Approved by:

Physics Department Chair — Date: 1/10/08

Associate Lab Director for NPP — Date: 1/16/08

Physics Department, BNL

ESSH Self-Evaluation

Department Summary

Fiscal Year 2007

Self-Evaluation - Overview

The Physics Department's Self-Evaluation for FY 2007 assesses the Department's performance against the Laboratory's contractual Goals and Targets. Each of these has a number of objectives and performance measures linked to those objectives. 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 meeting or exceeding its part for the Critical Outcomes of the Laboratory.

At the heart of this strong program of self-evaluation is the strong management commitment to ESSH, our Tier I Program, Work Planning and Control, Environmental Management System, and our proactive ESSH Committee.

Performance Measures for Brookhaven National Laboratory as established between the Department of Energy (DOE) and Brookhaven Science Associates (BSA)

There are eight performance measures that have been established. The Physics Department helps the Laboratory achieve its institutional goals by contributing at the departmental level to those measures that are applicable to the Department. Some performance goals are truly institutional and are not evaluated at the Department level.

Performance Measure 1.0 – Provide for Efficient and Effective Mission Accomplishment

The Physics Department continues to do its part in achieving 'World Class Science'. Our discoveries and publications, recognition of our excellent scientists through awards and support, continues to bring recognition to BNL.

Physics Department scientists are internationally recognized leaders in their fields. They participate in developing new science initiatives at BNL and also participate in scientific endeavors at other facilities world-wide and in establishing direction with their global counterparts for the next generation of initiatives and research tools.

Performance Measure 2.0 – Provide for Efficient and Effective Design, Fabrication, Construction and Operations of Research Facilities

The Physics Department provides the expertise for design, fabrication, and construction of the major detectors for RHIC. These plans are reviewed at the laboratory level and with the DOE to ensure their effectiveness and efficiency. The funding received to accomplish these reflects the confidence of the DOE developed through the past projects we have been successful with.

The Physics Department operates the Accelerator Test Facility (ATF), a proposal-driven Program-Committee-reviewed Users'-Facility dedicated for long-term R&D in Physics of Beams. ATF users, from universities, national labs and industries, are carrying out R&D on Advanced Accelerator Physics and are studying the interactions of high power electromagnetic radiation and high brightness electron beams, including laser acceleration of electrons and Free-Electron Lasers. Other topics include the development of electron beams with extremely high brightness, photo-injectors, electron beam and radiation diagnostics and computer controls.

Operations at the ATF are reviewed annually by the Department and the DOE. DOE and Laboratory approvals for the upgrades, operations, and new capabilities demonstrate continued commitment to this facility for its remarkable achievements.

Performance Measure 3.0 – Provide Effective and Efficient Science and Technology Program Management

The Physics Department accomplishes this in partnership with the Laboratory management. The Laboratory Director, Deputy Director for Science and Technology, Deputy Director for Operations, the Associate Director for Nuclear and Particle Physics, the Associate Director for Policy and Strategic Planning work with the Physics Department Chair and Associate Chairs to achieve this measure.

The Department works with Laboratory Management to develop new programs aligned with the DOE Mission and the scientific strengths of the Laboratory and participates in major projects at other laboratories world-wide. These programs are always well received by our scientific partners and reviewers, globally, demonstrating the excellence of our personnel and programs. The ability to get funding for some of these underscores their relevance to both the scientific community and the DOE.

Projects that have been previously approved and funded in prior years receive continued funding attesting to their effectiveness and efficiency. These projects undergo rigorous annual reviews internally and externally.

Performance Measure 4.0 – Provide Sound and Competent Leadership and Stewardship of the Laboratory

The Physics Department’s Chair, Deputy Chair, and Associate Chair assist the laboratory in achieving this measure by ensuring that Group Leaders and scientists are globally recognized as leaders in their fields. Additionally, the support personnel are chosen and retained for their demonstration of their quality of performance in supporting their leaders and commitment to excellence in stewardship of the Departments programs and assets.

Performance Measure 5.0 – Sustain Excellence and Enhance Effectiveness of Integrated Safety, Health, and Environment Protection

The Physics Department continues to provide a work environment that protects workers and the environment. The Department strives to keep its DART rate below the Laboratory average and below the DOE Office of Science expectation of 0.25 cases per 200,000 hours worked. We also work to keep our OSHA total recordable case rate below the laboratory average and below the Office of Science interim goal of 0.65 cases per 200,000 hours worked.

The Physics Department integrates ESSH into its policies and procedures providing a management system that enhances the safety and well-being of our personnel and the environment. We meet all the requirements established by the Laboratory and in addition have instituted proactive measures to control or eliminate risks. By measuring our own performance and soliciting feedback through our Group Safety Coordinators and Department members we can continuously improve that performance.

The Department is participating in the Laboratory's Human Performance initiative and has already implemented some elements into our programs. The Physics Department will ensure worker, scientist and technician participation in hazards assessment, evaluation and mitigation at the "task level." Job Risk Assessments will be reviewed and updated as deemed appropriate.

The Physics Department has developed an accident/incident management program where all incidents and accidents other than first aid cases are investigated. First aid cases are reviewed by the Physics Department's Manager of ESSH&T Programs to see if an investigation is warranted. The Group Leader owning the accident or incident has the responsibility to perform the initial investigation. The ESSH Committee reviews and provides further investigation, if necessary, develops corrective actions and lessons learned which are subsequently shared with Group Safety Coordinators and the entire Department at an 'all-hands' meeting.

The Physics Department effectively manages its waste effectively and efficiently and participates in identifying 'Pollution Prevention' projects and 'Safety Solutions' projects. The Department has had success in attempts to find funding within these Laboratory programs but will also fund others on its own.

The Department maintains its ISO 14001 and OHSAS 18001 registration.

Performance Measure 6.0 – Deliver Efficient, Effective, and Responsive Business Systems and Resources that Enable the Successful Achievement of Laboratory Missions

The Physics Department performs its part in helping the Laboratory achieve this measure through its participation in acquiring and developing the Laboratory business systems that meet its needs and by providing feedback to the business division for the programs in place.

The Department has set up an efficient means of reviewing acquisitions and maintaining its property that meets all laboratory requirements and incorporates additional reviews for safety and management.

