frontier of scientific knowledge on the structure of matter. The Department is organized into research ***Groups*** with either an ***Experimental*** or a ***Theoretical*** focus in Nuclear, High Energy and Condensed Matter Physics. The Experimental groups lead world-renowned activities at BNL-based facilities as well as at other major research laboratories. The Theoretical groups are at the scientific forefront in advancing new concepts in understanding the physical universe. The Physics Department also hosts the RIKEN - BNL Research Center and the RHIC and ATLAS Computing Facilities. The staff and these activities attract a large number of scientists from around the world and the Department supports an active visitor program to foster both national and international exchanges.

The primary outputs of the Department are:

1. Leading-edge scientific knowledge;
2. Key ideas and concepts for future research directions, for the Laboratory, the Nation, and the World Scientific Community.

The Physics Department services the following ***customers*** and ***stakeholders***:

1. The DOE, in support of its mission in Energy Research;
2. The U.S. scientific community, as well as the broader World-based research community;
3. Brookhaven Science Associates in its efforts to carry out the mission of Brookhaven National Laboratory;
4. Other BNL Departments, in providing leadership and expertise needed to carry out important research programs.

Self-Assessment Program - Goals

The Physics Department has established a set of goals that contribute to the Institutional Plan of the Laboratory:

1. Continued excellence in scientific research and commitment to advances in scientific research;
2. Maintenance of a collegial atmosphere, which aids in the recruitment and retention of leading scientists, and in which new ideas and breakthroughs can occur;
3. Maintenance of its stewardship of resources and capabilities;
4. Compliance with safety and environmental laws, rules, and regulations.

Basic science and applied research seldom produce immediate results. Applications that touch the public often take many years. Hence, this endeavor requires a long-term perspective along with a commitment to continuous improvement in scientific research carried out with safe and environmentally sound operational practices. The Physics Department is committed to an active and comprehensive program of self-assessment to assure our continued excellence, and leadership in the scientific community.

ESSH Self-Assessment Program - Roles, and Responsibilities

Associate Laboratory Director, High Energy and Nuclear Physics - The ALD is responsible for the management and oversight of the Physics Department's self-assessment program for High Energy and Nuclear Physics Groups. The ALD is also responsible for submitting a year-end evaluation report to the Deputy Director for Science and Technology.

Associate Laboratory Director, Basic Energy Sciences - The ALD is responsible for the management and oversight of the Condensed Matter Physics Group's self-assessment program. The ALD is also responsible for submitting a year-end evaluation report to the Deputy Director for Science and Technology.

Department Chair - The Physics Department Chair is responsible for the development and implementation of a self-assessment program and the preparation of a year-end evaluation report for submission to the ALD for High Energy and Nuclear Physics and the ALD for Basic Energy Sciences. The Department Chair shall appoint a Self Assessment Committee (SAC) and an Environmental Assessment Committee (EAC) to collect and evaluate information related to the defined measures. The Chair is also responsible and accountable for ensuring that appropriate corrective actions are taken to address identified weaknesses, commensurate with hazard, risk, vulnerability, and overall business objectives.

Staff - The staff (including guests and collaborators) is responsible for assessing and improving their work and work processes.

ESSH Self Assessment Committee - This Committee shall consist of at least the ES&H Committee Chair and ES&H Coordinators who will collect and evaluate information related to

the defined measures and report the results of this evaluation along with suggested measures for the following year to the Chair. The Committee evaluation includes measures and targets set by the Department's OHSAS 18001 program.

Environmental Assessment Committee - The EAC will consist of at least the Department Environmental Management System (EMS) Representative and the Environmental Compliance Representative. The EAC will collect and evaluate information related to the defined environmental measures and report the results of this evaluation along with suggested measures for the following year to the Chair. The EAC is responsible for ensuring that the EMS Compliance Assessment, the EMS System Assessment and the EMS Management Review are performed as required by ISO 14001.

