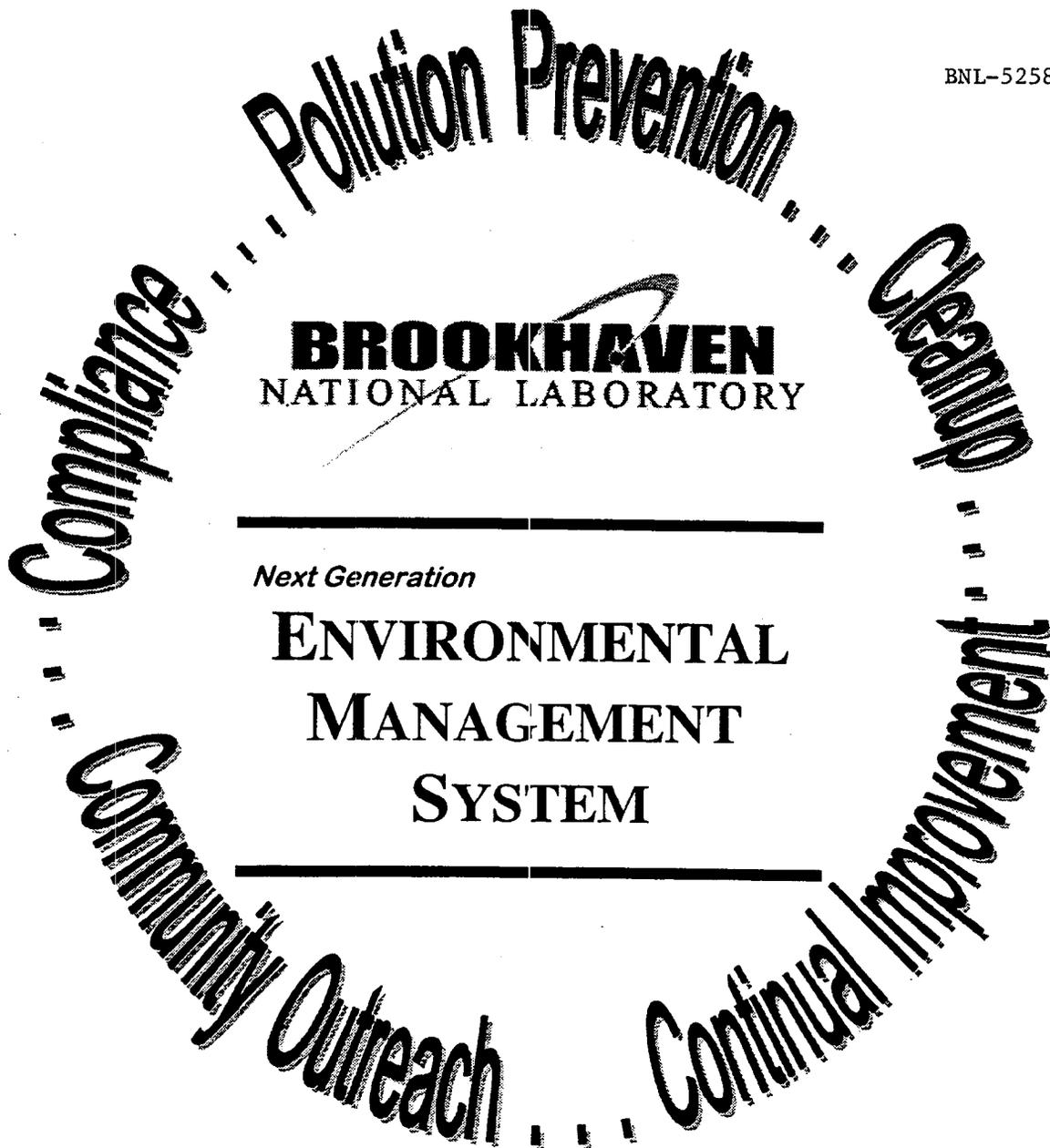




PROJECT MANAGEMENT PLAN

REVISION 1, 9/99



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**ENVIRONMENTAL MANAGEMENT SYSTEM
PROJECT MANAGEMENT PLAN**

**September 21, 1999
Revision 1**

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U. S. DEPARTMENT OF ENERGY**

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Appendices

Appendix 1	DOE/EPA Memorandum of Agreement: Attachment 2 and 2A
Appendix 2	ISO 14001 Environmental Management System Standard
Appendix 3	EMS Project Work Breakdown Structure (WBS) Dictionary
Appendix 4	EMS Implementation and Resource Model