Personnel in the Physics Department are our most valuable resource. Much time is devoted to recruiting and hiring excellent people, and to mentoring and assisting them in their development, both professionally and personally. The Physics Department strives to enhance its diverse population

in its hiring practices to ensure global participation in creating new ideas and tools that serve the needs of researchers world-wide.

The Physics Department invites external review from subject matter experts from Laboratory and DOE resources at BNL and participates openly in reviews from external agencies. The Department values these audits as validation of our excellent programs using any corrective actions or recommendations to provide the safest and healthiest working environment in the Laboratory and DOE complex.

Performance Measure 7.0 – Sustain Excellence in Operating, Maintaining, and Renewing the Facility and Infrastructure Portfolio to Meet Laboratory Needs

The Physics Department uses its resources in a most efficient and effective manner to maintain its infrastructure. We are involved in working with Laboratory Management to keep our operations in a safe and reliable condition. Our Tier I program includes inspection of infrastructure, developing any corrective actions, and relaying our needs to management.

Performance Measure 8.0 – Sustain and Enhance the Effectiveness of Integrated Safeguards and Security Management (ISSM) and Emergency Management Systems

The Physics Department participates in preparations for emergencies in concert with the Emergency Services Division. We keep them informed of our hazards and emergency needs for our people and equipment. Hazard placards are well maintained and people are trained as local emergency coordinators to assist as necessary. Experimental Safety Reviews require the principal investigator to list any emergency preparations or responses required for their work.

DOE property and equipment are properly managed. The Department also complies with all cyber security requirements. While the Department is not directly involved with classified or sensitive information, we strive to keep all our information and materials as secure as is reasonable. The Department has appointed its Manager of ESSH&T Programs as the ISSM point of contact to ensure effectiveness of this program.

ESSH Areas Assessed

This year a comprehensive review was undertaken in the following areas: Communications, Training, Leadership, Tier I Inspection Program, 10CFR851 Violations, Industrial Hygiene Monitoring, ESSH Committee and Work Planning, Security, Cyber Security, Accident and Incident Management, Corrective Action Management, Accelerator Test Facility (ATF) issues, Memoranda of Understanding (MOUs), Group Safety Coordinator (GSC) Program, Environmental Performance, Summer Student Monitoring Program, and Safety Observations. Additionally, we work with the Condensed Matter Physics and Materials Science Department of the BES Directorate to assess our performance in handling many of their ESSH functions as outlined in MOUs established last year.

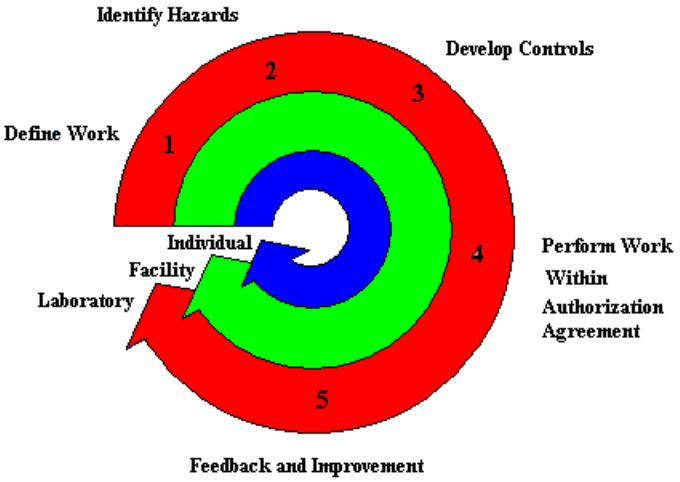
Evaluation of our OHSAS and EMS performance is addressed separately.

Overall ESSH Performance

The Physics Department's performance with respect to ESSH in FY 07 has been excellent. There was an enormous amount of time put in by the safety personnel to keep the Department in compliance, in addition to the BNL or external audits. In spite of this, many of the goals and objectives have been accomplished with few incidents, a DART rate of 0.80 (number of cases/200,000 hours worked) and TRC rate of 1.2 (number of cases/200,000 hours worked).

Integrated Safety Management

The Physics Department has embraced the core functions of Integrated Safety Management (ISM) in its conduct of work planning and control for operations and experiments. The Experimental Safety Review Form is organized into sections that are aligned with the 5 core functions – Define the scope of the Work, Identify the Hazards, Develop Controls for the Hazards, Work within the Approved Safety Envelope, and Provide Feedback to improve or fine tune the processes.



As a Department, we continue to assess and improve the process in response to the feedback received from the Laboratory, assessments and audits, incorporation of OHSAS, Group Safety Coordinators, and from the workers. The Physics Department has assessed how we are doing with conformance to the Seven Guiding Principles of Integrated Safety Management. These are presented below. In summary, we believe we have fully integrated ISM in our Department and are looking to continuously assessing what we are doing and to continuously improve.

7 GUIDING PRINCIPLES OF INTEGRATED SAFETY MANAGEMENT …AND HOW THE PHYSICS DEPARTMENT IMPLEMENTS THEM

Line Management Responsibility for ESSH.
Responsibilities are well documented (Physics Department Policies, SBMS, etc.)
Weekly Management discussion of safety as first item
Group Leader involvement in any incident/accident investigation
Department Management and Group Leader participation in Tier I Inspections
Department Line Management participation in Safety Observations
Department Chair directs Group Leaders to appoint a Group Safety Coordinator, and Group Leaders allow that person to spend time on ESSH issues

Clear Roles and Responsibilities
All employees have R2A2s
Safety Responsibilities well defined by Department Policies
JTAs reviewed annually or as jobs change

Competence Commensurate with Responsibilities
Authorized Worker Lists
Users receive hands-on training (where applicable)
Workers are required to read and sign ESR or Work Permit

Balanced Priorities: on the grand scale, are the hazards being appropriately addressed?
The Department does address the hazards associated with work and recognizes its need to allocate resources to address safety, through its programs and operations.
Job Risk Assessments are used to evaluate hazards or risks

Identification of ESH Standards and Requirements
The Department follows the SBMS for all the standards and requirements it operates under.

Hazard Controls Tailored to Work Being Performed
The Department has comprehensive SOPs and ESRs that list and describe all the hazards and provide controls for each. This is a dynamic system that changes with feedback or as experiments evolve.