Self-Assessment Program - Overview

The Physics Department's Self-Assessment Plan (SAP) for FY 2005 is based on the Laboratory's Critical Outcomes. The Department assesses the elements that are relevant to its internal strategic plans, operations, and objectives, with the goal of enhancing the performance of the Physics Department and contributing to the Critical Outcomes of the Laboratory. As the primary mission of the Department is to facilitate the basic research and development activities of its scientific staff and the excellence of its research programs, the SAP emphasizes those areas critical to enhancing this mission. Essentially, the process entails:

1. The collection of data on the Department's performance measures;
2. The analysis of these data against the Department's objectives; and,
3. The implementation of appropriate corrective actions based upon the analysis.

The primary objective is to ensure that the all work is carried out in a safe, effective and environmentally sensitive manner. At the heart of this is a strong program of self-evaluation, the Tier I Program and a comprehensive Experimental Safety Review Process.

The Tier I Program, under the direction of the Physics Department's Manager of ESH&T Programs, achieves the BNL's departmental laboratory and office safety inspection requirements. It serves to ensure that individual Physics Department laboratories and offices comply with:

1. Physics Department rules and regulations;
2. The authorized use of an individual lab or office;
3. Safe operating envelopes as approved by the relevant Experimental Safety Review or Safety Assessment Documentation;
4. Building Facility Use Agreements;
5. Applicable external regulations.

These inspections also serve as an information gathering mechanism for performing the assessments required for the Department's EMS. The program involves Level 1, 2, and 3 managers, the DOE Facility Representative, the Environmental Compliance Representative, Group Safety Coordinators, and other members of the department (and occasionally members of other departments).

The Department's ES&H Committee acts as the Experimental Safety Review Committee. As such, it evaluates the experimental activities for safety, environmental aspects, proper use of the facility, and reviews the training requirements of the individuals involved. The Physics Department plans and monitors its activities in accordance with the Subject Area, *Work Planning and Control for Experiments and Operations*.

The ES&H Committee also acts as the Accident/Incident Investigation Committee, an internal formal investigation committee that has developed measures to handle incidents that are notable violations of accepted Department procedures. In almost all cases these are not reportable incidents. However, establishing the root cause and lessons learned is valuable for strengthening the overall ESSH program.

The Department has established and maintains an ISO 14001 compliant Environmental Management System (EMS). The Department performs an annual evaluation of its overall environmental performance, which includes an Environmental Management Assessment, a Regulatory Compliance Assessment, and an Environmental Management Review.

The Department is developing an OHSAS 18001 compliant Occupational Health and Safety System. The Department performs an annual evaluation of its overall OSH performance, which includes an OHSAS Management Assessment, a Compliance Assessment, and an OHSAS Management Review.

The Department's Corrective Actions are tracked in BNL's ATS.

Self-Assessment Program –
Measures of Performance Linked to the 2005 Critical Outcomes

Critical Outcome – Basic Science and Technology

The Physics Department recognizes that a commitment to excellence in science and technology requires an equal commitment to the environment, worker and infrastructure safety, and health. The Department's management exploits every opportunity to remind its people of their responsibilities to themselves, each other, and the Department. It does this through the Department–specific briefing, Work Planning and Control for Experiments and Operations, Training, Department communications i.e. Department meetings, and electronic messages, and the use of R2A2s.

Critical Outcome – Environment Management

The Physics Department has disposed of nearly all legacy items. Those that remain have been reported to laboratory management and are being properly managed. The remainder of the Department's commitment to the environment consists of Environmental Management System for identifying hazards, ESRs for controlling them and our Tier I and other inspections for monitoring them.

Critical Outcome – Laboratory Management and Operations

The Department uses all the applicable management systems introduced by BSA in handling ESSH matters in the Department. Specifically, these include the Environmental Management System (EMS), Integrated Safety Management, (ISM), the Brookhaven Training Management System (BTMS), and the Standards Based Management System (SBMS) for the subject areas that govern our operations.

Self-Assessment Program – Areas Assessed

This year a comprehensive review will be undertaken in the following 13 areas: Communications, Training, Leadership, Tier I Inspection Program, Work Planning, Security, Accident and Incident Management, Accelerator Test Facility (ATF) issues, Memoranda of Understanding (MOUs), Group Safety Coordinator (GSC) Program, Environmental Performance, OSHAS registration performance, and the Summer Student Monitoring Program.

