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| 1) Policies<br>a) Specify goals and the means to achieve them | 1) Policies<br>a) Goals, objectives and targets, some of which are derived from institutional-level documents, e.g., an Appendix of the BSA Contract, Critical Outcomes, Objectives and Performance Measures, are integrated into the Department's Environmental Management Programs (EMPs), OSH Management Plan and the annual Self Assessment Plan for the C-AD. The C-AD goal for risk from all hazards is not only to be below relevant legal limits, but also is to be 'as low as reasonably achievable (ALARA).' The goal for work related illness and injury is zero and ESH is an overarching priority for all activities. For radiation exposure, the annual ALARA goal is recommended by the ALARA Committee and approved by the Department Chair. The ALARA philosophy has also been expanded to include waste generation and the potential for pollution from accelerators and experiments. Performance against goals is reviewed by C-AD and BNL managers at the annual Environmental, OSH and Self Assessment Management Review, and resources are assigned, if appropriate, following the review. | 1) Policies<br>None |
| b) Specify the type of controls necessary to implement the policy | b) Supervision, administrative controls, training, procedures and engineered safety systems are used to implement policy. | |
| c) Personnel should understand their authority and responsibility, through accountability | c) Authority, responsibility, accountability and interfaces with other groups are defined clearly in the Operation Procedure Manual (OPM), Chapter 1, "Authorization, C-AD Documents, and Definitions" and Chapter 2, "Guidelines for the Conduct of C-AD Operations." Specific individuals are trained and held accountable for safety, emergency, commissioning and operations roles. The Department employs the R2A2 concept, which is an institutional program to define role, responsibility, accountability and authority for each employee. In addition, to hold all staff responsible for accountability, OPM 1.26, "C-AD Standards for Disciplinary Action" describes the Department disciplinary policy. | |
| d) Physical Security should conform to DOE 5630.11, "Safeguards and Security Program" | d) The exterior doors to most buildings are locked from 5 PM to 8:30 AM and on weekends and holidays. The accelerator vault at the Tandem Van De Graaff (TVDG) is secured when operations personnel are not in residence. A C-A Property Protection Area (PPA) is a facility, or portion thereof, that requires access control to prevent unacceptable loss or destruction of | |

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| | valuable property and/or disruption of research. Assigned PPA's for C-A are Cryogenic Control Room (Building 1005S), the Equipment Area (Building 911B), and NSRL Experimental Building 958, when the facilities are operating. See OPM 2.32, "Access Controls – Building 911B, 958 and 1005 Property Protection Areas (During Operations)." C-AD accelerator areas are secured via automatic access-control system hardware. In addition, requirements for security of valuable materials is specified in OPM 1.20, "C-A Policy for Valuable Materials Security" and OPM 9.10, "C-AD Security Committee Policy and Requirements." | |
| 2) Resources<br>a) Provide sufficient resources, material, and labor<br><br>b) Do not use excessive overtime<br><br>c) Provide technical support personnel<br><br>d) Develop a long range staffing plan. | 2) Resources<br>a) We have a minimum numbers of Operators and Operations Coordinators defined in the Accelerator Safety Envelopes. This minimum staff is deemed sufficient by DOE for safe operation, although larger staffs are used routinely for operational efficiency. During operations, materials and resources for the accelerators are managed day-to-day by the Operations Coordinator, and during Shutdown, by the Maintenance Coordinator. Sufficient resources are provided.<br><br>b) Excessive overtime is avoided where possible by using shift operations. Overtime is specifically addressed in OPM 1.23, "Staff Working Hours and On-Call Hours."<br><br>c) The technical support personnel, accelerator operators, Siemen's operators, Radiological Control Technicians (RCTs), Collider Accelerator Support (CAS) personnel and Cryogenic Systems (Cryo) Watch personnel, are staffed according to various changes in operations.<br><br>d) C-AD management prepares a long-range staffing plan | 2) Resources<br>None |
| 3) Monitoring Of Operations Performance<br>a) Refer to Chapter VI for operating problems<br><br>b) Document problems for evaluation | 3) Monitoring Of Operations Performance<br>a) See Chapter VI for operating problems<br><br>b) Scheduled inspections, performance indicators, audits, reviews, critiques, injury and illness reports, self-assessments and self-evaluations are used to document problems for evaluation and to observe operations. Problems are also documented via the Trouble Reporting System (OPM 2.9) and occurrences are documented via the Occurrence Reporting System (OPM | 3) Monitoring Of Operations Performance<br>None |