Operations Authorization
For the User
- Comprehensive Check-in procedures and forms
- Site specific training by PIs (or his designee) is an individual training providing an excellent platform for interaction and evaluation of competence.
- Authorized User Lists (Electrical Workers, LO/TO, Laser Operators, ATF Linac Operators, Modulator Operators, Machine Shops, Material Handlers, MPMS, Rotating Anode)

For the Experimental Laboratory
- ESR or Work Permit that is comprehensive

For the ATF
- ATF Specific training
- SAD, ASE, COO, ATF Procedures

Details of the Assessment

The ESSH Committee and Line Management performed the initial assessment. Input was solicited from Group Leaders and all members of the Department, statistics were generated by the ESH Coordinators and the report written by the Manager of ESSH&T Programs. The draft was distributed to the ESSH Committee, Group Safety Coordinators, and Line Management for comment. The results are as follows.

Communications

There is a strong Line Management Commitment to safety through the discussion and review of ESSH topics at each Department Administration Meeting (usually weekly), Department Group Leader Meetings, Department Group Meetings, and at Department "All Hands" Meetings. These meetings have been enhanced with an increased safety focus, with a goal of reaching every employee. The meetings included safety issues as a principal component of discussion, always first.

Group Leaders remain committed to providing their personnel a safe working environment and encourage communication in their group meetings. Groups meet at different frequencies depending on the nature of their work. The following have been reported by Group Leaders for this self-evaluation.

The **Electronic Detector Group** has weekly meetings with safety as the first item on their agenda. They discuss the ESH&Q Monthly Newsletter, go over ORPS reports, and have discussions about their various ESRs. They have devoted time to PPE issues in their workspaces. This group is taking the primary responsibility for developing safety policies for the Daya Bay project with Ralph Brown as chief engineer and Dana Beavis as the US Project Safety Officer.

The **PHENIX Group** has group meetings the first and third Thursdays of the month for scientific staff. The first topic on the agenda is safety. Additionally, the PHENIX technical support team has weekly meetings to discuss safety, work planning, and jobs for the upcoming week. This includes all technicians, engineers, scientific associates, and PHENIX physicists involved in operations.

The **Heavy Ion Research Group** held three group meetings with safety as a topic. There have also been work planning meetings where safety issues related to the decommissioning of parts of the BRAHMS Experiment.

The **Physics Applications Software Group** holds weekly meetings where safety is discussed as relevant to computer engineers and scientists.

The **RHIC Computing Facility Group** holds weekly group meetings that include safety and cyber security.

The **Accelerator Test Facility Group** has engineering meetings each Monday morning to discuss safety related to the ATF (any corrective actions related to ATF, interlock work, documentation, rack grounding, etc.), and Friday meetings where safety is also discussed.

The **STAR Group** holds weekly Thursday meetings during the shutdown periods to discuss the work that needs to be done, (Work planning including the safety issues involved) and has general discussions of safety.

The **LEGS Group** meets biweekly where safety is always a topic.

The **Advanced Accelerator Group** has roughly 2 group meetings per year where safety is discussed. Most of the group's work is computer based.

The **OMEGA Group** does not have group meetings. The scientist in charge of the technicians who are involved in laboratory setups works individually or in small groups with the technicians where safety as applicable is discussed on roughly a monthly basis.

The **Medium Energy (RHIC Spin) Group** encompasses three working sub-groups: STAR, PHENIX, Polarimetry. The STAR subgroup discusses safety regularly in its weekly work planning meetings. The Polarimetry subgroup meets as needed, and safety is included in the work planning. The PHENIX subgroup includes safety discussion and training in preparation for shift duties.

The Department's ESSH Committee reviewed our ESRs electronically not requiring a meeting since much of the work is on-going from year to year.

There was one Group Safety Coordinator Meeting that was solely focused on safety and provided valuable worker feedback on safety to Line Management. These discussions are very productive and help to round out the ISM cycle.

There are good lines of communications between the ATF and the Physics Department's ESSH personnel. The ATF ESH Officer is the Group Safety Coordinator for the Accelerator Test Facility Group and is a member of the ESSH Committee. This ensures ATF representation in all ESSH activities in the Department. The ATF Group Leader includes the Manager of ESSH&T Programs on the distribution list for the weekly Engineering Meeting notes.

The Physics Department continues to disseminate the ESH&Q monthly newsletter to all personnel. In addition information on accidents, recalls of products, timely safety messages, and lessons learned were also distributed.

There was one Radiological Awareness Report concerning training not being entered in an employee's history that was generated and distributed.

Training

The Physics Department maintained a level of 97% of required training completed for employees and 91% for guests as of 9/30/07

All employees and long term guests received and reviewed their JTAs.

Cyber, physical, and personal identity security issues received much attention across the laboratory this year. Physics Department employees and guests participated in the lab-wide stand-downs last October and completed the required training.

The ESH Officer performs monthly training database and ESR audits of all ATF staff and experimenters. He also gives the Department specific training in addition to the ATF Facility training.

Another area of emphasis and training was for CPR. Although it is a requirement for our authorized electrical workers, roughly 20% of our 250 employees are now trained and are able to use our new AED (Automated External Defibrillator).

The Manager of ESSH&T Programs is now a trained Facilitator for Fact Finding, Human Performance Improvement, and for several types of Causal Analysis. The ESSH Committee Chair is also a trained Facilitator.

Leadership

The Department has representation on SBMS Subject Area Development Groups – Event and Issues Management, Internal Controlled Documents, Work Planning and Control for Experiments and Operations, Lead, Electrical Safety, and Conduct of Operations. Department ESH Coordinators participate in Third Party Evaluations of various BNL Programs. Additionally, the Manager of

ESSH&T Programs is the SBMS POC (Point of Contact) to ensure all relevant changes to existing Subject Areas or the development of new ones are properly reviewed and/or passed to appropriate Department members for their review.