List of Acronyms

ACWP	Actual Cost of Work Performed
ALD	Associate/Assistant Laboratory Director, Brookhaven National Laboratory
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BHG	United States Department of Energy Brookhaven Group
BNL	Brookhaven National Laboratory
BSA	Brookhaven Science Associates
CCATS	Commitments and Corrective Action Tracking System
CIGPA	Community Involvement, Government, Public Affairs
CTO	Central Training Office
DOE	United States Department of Energy
EM	Environmental Management Directorate
EMS	Environmental Management System
EPA	United States Environmental Protection Agency
EPO	Environmental Protection Office
EPT	Emergency Planning Team
EMSD	Emergency Services Division
ESD	Environmental Services Division
ESH&Q	Environment, Safety, Health and Quality Directorate
FY	Fiscal Year
IAP	Integrated Assessment Program
IP	Integrated Planning
ISM	Integrated Safety Management
ISO	International Organization of Standardization
MOA	Memorandum of Agreement
MSIP	Management System Improvement Program
P2	Pollution Prevention Program
PBMS	Performance Based Management System
PMP	Project Management Plan
QMO	Quality Management Office
R&D	Research and Development
R2A2	Roles, Responsibilities, Authorities and Accountabilities
SHSD	Safety and Health Services Division
SBMS	Standards Based Management System
SEAPPM	Safety and Environmental Administrative Policy and Procedures Manual
T&QS	Training and Qualification System
WBS	Work Breakdown Structure
WMD	Waste Management Division

EXECUTIVE SUMMARY

The Environmental Management System (EMS) Project establishes a comprehensive Laboratory system for planning, implementing, monitoring and assessing environmental issues at BNL. This system will enhance environmental management at BNL by adopting the tenets of the ISO 14001 Standard and increasing emphasis on compliance assurance, community outreach and pollution prevention. To maximize effectiveness and minimize resource expenditures, the EMS will be implemented at BNL within the framework of Integrated Safety Management (ISM) and integrated with other related BSA initiatives. The project has been initiated to satisfy the EPA/DOE Memorandum of Agreement (MOA) and the DOE/BSA contract commitments. It has been designed to achieve success in DOE-BHG annual audits and meet the expectations of BSA, DOE, EPA, and the community. This EMS Project Management Plan attests to BNL's commitment to comply with applicable regulations, prevent pollution, and continuously improve the Laboratory's environmental performance.

The scope of this EMS project in year one includes developing an institutional, laboratory-wide program that provides the basic requirements and a set of effective and efficient operational practices for environmental management of BNL operations. Initial implementation will be done in three pilot facilities: Reactor Operations, Waste Management Division and the RHIC Project. The lessons learned from the pilot facilities will be incorporated into the institutional EMS and deployed throughout the remaining Directorates in year two. The Laboratory as a whole shall "self-declare conformance", and upon DOE approval, facilities with a high potential to impact the environment shall become "certified" to ISO 14001 Standard by the end of FY00. During year three, the project will transition to the respective line managers and Management System Owner for maintenance and improvement, and is closed-out when the Laboratory successfully completes the third annual audit required by the EPA/DOE MOA.

The EMS project is being implemented using a project management approach with requisite controls to ensure satisfactory completion of milestones and commitments. The total cost estimate for the EMS Project is \$2.74 M over the life of the project (2.5 years: 6/98-12/00). Annual costs to maintain the EMS Program are estimated to be \$0.4 M. The project cost is distributed between Line Department Support, \$1.75 M, Overhead Department Support, \$0.38 M, and Project Management Support, \$0.61 M.

INTRODUCTION

This project management plan presents the requirements, planning, organization, and management system that will be used by Brookhaven National Laboratory (BNL) to identify, direct, control, and report the scope of work included in the Environmental Management System (EMS) Project. The EMS Project Management Plan (PMP) has been prepared to implement the requirements of the DOE-EPA Memorandum of Agreement (MOA) with regard to establishing a system to manage environmental matters at BNL. The EMS system has been developed within the framework of a site-wide integrated Environment, Safety and Health Management system in accordance with the ISO 14001 Standard and with enhanced emphasis on compliance assurance, community outreach, and pollution prevention at BNL. Successful implementation contributes to the critical outcomes established by BNL as the most important deliverables in the next 3-5 years. This project is directly related to the following two 1999 critical outcomes:

BNL will conduct all work and manage its facilities with distinction, fully integrated with and supportive of the science, technology, and clean-up missions, while being fully protective of workers, users, the public, and the environment (Critical Outcome 3.0, Operational Excellence).

BNL will be an exemplary environmental steward through safe and aggressive environmental clean-up, efficient waste management and effective communication of the environmental health of the Laboratory (Critical Outcome 4.0, Environmental Stewardship).