The results of internal/external audits, with the planned 13 assessments will be documented in a self-evaluation published in the 1st quarter of FY 2006.

The recommendations from the FY 2004 Self-Evaluation are listed below and will be implemented and addressed in the FY 2005 Self-Evaluation.

1. More emphasis on experimental work that includes field observations, ESR, and laser SOP signature audits.

2. The ES&H Committee needs to have a more formal set of procedures established for how it conducts its business. Some items to be addressed are: what consists as a quorum, formation of sub-committees, who may serve as the acting Chair when the Chair is not available, etc.

3. The Physics Department will prepare for ISO 18001 registration.

4. The Physics Department will conduct a separate self-evaluation of the ATF covering infrastructure, day-to-day activities, experiments, and needs.

5. We need to complete the streamlined ESR process for the ATF experiments.

Communications

There is a strong Line Management Commitment to safety through the discussion and review of ESSH topics at each Department Administration Meeting (weekly), Department Group Leader Meetings (2-4 per year), Department Group Meetings (varied depending on group – quarterly suggested), and at Department 'All Hands' Meetings (BES – quarterly, HENP – 2 to 4 as needed). These meetings will be enhanced with an increased safety focus, with a goal of reaching every employee. The meetings will include safety issues as a principal component of discussion, preferably first. Any issues that cannot be resolved or are deemed significant should be passed up to the Department Chair for follow up and corrective action.

The Department's ES&H Committee meets regularly (about 12 times per year) to assess the performance of the Department, review radiological and environmental compliance, review and update ESSH documentation, and establish, track, and ensure the implementation of any corrective actions it deems necessary. The ES&H Committee reviews and approves the

experiments performed in Physics Department space and inspects the laboratories where that work is done.

Each group selects a Group Safety Coordinator (GSC) so that a cross-section of work functions (technicians, administration representatives, engineers, and scientists) is represented to provide a channel for employee feedback. A subset of the ES&H Committee plans to meet quarterly with the Group Safety Coordinators to pass down information, explain programs and receive feedback about the ESSH state of the Department and the viability of the programs. Specifically we plan to have the GSCs provide input on laboratory and Department ESSH issues and policies, and identify opportunities for improvement in the workplace. They also will periodically review ESSH and self-assessment data and serve as a vehicle for expression of staff ESSH concerns/issues

Training

The Physics Department plans to continue to maintain or improve the current level of training completion for employees at or above the 97% level. The training completion rate goal for guests and contractors will be 85%. This will be tracked by Department Training Coordinator and reported at Department management meetings.

Leadership

Individual performance goals will reflect directorate and department ESSH goals, and staff will be evaluated against these goals. Examples: compliance with ESSH and training requirements, PI participation in Tier 1s, identification and correction of hazards, response to audit and investigation findings, frequency of injuries and accidents. The Safety and Training Office will provide statistics to all Group Leaders and The Department Chair for this purpose.

The Department maintains a strong representation on nearly all the ESSH Subject Area Development Groups, Laboratory Level Working Groups (Laboratory ES&H Committee, Laser Safety Committee, Training Steering Committee, Radiation Protection Committee, etc.), and is active in the development of Laboratory policy.

Tier I Inspection Program

The Tier 1 Inspection program is a mature program. Nonetheless, the Department must remain alert in an effort to anticipate areas that might develop into problems. To that end, we will try to implement the following:

1. Trending the results;
2. Ensure PI participation in inspections of their labs;
3. Incorporation of ESR and SOP random reviews into the Tier 1 process.

Recognition

The Physics Department recognizes outstanding safety performance by displaying two boards that display the number of days worked without a lost time accident. The Department plans to celebrate with all Department members the achievement of surpassing previous records and other milestones that may be achieved.

Individual recognition for safety will be celebrated by the awarding of Spotlight Awards for safety performance. The ES&H Committee will provide nominations to the Department Chair. In addition, outstanding individual, group, and/or department safety performance will be recognized at 'All Hands' meetings.