Members of Physics Department who are involved in departmental and laboratory safety committees or SBMS Subject Areas:

Marcus Babzien - **Laser Safety Committee**

Dana Beavis, - **Chair, C-AD Radiation Safety Committee, C-AD Experimental Safety Committee, Laboratory ES&H Committee, Ad hoc Committee to review NSLSII shielding and interlocks, Daya Bay Safety Officer**

Ron Gill, ESH Coordinator - **Laboratory ES&H Committee, Working with Chemicals Working Group, Small Science Working Group, Physics Department ESSH Committee**

Brant Johnson - **ESSH Committee Chair -BNL Director's Safety Committee, PAAA Committee, PPE Working Group**

Karl Kusche - **ESSH Officer at the ATF, Public Access AED SBMS Subject Area, Group Safety Coordinator**

Tom Muller – **BNL Envoy, PPM Committee, Physics Department's ESSH Committee**

Mike Zarcone – **Event Categorizer (ORPS), Training & Qualifications Steering Committee, Laser Safety Committee, Operations Forum, Radiation Protection Working Group, PPE Working Group, Physics Department's ESSH Committee.**

Howard Gordon - (U.S. Atlas Project) **conducted a safety stand-down at CERN in October 2006 after a near miss in the ATLAS Cavern.** This was attended by about 200 people from the four LHC experiments including safety managers from CERN, some DOE staff who were visiting CERN and some of whom attended by phone. Additionally, Howard arranged and accompanied Jim Tarpinian (ALD ESH&Q Directorate, BNL), and Bill Griffing (Fermilab) on a tour of ATLAS in December 2006 for the purpose of learning about the safety procedures and issues. Finally, Howard hosted a visit of Head of Safety from CERN - Maurizio Bona to discuss safety at BNL and CERN.

Ron Gill has developed an 'on-line' ESR form that has wide support in other small science departments and will be available lab-wide this year. This form is very beneficial to the principal investigator as it guides them to including more appropriate text and informational links.

The Physics department recognized its Group Safety Coordinators with a 'Thank You Luncheon' again this year for the leadership they provide do in bringing safety issues to their groups and group safety issues to management.

Cyber security issues are now included in our weekly Management Meeting with two of our Cyber security representatives, Brett Viren and Tom Throwe attending and giving weekly updates. The Department demonstrates leadership as Tom Throwe was the former head and Martin Purschke is the current head of CSAC (Cyber Security Advisory Council). Michael Ernst is also a member of CSAC. Additionally, the Physics Department makes up approximately one-third of the Cyber Security Policy Working Group (Brett Viren, Jerome Lauret, Martin Purschke, and Tom Throwe) with one-third from ITD, and the remainder from other BNL Departments.

Tier I Program

The Tier 1 program worked very well this year. No situations involving 'imminent danger' were discovered. As can be seen from the data and the chart below, Housekeeping, Working Environment Plant (lighting), Electrical Safety Distribution (daisy chaining, blocked breaker panels), and machine shop issues (guards and magnetic anti-startup devices) make up 2/3 of the issues. Corrective Actions were assigned and tracked to completion. Responses to the corrective actions were timely. Participation was good with Department Chair, Associate Chairs, ESSH Committee Chair and members, PIs, Group Leaders, and Group Safety Coordinator participation.

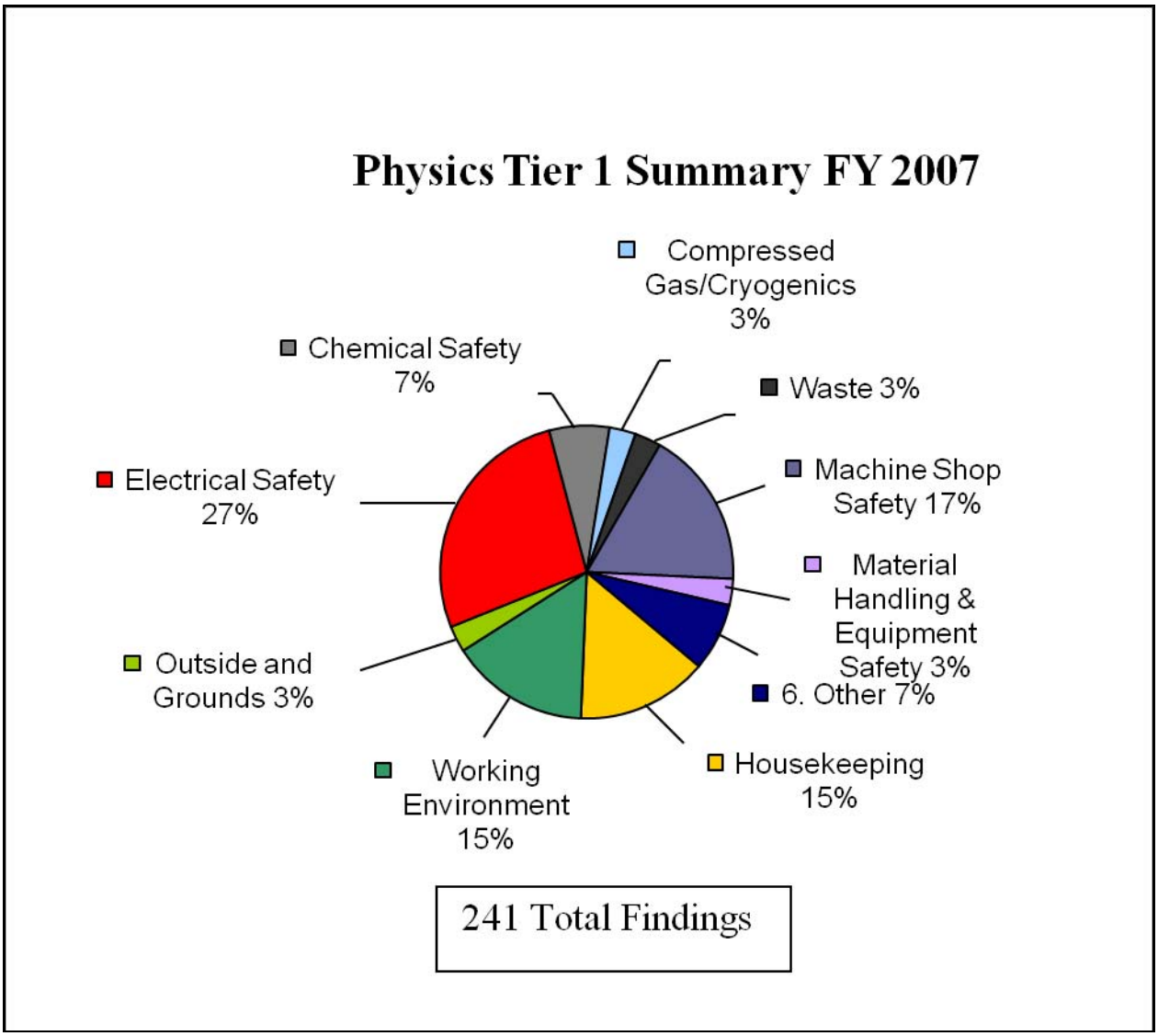
Cat. #	Code	Category	1st Qtr Oct-Dec'06	2nd Qtr Jan-Mar 07	3rd Qtr Apr-Jun 07	4th Qtr Jul-Sep 07	Total Findings
1	HK	Housekeeping	8	14	10	3	35
2	WEP	Working Environment: Plant	0	13	11	11	35
3	WED	Working Environment: Department	0	0	0	2	2
4	OG	Outside and Grounds	0	0	0	7	7
5	FS	Fire Safety	1	2	1	1	5
6	ESD	Electrical Safety: Distribution	11	22	7	7	47
7	ESE	Electrical Safety: Equipment	1	7	4	2	14
8	ESP	Electrical Safety: Programmatic	0	1	3	0	4
9	CSL	Chemical Safety: Labeling	3	0	2	0	5
10	CSU	Chemical Safety: Use	0	0	1	1	2
11	CSS	Chemical Safety: Storage	2	3	3	1	9
12	PPE	Personal Protective Equipment	1	1	0	0	2
13	CG	Compressed Gas/Cryogenics)	2	4	1	0	7
14	BH	Biohazards	N/A	N/A	N/A	N/A	N/A
15	RS	Radiation Safety	0	0	0	1	1
16	WT	Waste	3	2	1	1	7
17	EM	Environmental	0	2	2	0	4
18	MS	Machine Shop Safety	7	7	18	10	42
19	MH	Material Handling and Equipment Safety	2	3	1	1	7
20	IH	Industrial Hygiene Issues	0	0	0	0	0
21	UP	Unsafe Practices	1	3	1	1	6
22	OT	Other	0	0	0	0	0
		Total	42	84	66	49	241