By enhancing emphasis on community outreach, the EMS project also contributes to the success of the following critical outcome:

BNL will be recognized as a community asset, a good neighbor, and a valued employer (Critical Outcome 2.0, Communications and Trust).

1.1 PROJECT PLAN DESCRIPTION

The EMS Project Plan establishes the criteria by which the EMS Project will be managed. This plan does not include provisions in the MOA to implement the process evaluations and environmental regulations training, nor the annual audit components of the MOA. The effort associated with development and implementation of the process evaluations and environmental regulations training is the subject of the Process Evaluation PMP. The DOE-BHG is directly responsible for management and implementation of the annual audit program requirements specified in the MOA, however this project plan does include the tasks associated with hosting and developing corrective actions for the first three of five annual audits. The tasks, schedule, and resource estimates contained within this PMP will be maintained current. Any changes to the management of this project will be incorporated as changes to this project plan via the Baseline Change Control Process. This PMP contains the following sections:

- Section 1 - Program Goals and Objectives: This section provides a summary of the basis for the Environmental Management System Project, the goals and objectives of the project effort, and a summary scope description.
- Section 2 - Management Organization and Responsibilities: This section identifies the project

organization (incremental and contributed resources), authorities, accountabilities, roles, and responsibilities established to achieve the project goals and objectives. This section provides the organizational breakdown structure which is the responsibility matrix for the project work breakdown structure (WBS).

- Section 3 - Project Baseline: This section describes the project work breakdown structure, scope, cost, schedule baselines, project milestones, and deliverables.
- Section 4 - Project Control System: This section outlines the management system used to monitor and control project implementation and performance. This support provides control of the "commercial quality" of the project.
- Section 5 - Project Support: This section describes the indirect support requirements necessary to assure the "technical quality" of the project.
- Section 6 - Project Transition and Closeout: This section describes the activities necessary to ensure that the effort put forth to complete this project has been effectively transitioned to permanent organizations.

2 PROJECT BACKGROUND

In May 1997, the U. S. Environmental Protection Agency (EPA) conducted a multi-media audit of BNL. The findings of this audit resulted in the EPA Region II Administrator and the U. S. Department of Energy (DOE) Office of Energy Research Director voluntarily signing a MOA on March 23, 1998. This MOA requires DOE (and BNL) to establish and perform four environmental initiatives, Environmental Regulations Training, Facility-Wide Process Evaluations, Environment Management System Audits, and Environmental Management System Implementation.

In the agreement, the Phase III provisions require that DOE conduct five annual audits at BNL starting in 1998 (the requirements of the audit are detailed in Attachment 2 of the MOA, *Environmental Management Systems Audit Agreement*). The purpose of these audits is to gauge the progress of BNL in implementing an effective Environmental Management System (EMS). The DOE Brookhaven Group (BHG) has lead responsibility for implementing the annual audit requirements. The specific elements which will be audited include the ISO 14001 Standard, DOE Integrated Safety Management System (ISM) principles, and additional criteria for compliance assurance, community outreach, and pollution prevention. These elements are defined as the basis for the BNL EMS in Attachment 2A of the MOA, *Elements of BNL Environmental Management System* and will be implemented by BNL. The sections of the MOA that pertain to Phase III (annual audits and the EMS program elements) are included for reference in this project plan as Appendix 1.

Brookhaven Science Associates (BSA) commitment to DOE, independent of the MOA, is to fully integrate ISO 14001 implementation with the development and implementation of ISM. The DOE/BSA contract also requires BSA to: (1) recommend operations that should pursue third-party registration (to ISO 14001) by end of FY 1998; (2) obtain third-party registration by the end of FY 2000 in the program areas having a high potential to impact the environment, as approved by DOE; and (3) "self declare" conformance to ISO 14001 for the Laboratory as a whole by mid FY 2000. The ISO 14001 requirements are provided in Appendix 2.

The DOE-BHG followed up the MOA with correspondence to BNL outlining their commitment to implement the EMS and requested that this effort be implemented using a project management approach. Dr. Kenneth C. Brog, Assistant Laboratory Director for ESH/Q, has been assigned Level 1 responsibility and accountability for the EMS; M/s. Susan L. K. Briggs has been appointed Project Manager. In response to the BSA commitment to DOE, the voluntary EPA/DOE MOA, and request by DOE-BHG, this project management plan has been developed.

1.3 PURPOSE

The EMS project establishes a comprehensive Laboratory system for planning, implementing, monitoring and assessing environmental issues at BNL. This system will enhance environmental management at the BNL by implementing the requirements of the ISO 14001 Standard with increased emphasis on compliance assurance, community outreach and pollution prevention. To maximize effectiveness and minimize expenditures of resources, the EMS will be implemented at BNL within the framework of ISM and other related BSA initiatives such as Integrated Assessment (IAP), Performance Based Management System (PBMS), Standards Based Management System (SBMS), Training and Qualification System (T&QS), Strategic Communications, and Integrated Planning. Table 1 identifies the interdependence of the BNL Management Systems and the respective EMS program elements.