Work Planning

The Department will continue to reinforce the need for compliance with ESR and Work Planning Subject Areas. The current level of compliance will be assessed and improvement actions identified. The ESR signature audit that occurred in 2003 will be repeated with the objective of improved compliance.

Security

The Physics Department will assure compliance with SECON security requirements. In particular, assure all laboratory and office doors shall be locked outside of working hours. Noncompliance reports will be given to the Department Chair and Group Leaders of the responsible individuals. This information will be made available for inclusion in performance evaluations.

The Department Chair and Group Leaders will assure that all appropriate material is adequately safeguarded, i.e., radioactive materials, drugs, and materials and equipment of high commercial value.

Accident and Incident Management

The Physics Department will take an active role in Accident and Incident Management by reviewing all incidents and accidents that occur in the Department, regardless of their reporting status, in an effort to pro-actively reduce situations where accidents or incidents may occur. The Department Chair determines the level of investigation of all accidents and incidents and charges either the ES&H Committee or another group to investigate and submit a written report to him. As part of the investigation, the ES&H Committee routinely charges the Group Leader of the group where the accident/incident occurred to perform an initial investigation and produce a written report to the Committee. This ensures that line management takes an active part in accident investigations. Additionally, the Department of Energy's Brookhaven Area Office will be informed through their Physics Facility Representative who is an ex-officio member of the ES&H Committee

Information from the investigations will be disseminated to all Department personnel along with any Lessons Learned. Incidents and accidents will be discussed with Group Safety Coordinators for their input and feedback.

The Safety and Training Office will electronically distribute to all Physics Personnel information gathered and published monthly by the Assistant Laboratory Director for ESH&Q, to keep them apprised of safety and other incidents in the Laboratory.

Accelerator Test Facility (ATF) Issues

The SA evaluation team will look at the ATF as a separate entity since it is our only facility. This will involve the ES&H Committee Chair, ES&H Coordinators, and ATF personnel. The goal is to get feedback relevant only to the ATF so its concerns are not lost in the larger department roll-up.

A streamlined procedure for reviewing experiments will be developed so that similar experiments and use of beam lines involving the same set of hazards (or lack of any) do not need separate full reviews by the ESR Committee.

Memoranda of Understanding (MOU)

The Physics Department generates MOUs for inter-departmental work. This is intended to define the responsibilities of each department with respect to Tier I Inspections, Work Planning and Control, ESRs, and infrastructure. The Physics Department will review its current MOUs and will renew or update those that are 3 or more years old. The Safety and Training Office will determine if inter-departmental situations exist that are currently not defined by MOUs and generate them where necessary.

Group Safety Coordinator (GSC) Program

The Group Safety Coordinator Program will be enhanced in order to get more employee involvement in safety issues. We will try to hold GSC meetings quarterly.

Environmental Performance

The Physics Department will do its part to maintain the laboratory-wide ISO 14001 registration and strive to continually improve the Environmental Management System. Our goals are to be in full compliance with all applicable environmental requirements and to continue efforts to identify pollution prevention opportunities.

The Physics Department will continue to manage its waste well. Over the past few years, the waste generated has been below projections that the Environmental and Waste Services Division provides.

The Department plans to continue to remind its personnel of the problems associated with the dumping of household goods and garbage in the Physics Department dumpsters. In addition to compliance issues there are costs associated with clean-ups and fines are possible.

OSHAS Performance

The Physics Department is working towards achieving OHSAS 18001 registration in early FY2006. The ES&H Coordinators will monitor the system performance that includes tracking and trending injuries, reviewing FRAs and JRAs, and other specific measures as defined in the OHSAS Management Plan. Facility and Job Risk Assessments are reviewed periodically. The review includes: removing FRAs and JRAs that are no longer relevant to the work being performed in the Department; adding new or more detailed assessments as needed; re-evaluation of FRAs and/or JRAs following an incident or injury. A summary of the FRA and JRA changes is presented to management during the annual Management Review. Progress during the year is reported in weekly management meetings.