10CFR851 Violations

An external audit in 2006 of the OSHA violations assigned to the Physics Department showed that some items were not completed and some that had been closed became open again. Most were in the Central Fabrications Division's and our own Machine Shops in Building 510. The main problem is clearance from in front of electrical panels and disconnects and also magnetic anti-restart switches. A new MOU that assigns responsibility for these items was generated in 2007 between the Physics Department and the Central Fabrication Division. Some of the violations have been mitigated while others are awaiting the appropriate funding channels.

There is an effort to reduce the number of machines (up to 8) in the Central Fabrication Divisions satellite shop in building 510. This is necessary in order to rearrange the remaining machines away from blocking circuit breaker panels and shot off switches. It is anticipated this will be completed in 2008. We will also reduce the number of machines in the Physics Department.

The Department has completed the testing of all equipment being used in the labs that were made at BNL and do not have a NRTL (Nationally Recognized Testing Laboratory) label. We will continue to require NRTL labels on all newly acquired equipment or testing. The older equipment will be tested or approved prior to the September 30 2009 date.



Industrial Hygiene Monitoring

The Physics Department has relatively few high hazard processes that require active IH monitoring. Our occasional small scale soldering operations were not believed to warrant much attention but this turns out not to be the case. In preparation for some lab cleanups we sampled various areas for heavy metals (lead, cadmium, chromium, and beryllium) and found that there is legacy contamination in many of our laboratories due mostly to use of lead, past machining of metals, and target and experimental preparations.

Additionally, we had discussions with different groups about personal hygiene regarding eating and drinking in areas where soldering operations occur.

ESSH Committee & Work Planning

The ESSH Committee consists of a Department of Energy Facility Representative, a member of the Physics Department's Management (a scientist), a Radiological Controls Division Technician, our Department's Environmental Compliance Representative, two ESH Coordinators, an engineer and ESH Officer from the ATF, the Building Manager, and a project manager with a quality control background. Additionally, the Department Chair, an Associate Chair, an Acting Associate Chair, and a Radiological Controls Division Representative are informed of all issues. Finally, subject area experts and other laboratory personnel are invited as needed.

The Committee reviewed and approved all ESRs that were brought to it this year. Work Permits have been updated in the Department for Machine Shops, Winding Machines, and the routine work performed by staff at the ATF and the Rotating Anode.

All Department Policies were reviewed. Some policies were combined, some deleted, and some reissued.

Whole body exposures continue to be very low with a total cumulative exposure of 24 mRem for the entire year. This has been the case for the last 5 years where the annual exposures in mRem were 0, 56, 50, and 33 for the years 2006, 2005, 2004, and 2003 respectively. Doses at the ATF for the complex continue to remain below 100 mRem as seen on the area monitors.

The ATF ESH Officer reviews all ESRs, ensures compliance with the Generic Work Permits for day-to-day ATF maintenance, machine shops, and operations. The ATF has its own Work Control Coordinator and generates job specific work permits as needed. Much of the operational procedures are governed by the Conduct of Operations, ATF Handbook, Accelerator Safety Envelope, and ATF task-specific procedures. ATF personnel consistently work within their approved work authorization.

Security

To date, no new issues have been identified that need attention. Security issues and information are presented at All Hands meetings.

The Physics Department is in compliance with SECON security requirements. In particular, all laboratory and office doors are locked outside of working hours. Noncompliance reports (doors left open) have been given to the Department Chair and Group Leaders of the responsible individuals. There were 6 unsecured doors found in Physics Department buildings this fiscal year most due to lock problems that were repaired.

Cyber Security

Cyber security received a greater emphasis this year and the Physics Department has done it part to satisfy the concerns of the DOE. Department personnel participated in the dual stand downs for cyber security and personal identifiable information. Cyber security issues are now included in our weekly Management Meeting with two of our Cyber security representatives attending.

All computers in the Department have had password protected screensavers activated, DOE login banners installed, all computers with Windows based operating systems have been added to the BNL Domain, and all UNIX systems have had the Ordo host-based scanner installed. The Department

continues to respond to the monthly network-based scan results for vulnerabilities (<=3% of the approximately 1000 computers). Nessus network scanner findings not always addressed promptly. We have started a weekly "list of shame" sent out to the computer liaisons showing systems and their administrators that have open findings.