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| | 10.1). Minor issues are critiqued to reduce the chances that they lead to future occurrences. The C-AD operators use a web-based machine-performance monitoring log. | |
| c) Supervisor should observe operations frequently. | c) Supervisors participate in inspections and audits, they are members of safety review committees, and they are encouraged by C-AD management to 'supervise by walking around.' | |
| d) Operations Goals should be to:<br>i) Minimize the unavailability of the safety system | d) Operations Goals<br>i) Operations procedures minimize the unavailability of safety systems by requiring operations to be curtailed should safety systems fail to operate | |
| ii) Minimize personnel errors | ii) Minimizing personnel errors is a goal, see OPM 2.1, "Operations Organization and Administration." INPO Human Performance approaches are used to minimize events by recognizing error-likely situations | |
| iii) Conform to ALARA guidelines | iii) ALARA is integrated into routine operations via OPM 6.1.0, "ALARA Strategies for Tuning during Proton Operations" and into work review and planning via ALARA Committee procedures (OPM Chapter 9.5 series). Operators aim at reducing beam losses to the lowest reasonably achievable level. | |
| iv) Minimize loss of the facility capability | iv) High reliability is a C-AD goal given the overarching constraints of safety and the available resources. Equipment breakdown at C-AD is the major source of radiation exposure to workers, and high reliability is built into components based on experience gained in the past 45 years. At the TVDG, a computer aided maintenance program is audited on a daily basis in order to aim for maximum system and facility availability. | |
| v) Minimize the number of unscheduled shutdowns | v) Unscheduled shutdowns are minimized through periodic maintenance, formal reporting of problems such as the C-AD Trouble Report System, good communications between users and operators such as the Weekly Time Meeting and the C-AD Web Site, and by designing | |

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| | equipment to be "radiation hardened." | |
| vi) Complete inspections on a timely basis | vi) Completing inspections on a timely basis is ensured through written procedures and checklists for Operators, RCTs, Cryo Watch and CAS | |
| vii) Minimize the amount of overtime | vii) Maintaining shift operations during running periods minimizes overtime. Overtime is specifically addressed in OPM 1.23, "Staff Working Hours and On-Call Hours." | |
| viii) Achieve and maintain complete staffing and training requirements | viii) Achieving and maintaining complete staffing and training requirements are requirements in OPM 2.1, "Operations Organization and Administration." For example, see the Operational Safety Limit for Operators, Operations Coordinators and Watch for Hydrogen Targets in OPM 2.5, "Accelerator Safety Envelope Parameters for AGS, Booster, Linac and Associated Experimental Areas." | |
| ix) Minimize waste | ix) Waste minimization is a formal program in SBMS, and requirements are implemented via the OPM 8.20 and OPM 8.22 series of procedures that deal with hazardous, radioactive and clean waste plus recycling. Also see OPM 1.7, "Supervisory Practice for Working with Hazards," which describes supervisor responsibilities in this area. Waste minimization and pollution prevention are specific responsibilities listed in each person's R2A2 (Roles, Responsibility, Accountability and Authority). It is also considered during the environmental concerns portion of planning of work as shown on the Work Permit form. | |
| x) Minimize the number of lighted annunciators | x) When new systems are introduced into the Main Control Room, Sieman's Control Room, TVDG Control Room and Cryogenic Control Room, human factors are considered in the design of panels and annunciators. | |
| xi) Goals should be measurable, achievable, and auditable | xi) Goals such as days away from work or transfer (DART) case rate, collective dose and dose per proton are measurable and many have been achieved each year over the last decade. Specific operations goals are included in the Department's Self-Assessment Plan. ALARA goals are included in OPM 9.5.7, "ALARA Goals." Each week during | |