Summer Student Monitoring

The Physics Department recognizes the additional risk posed by inexperienced people working in areas where hazards are present. In an effort to manage this, the Physics Department's Safety & Training Office will maintain a list of summer students and the ES&H Coordinator will visit summer students during their time in the Department in order to assess their working conditions and their understanding of the hazards they are working with. This will be an informal assessment, however, if deficiencies are found, they will be corrected in concert with the student's host.

Self-Assessment Evaluation Overview

The Physics Department has a policy that mandates certain annual assessments be included in the annual Self-Evaluation, in conjunction with or in addition to the BNL required assessments. These are given below.

Environmental Management System Assessments

Compliance Assessment

Tier I inspections serve as an information gathering mechanism for the EMS Compliance Assessment. The Department EMS Representative (DER) and the Environmental Compliance Representative (ECR) shall serve as a member of the inspection team and represent the EAC whenever such information is gathered. Information relevant to regulatory compliance shall be entered in the Environmental Aspects spreadsheet. The goal is to complete inspections of two laboratory or shop areas during the first quarter of the fiscal year.

The DER shall update the list of satellite accumulation areas and check for compliance by visiting each area. The ECR may act in a supporting role, if necessary. The goal is to complete this activity during the second quarter of the fiscal year.

Non-Compliances shall be reported to the Department Chair and others as appropriate. Finding significant problems may require convening an additional Management Review. If such a review is deemed necessary, it shall be held as soon as possible after the problem has been identified.

Records of the Compliance Assessment shall be maintained with other self-assessment records.

System Assessment

Evaluate Documents. The EMS document evaluation should normally take place in December – January. This coincides with the annual Experiment Safety Review "cycle," when ESR procedures and forms are examined, evaluated and modified if necessary. The DER and the Department ES&H Committee shall include an evaluation of EMS documents as part of this assessment. The ECR has a supporting role. The Department ES&H Committee must approve any changes.

Evaluate Operations. Tier I inspections can function as an opportunity to observe operations and to interview workers. The DER and ECR shall be part of the Tier I team during these evaluations. Information pertaining to observations shall be recorded on the appropriate assessment checklist, such as that provided in the SBMS Subject Area. The goal is to complete two evaluations during the fiscal year.

System Audit. A formal audit of all the elements of the EMS shall be performed at least every three years. This may be accomplished by audits of subsets of the EMS elements each year. A

qualified auditor or an audit team shall perform the audit. A qualified auditor who is external to the Physics Department shall lead the audit team.

The results of the System Assessment shall be documented in a formal report to the Department Chair within 60 days of the completion of the assessment. Finding significant problems may require convening an additional Management Review. If such a review is deemed necessary, it shall be held as soon as possible after the problem has been identified.

Records of the System Assessment shall be maintained with other self-assessment records.

Management Review

The results of the Compliance and System Assessments are used by the DER as input to the Management Review. The Management Review may also be held at the Directorate level, at the request of the relevant Associate Laboratory Director. Additional Management Reviews may be scheduled as necessary as a result of findings of the Compliance and System Assessments. Such meetings may be called at the discretion of the Laboratory Management, Directorate Management, Department Management, or Assessment Team(s).

Records of the Management Review, including minutes of the meeting shall be maintained with other self-assessment records. Recommendations and corrective actions that are identified as a result of this review will be tracked to completion through the BNL ATS.

OSHAS Management System Assessments

Compliance and System Assessments

These assessments are carried out as required by the OHSAS 18001 system and include both internal and external assessments or audits. The scope and timing of these assessments is determined in coordination with the BNL ESH&Q Division.

Management Review

The results of the Compliance and System Assessments are used by the ES&H Coordinator as input to the Management Review. The Management Review may also be held at the Directorate level, at the request of the relevant Associate Laboratory Director. Additional Management Reviews may be scheduled as necessary as a result of findings of the Compliance and System Assessments. Such meetings may be called at the discretion of the Laboratory Management, Directorate Management, Department Management, or Assessment Team(s).

Records of the Management Review, including minutes of the meeting shall be maintained with other self-assessment records. Recommendations and corrective actions that are identified as a result of this review will be tracked to completion through the BNL ATS.