Finally, the Physics Department is being progressive in the area of encryption of laptops as the DOE is pressuring to make all laptop disks use encryption. Physics is proactively testing forms of encryption in order to assure we can comply with out negatively impacting our work.

Accident and Incident Management

There were five incidents/accidents for the fiscal year 2007 as compared to four in 2006, three in 2005, four in 2004, ten in 2003, and three each in 2002 and 2001. There were two ORPS and no PAAA violations.

They were:

Employee using a screwdriver lacerated thumb (Recordable)
Employee descending a ladder slipped on 3rd rung (DART – Recordable)
Employee was descending ladder was lacerated on forearm (First Aid)
Employee walking on grass fractured ankle (DART – Recordable – ORPS)
Laser status indicators not functioning (ORPS)

There were no definite trends noted for these incidents although consistent with BNL statistics for trips, falls, and office accidents. These incidents were discussed with the Department at All Hands meetings and with the GSCs.

There was 1 first aid case this year, 3 Recordable including two DART cases as compared to 3 (2 Recordable (R) and 1 Not Recordable (NR)) in 2005, 3 in 2004 (1 R, 2 NR) and 4 in 2003 (1 R, 3 NR). The 2007 DART was 0.80 (per 200,000 hours worked) due to an employee fracturing her ankle and the other one where an employee descending a ladder slipped and injured his leg. The TRC rate is 1.2 per 200,000 hours worked (the two DART cases plus one other).

Although there was only one cut thumb last year, we need to have a discussion in the Department with technicians and GSCs concerning PPE. Safety glasses are still an issue since there are those in machine shops who prefer to use their prescription eyewear that does not fully protect their eyes.

Corrective Action Management

This year we had the opportunity to review some of the corrective actions that were generated in 2003 in response to a PAAA violation (NTS-CH-BNL-2003-0001). Of the 20 corrective actions generated, all but one was found to be completed and effective. This review was conducted by the Office of Independent oversight working with the Physics Department. The one corrective action that had not been fully implemented related to the filling out of the checklist at the ATF when starting up the accelerator. The checklists are reviewed quarterly by the ATF ESH Officer and the Manager of ESSH&T Programs. If any items were not complete and are related to safety, an incident report will be generated.

Accelerator Test Facility Issues

The ATF underwent a “Work Observation by Senior Management” during a shutdown period in June 2006. This involved a walkthrough by DOE and BNL personnel, reviews of procedures, postings, work spaces, and interviews with relevant personnel. The ATF did exceptionally well with one finding, and one recommendation for improvement. These were implemented in 2007 with

changes to the Safety Analysis Document (reviewed by the Laboratory ES&H Committee) and the Conduct of Operations

The dose to the area monitors was reviewed quarterly. The only concern was two areas that may reach 100 mR in a year requiring a higher level of posting. Documentation establishing one of these areas as a low occupancy area was completed. The other area is in an interlocked room, generally unoccupied when the beam is on, and presents no hazard to the public. As effort to map the radiological footprint in this area was conducted and found to be confined to a small area where there is no occupancy. It is noted that all TLDs of personnel at the ATF have no recorded dose.

Shielding calculations were developed for a new x-band klystron, were reviewed by the Radiological Controls Group, and approved.

The laser interlocks were replaced by the Interlock Controls Group from the Collider Accelerator Department this year. During the replacement it was found that the previous interlock controls did not include the laser status indicators and some of the drawings were not completely accurate. Although no one was ever injured, the potential for injury existed and this was reported as a management concern and documented as an ORPS.

Memoranda of Understanding

There were eight Memorandums of Understanding that were reviewed, updated, combined, dropped, or generated. These MOU establish the responsibilities for Work Planning and Control of Experiments and Tier I Inspections. They are:

MOU with C-AD for Physics Personnel working in C-AD space (combined 3 into 1)
MOUs (2) with ITD for our use of Building 515
MOUs (2) with the CMPMS Department for their use of Building 510 space

A new MOU is being established this year between the Central Fabrication Services Division and the Physics Department for their satellite shop in our building.

GSC Program

The GSCs were again involved as members of teams reviewing Job Risk Assessments. A 'Thank-You' luncheon and meeting was held in September. Amber Aponte, Ken Asselta, Ed Baker, Marcy Chaloupka, Joseph Cracco, Susan Duffin, Ron Gill, Harold Kirk, Karl Kusche, John Riordan, Sean Stoll, and our colleagues from the CMPMS Department - Robert Konik, Al Langhorn, Fran Loeb, Bill Schoenig, and Ed Stein.

The discussions and interaction of this group remain productive each year. There is more feedback and discussion of items on the agenda and other issues are brought up by GSCs. This is in contrast to a few years ago when there was little or no response from the GSCs.

One area of concern is the number of GSCs at the meetings. This past year we only had one. We need to schedule meetings where more frequently and when more GSCs are able to attend.

Environmental Performance

Physics has an outstanding record with regard to protecting the environment. Over the past few years, the waste generated has been below the projections Waste Management has provided for the Physics Department. The Department has increased awareness for proper waste disposal which has nearly eliminated personal waste (trash and items brought from home) and improper disposal of items (computer monitors, etc). More lead bricks in building 510 have been recycled and more at the

ATF have been replaced with painted ones. Some vacuum pumps that contain oil have been replaced with dry pumps reducing the oil waste generated. We have also reduced the number of chemicals in the building. The Department also recycled a few thousand pounds of old electronic materials as part of the DOE recycling program.

Summer Student Monitoring Program

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 maintained a list of summer students and the ESH Coordinator met with the students as a group when they arrived. The ESH Coordinators and Building Manager specifically looked for students working in laboratories throughout the summer to make sure they were working safely. Students were reminded to wear a bicycle helmets.

The ATF does host students throughout the year. The students receive a comprehensive orientation and are monitored at all times. Their ability to work independently is governed by their achievements in their areas of expertise and demonstrated record of compliance.