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| | operations and less frequently during major shutdowns, physicists, operators, Head of Main Control Room, Users, and C-AD management meet to critique the previous week's operations and to discuss future goals. | |
| xii) Develop an Action Plan to meet goals | xii) The Self Assessment Plan is an action plan for Department operations. Ad hoc groups or C-AD committees typically develop action plans in response to an event or audit results. Action plans to meet goals are also found in the Department's Environmental Management Programs and OSH Management Plan that relate to BNL environmental and OSH goals. | |
| xiii) Report results of audits to facility management and DOE | xiii) Results of audits are reported to C-AD management and where applicable up the line to DOE. Annually, results of audits are reviewed at the Department's Environmental, OSH and Self Assessment Management Review. | |
| xiv) Perform Self-Assessments | xiv) Management and worker self-assessments and self-evaluations are conducted on an established schedule and reports are forwarded to C-AD management. Corrective actions are tracked to closure via the Assessment Tracking System (ATS). See OPM 9.4.2, "C-AD Self Evaluation" and OPM 13.10.1, "Independent Assessment." The C-AD Enhanced Work Planning Procedure, OPM 2.28, "C-AD Procedure for Work Planning and Control for Operations," contains a job-specific assessment module that requires workers to assess specific jobs at completion. The department's self-assessment program is described in terms of the Baldridge Award Criteria in the Assessment Planning and Evaluation Criteria Framework as defined in the SBMS Integrated Assessment Subject Area. | |
| 4) Accountability<br>a) Hold workers and supervisors accountable for their actions | 4) Accountability<br>a) The C-AD has a formal performance appraisal program and Roles, Responsibilities, Authorities and Accountability (R2A2) program for all C-AD staff. These documents are maintained by the C-AD Chairman's Office. | 4) Accountability<br>None |
| b) Use discipline and performance appraisals to ensure accountability | b) Adhering to all rules, including rules dealing with safety, quality, operations or maintenance, is factored into an individual's appraisal, performance goals | |

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| | and R2A2. Discipline has been used when appropriate as described in OPM 1.26, "C-AD Standards for Disciplinary Action." For example, letters to a personnel file have been written when procedures were not followed. On other occasions, personnel have been given time off without pay or Users have had letters sent back to their University management when safety rules were willfully violated. | |
| 5) Management Training<br>a) Formal training of supervisors and other management should be incorporated into overall training plan. | 5) Management Training<br>a) The C-AD Training Plan is described in OPM 1.12, "Conduct of Training Policy (Training Plan)." The C-AD has performed job assessments for all positions including management and supervisors, and has developed corresponding training requirements. The C-AD Training Manager maintains the Job Training Assessments (JTA). | 5) Management Training<br>None |

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| 6) Planning For Safety<br>a) Provide guidance to personnel so that they understand safety requirements | 6) Planning For Safety<br>a) All jobs are assessed for environmental, safety and health hazards, and the necessary training is given before persons are authorized to perform the job. In order to guide personnel, the C-AD has incorporated job-specific safety requirements into OPM procedures. See OPM 2.28, "C-A Procedure for Work Planning and Control for Operations," and OPM 2.29, "C-AD Enhanced Work Planning Procedure for Experimenters." Where appropriate, C-AD has required staff and users to qualify in formal training programs where job-specific safety rules are explained. | 6) Planning for Safety<br>None |
| b) Explain the role of Safety Analysis system to all operations personnel | b) The Accelerator Safety Envelopes (OPM 2.5 series of OPMs) binds operators. Safety analysis and DOE approval are required for operations outside the envelope. Management requirements to control change at the accelerators or experiments are set down in OPM Chapter 9 procedures for physicists and engineers, and in OPM 2.11, "Conduct of Operations for Accelerator Physicists and System Specialists," which is directly relevant to accelerator physicists or beam commissioners. C-AD accelerator physicists, beam commissioners, project engineers, project physicists, liaison engineers and liaison physicists are made familiar with the requirements for safety review through periodic training. For operations that inadvertently go beyond the safety envelope, operators are required to report via the Occurrence Reporting Procedure, OPM 10.1. All operations staff is made aware of the protocols either for reporting occurrences or for scheduling safety reviews through facility-specific and job-specific training programs. | |