Safety Assessments

Tier I Program

The Tier I Program, under the direction of the ES&H Coordinator, achieves BNL's Departmental Laboratory and Office safety inspection requirements and serves to ensure individual Physics Laboratories and Offices

a. Comply with Physics Department rules and regulations,
b. Adhere to the posted authorized use of an individual lab or office,
c. Conform to the safe operating envelopes as granted by the Experimental Safety Review,
d. Conform to building infrastructure use.

These inspections also serve as an information gathering mechanism for performing the assessments required for the Department's EMS. The program involves Level 1, 2, and 3 managers, other departments, the DOE Facility Representative, the Environmental Compliance Representative, Group Safety Coordinators, and other members of the department.

Experimental Safety Review Program

The Department plans and monitors most of its activities under the Work Planning and Control for Experiments and Operations Subject Area. The Department's ES&H Committee acts as the Experimental Safety Review Committee, which evaluates the activities for safety, environmental aspects, proper use of the facility, and a review of the training requirements of the individuals involved in the projects. Projects that involve the use of radioactive materials receive an informal ALARA review by the Committee. The review requires a waste minimization plan and the Committee looks for pollution prevention opportunities while reviewing individual experiments and systematically while comparing similar experiments. The review is comprehensive since it involves feedback from those working on the project and also a visual inspection of the laboratory area by Committee members.

Item Specific Audits

The results of the following specific audits are reported in the Minutes of the ES&H Committee:

1. Chemical Audit - Annual, by all Department Chemical Owners and the ES&H Coordinator.
2. Dose Reviews - Semi-annual, by the ES&H Committee.
3. Department ESSH Policy Audits - Annual, by the ES&H Committee.
4. Sealed Source Audits - Semi-annual for non-exempt sources, by the ES&H Coordinator.
5. Hazard Placard Audit - Annual, by the ES&H Coordinator.

Excellence in ESSH: Areas identified in the Self-Assessment Plan

Monitoring the twelve distinct areas will provide the assessment of the operational excellence of the Physics Department's ESSH program. These activities were selected to represent important areas of concern to the Department and to demonstrate the management commitment to the ESSH and Self-Assessment programs. The areas are:

1. Communications,
2. Training,
3. Leadership,
4. Tier I Inspection Program,
5. Work Planning,
6. Security,
7. Accident and Incident Management,
8. Accelerator Test Facility (ATF) issues,
9. Memoranda of Understanding (MOUs),
10. Group Safety Coordinator (GSC) Program,
11. Environmental performance,
12. OSHAS registration performance, and
13. Summer Student Monitoring

The success of each of these activities can be gauged by several measures that involve input from personnel spanning the whole of the Department. Collecting and evaluating these measures is viewed as a value-added exercise that will lead to genuine improvements in the operation and performance of the Department's ESSH program and may well impact other facets of the Department.

Acronyms

ALARA	As Low As Reasonably Achievable
ATF	Accelerator Test Facility
ATS	Action Tracking System
BES	Basic Energy Sciences
BTMS	Brookhaven Training Management System
CMP	Condensed Matter Physics
DER	Department EMS Representative (R. Gill)
DOE	Department of Energy
EAC	Environmental Assessment Committee (R. Gill and S. Ferrone)
ECR	Environmental Compliance Representative (S. Ferrone)
EMS	Environmental Management System
ESH	Environment, Safety, and Health
ESH&Q	Environment, Safety, Health & Quality
ESR	Experimental Safety Review
ESSH	Environment, Safety, Security, and Health
FRA	Facility Risk Assessment
GSC	Group Safety Coordinator (See GSC list)
HENP	High Energy and Nuclear Physics
ISM	Integrated Safety Management
ISO	Independent Standards Organization
JRA	Job Risk Assessment
MOU	Memorandum of Understanding
OSHA	Occupational Safety and Health Administration
OSHAS	Occupational Safety and Health Assessment System

PI	Principal Investigator
RF	Radio Frequency
SAP	Self Assessment Plan
SBMS	Standards Based Management System
SECON	Security Conditions
SOP	Standard Operating Procedures
R2A2	Roles, Responsibilities, Authorities, and Accountabilities