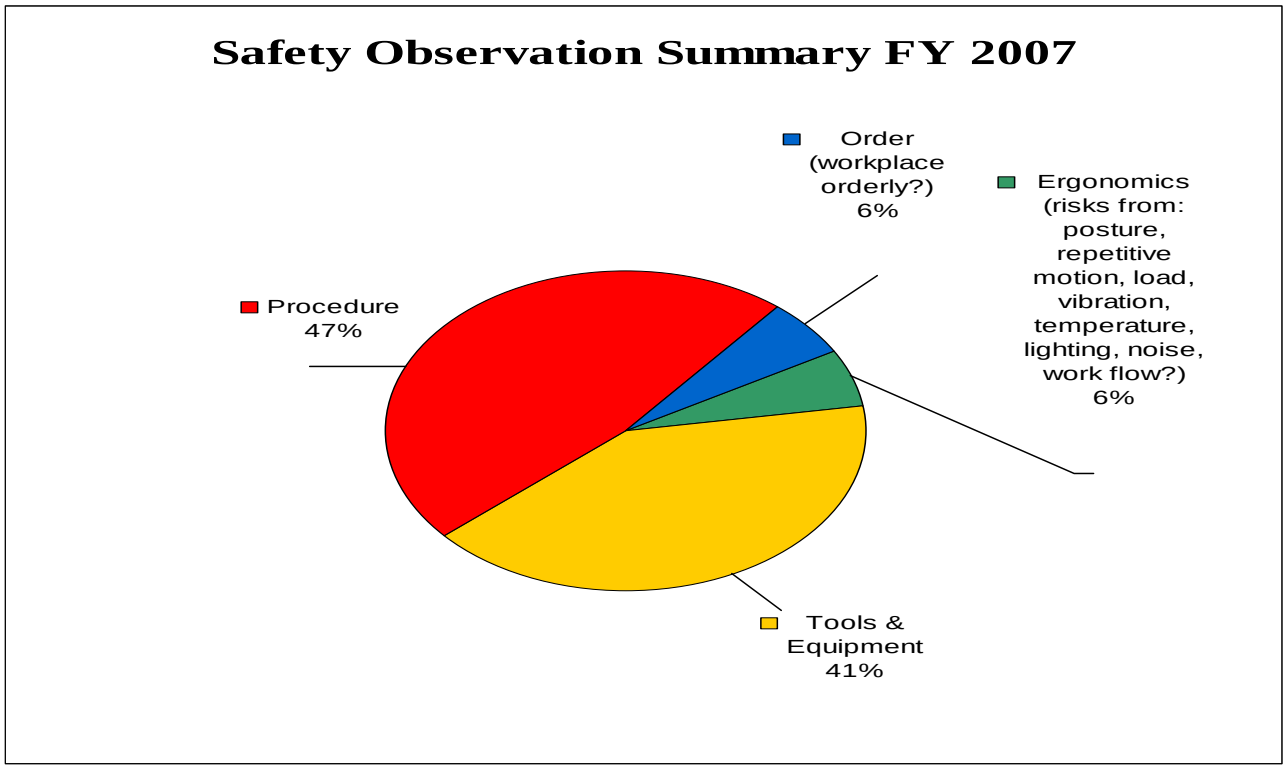
Physics Department & Condensed Matter Physics / Materials Science Department

In two MOUs established last year, the Physics Department provides safety services for the CMPMS Department. Specifically, responsibilities for ESRs, Work Permits, Authorized User Lists, Web request approvals for chemicals and hazardous equipment, Radiation Generating Devices, LO/TO, FUAs, waste, training, audits, Accident/Incident Investigation, EMS, OHSAS, Self-Assessment and Evaluation, Points of Contacts, and Tier I Inspections are covered in these agreements.

This arrangement is scheduled to cease at the end of the 2008 fiscal year. New MOUs will be generated at that time to govern the responsibilities of each Department for safety and Tier Is.

Safety Observations

The Physics Department has 4 members (Chair, Associate Chair, ESSH Committee Chair, and Manager of ESSH&T Programs) who have taken the training and hosted approximately 25 people for observations in Building 510 for the practical portion of that training. Additionally, the ALD of NPP, Manager of ESSH&T Programs in Physics, and the Associate Chair for ES&H/QA from the C-A Department have done monthly walkthroughs since then. These have proved to be fruitful and worthwhile. A number of corrective and follow-up actions have resulted from these observations.



- Procedures
  - Researcher was eating lunch in one portion of the lab. Stated he keeps food separate from area where hazardous materials are.
  - Researcher is organizationally from Medical Department. Expiration of training would not be flagged in PO
  - Observers concerned that troubleshooting station was set up next to mechanical technician w/o a review of the work or consideration of the proximity to the technician. Technician was not concerned as he "trusted" the other workers. The supervisor of the technician was also unaware of the setup.
  - There may be a conflict of interest in the Duty operator performing a sweep for himself, keeping his own people in the experimental hall.
  - NRTL check of equipment
  - Circuit breaker on wall is behind equipment – is it permissible or needs to be moved?
  - Laser operator turned on laser without fulfilling entrance requirement to 'log in'.
  - Access to some electrical boxes does not have the required OSHA clearance.
- Tools & Equipment
  - Found a built-in bench in front of circuit breaker box.
  - Power strip daisy chained into another power strip.
  - Drop cord from ceiling – is it temporary wiring or permanent?
  - Found a built-in bench in front of circuit breaker box.
  - Power strip for heating tapes is being controlled through a Variac – is it permitted?
  - There may be fire hazard issues

Additionally, our DOE Facility Representative and the Manager of ESSH&T Programs also make unannounced visits to areas of the Department. During these visits, workers have an opportunity to bring safety issues to the attention of our DOR Representative who has followed up on issues to the benefit of the Department, the work area, and the morale of employees.

Audits

External

- 11/16 NYSDEC Hazardous Waste Inspection
  - No findings
- 5/21 – 5/25 EMSA & OHSAS Reassessment
  - No findings
- 8/6 – 8/10 ISM Planning Visit
- 8/20 – 8/31 ISM Audit
  - Good programs, but many opportunities for improvement
    - Inadequate implementation and enforcement of controls
    - Gaps in IH monitoring: soldering, machine shops
    - Need more specific controls in ESRs

BNL Internal

- 11/15 – 12/15 10CFR 851 gap analysis self assessment
  - Small Science Working Group responded
- 1/5 Beryllium Use Review Form audit
  - No findings
- 1/22 – 1/25 DOE-BHSO material handling operations & equipment assessment
  - No findings
- 1/25 RGD Triennial Assessment
  - No Findings
- 1/29 – 2/2 DOE-BHSO laser audit
  - No findings
- 2/5 – 2/9 EMS & Partial OHSAS audit
  - Noteworthy: incorporated risk assessment into ESRs
  - Noteworthy: OSH objectives concentrate on improvements
  - Noteworthy: introduction to the Physics Department presentation
- 2/16 Shielding Policy Review by RCD
  - Recommendation – Although the ATF's SAD, ASE, and procedures contain the shielding policy requirements, it is difficult to pinpoint exactly where the information is. It would be beneficial to have a shielding policy section in the SAD with a reference to where the required information is located in the SAD and other documents
- 4/9 – 4/13 DOE-BHSO exhaust ventilation audit
  - No findings
- 5/9 Worker feedback, lessons learned assessment
  - Fact finding mission, no report
- 4/14 – 4/18 DOE-BHSO Radiation Protection Program assessment
  - No findings
- 4/19 Interview with Facilities Safety Management System Team (regarding the ATF's ASE)
  - No findings
- 5/11 Calibration audit
  - CMP: several questions about procedures, but no finding
- 5/13 DOE-BHSO audit of electrical safety corrective actions
  - No findings
- 9/20 Nuclear material audit
  - No findings, but closed unneeded MBA after audit
- 9/20 – 9/25 Industrial hygiene and safety engineering audit
  - LOTO policy did not differentiate between "authorized" and "effected" workers
- 9/27 DOE-BHSO RCRA audit

    - Storage of waste outside satellite area: corrected immediately, finding rescinded
- 9/30 DOE-BHSO rollup of Tier 1 observations

Physics Assessments

- Various ergonomic evaluations
- Lead & Cadmium surface wipes
    - Identify contamination of areas being abandoned
    - Improve work practices, in collaboration with CMP
    - Clean up legacy areas, in collaboration with CMP
- 1/5 Physics Department FY06 self assessment
- 3/15 – Chemical inventory reconciliation
- 5/7 – Gas system evaluation
- 7/24 – Noise evaluation at BCF
- Quarterly reviews of ATF area dose rates

Completed Recommendations/Goals for FY 2007

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

2. Work for a smooth transition for CMPMS Department eventual take over of all their safety and Tier I responsibilities from the Physics Department that leaves no gaps or lapses in ESSH or other programs.

3. The Physics Department will improve its Corrective Action Management by reviewing more of its corrective actions 12-18 months after closure to evaluate their effectiveness.

4. Prepare Department for 10CFR851 Rule.

5. Prepare Department for ISM Audit.

Recommendations/Goals for FY 2008

1. Reduce the number of machines in the Physics Department's machine shops
2. Reduce the number of machines in the Central Fabrication Division's satellite shop
3. Re-arrange the machines in the CS satellite shop to move them away from the breakers and switches
4. Provide magnetic anti-restart devices or signs for all our remaining machines
5. Evaluate and approve at least 50% of the electronic equipment as a NRTL goal
6. Sample and clean at least 2 labs for heavy metal contamination
7. Convert most of the ESRs to the on-line form
8. Increase the number of GSC meetings to 2 or 3 this year. Conduct a Meeting where the main topic is PPE – especially for machine shops with proper eyewear and for using gloves when using sharps
9. Some computer systems are lacking responsible system administrators (SA). We are instituting a list of "official SAs" and assuring that every system is administered by someone on the list.
10. We will have all our laptops with property passes are encrypted and will work to get encryption on many of the others

11. Longer term, ITD is pressuring to centralize the administration of all Unix systems. We must either show that our systems already meet the goals of this centralizing project or we must install their centralization tools.
12. Remove >50% of spray cans in labs with the focus on those that will not be used in the next year and consolidate chemicals in labs

Acronyms

ALARA	As Low As Reasonably Achievable
ALD	Associate Laboratory Director
ASE	Accelerator Safety Envelope
ATF	Accelerator Test Facility
ATS	Action Tracking System
BES	Basic Energy Sciences
BNL	Brookhaven national Laboratory
BSA	Brookhaven Science Associates
BTMS	Brookhaven Training Management System
BURF	Beryllium Use Review Form
C-AD	Collider-Accelerator Department
CA	Corrective Action
CFN	Center for Functional Nanomaterials
CMP	Condensed Matter Physics
CMPMS	Condensed Matter Physics & Materials Science
CMPMSD	Condensed Matter Physics & Materials Science Department
COO	Conduct of Operations
DART	Days Away, Restricted, or Transferred
DEC	Department of Environmental Compliance
DER	Department EMS Representative (R. Gill)
DOE	Department of Energy
DOE-BHSO	Department of Energy-Brookhaven Site Office
EAC	Environmental Assessment Committee (R. Gill and M. Van Essendelft)
ECR	Environmental Compliance Representative (M. Van Essendelft)
EMS	Environmental Management System
ESH (ES&H)	Environment, Safety, and Health
ESH&Q	Environment, Safety, Health & Quality
ESR	Experimental Safety Review
ESRC	Experimental Safety Review Coordinator
ESSH	Environment, Safety, Security, and Health
ESSH&T	Environment, Safety, Security, Health, and Training
EWMSD	Environmental & Waste Management Services Division
FY	Fiscal Year
GSC	Group Safety Coordinator (See GSC list)
IA&O	Internal Audit and Oversight
ISM	Integrated Safety Management
ISSM	Integrated Safeguards and Security Management
ISO	Independent Standards Organization
ITD	Information Technology Division
JTA	Job Training Assessment
LOTO	Lock Out Tag Out
LSO	Laser Safety Officer
MOU	Memorandum of Understanding

MPMS	Magnetic Properties Measurement System
NFPA	National Fire Protection Act
NPP	Nuclear and Particle Physics
NRTL	Nationally Recognized Testing Laboratory
NSLS	National Synchrotron Light Source
NYSDEC	New York State Department of Environmental Compliance
OHSAS	Occupational Health & Safety Assessment Series
OPSEC	Operations Security
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PAAA	Price-Anderson Amendment Act
PI	Principal Investigator
POC	Point of Contact
R2A2	Roles, Responsibilities, Authorities, and Accountabilities
R&D	Research and Development
RCD	Radiological Controls Division
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
RGD	Radiation Generating Device
RHIC	Relativistic Heavy Ion Collider
SAP	Self Assessment Plan
SBMS	Standards Based Management System
SECON	Security Conditions
SOP	Standard Operating Procedures
TLD	Thermoluminescent Dosimeter