The scope of this project includes developing an institutional laboratory-wide EMS program that provides the basic requirements and a set of clearly delineated, effective and efficient operational practices for environmental management at BNL. The institutional system will be augmented by facility level and project level protocols if needed to further describe how specific requirements, authorizations and controls necessary for operating the facility, performing work or conducting scientific research and development (R&D) projects are implemented. A graphical representation of the BNL EMS as embedded within the ISM model is provided in Figure 1a. A pictorial description of how the EMS will be deployed at BNL is shown in Figure 1b. By integrating the requirements of this project with the new BSA Initiatives, BNL will institute an EMS that meets the expectations of BSA, DOE, EPA, and the community, and will complement DOE-BHG's responsibility to meet schedule requirements for the annual audits specified in the MOA.

1.3.1 PROJECT GOALS

The overall goal of this three-level integrated approach to implementing an EMS at BNL is to ensure protection of the environment, regulatory compliance, and continuous improvement in environmental stewardship. This project will also contribute to achieving the Laboratory's critical outcomes and performance objectives. The specific goals of the EMS project are:

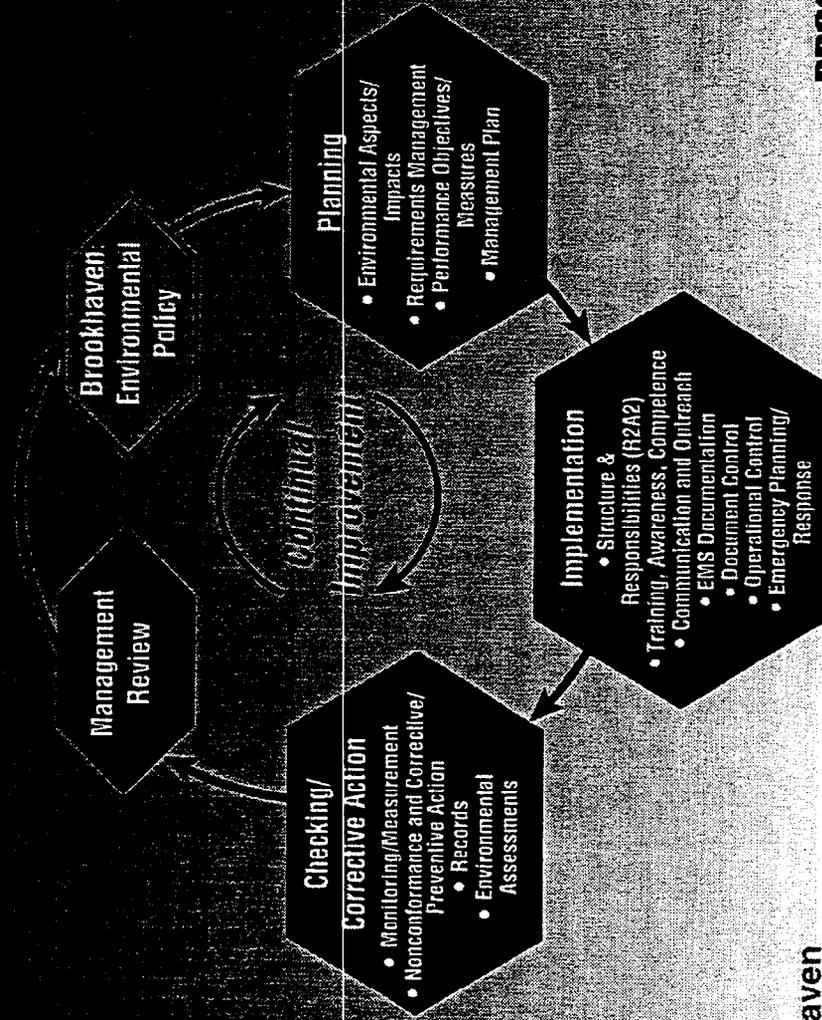
- Establish a Laboratory EMS that conforms to the ISO 14001 Standard.
- Integrate the requirements of this EMS into the related BSA Management System Initiatives.

Table 1

EMS Integration with BSA Management Systems

- Integrated Safety Management & Phase II Process Evaluations
 - Aspects & Impacts
 - Operational Control
 - Monitoring & Measurement
 - Compliance Assurance
 - Pollution Prevention
- Strategic Communications
 - Communications
 - Community Outreach
- Training & Qualification
 - Training, Awareness & Competence
- Integrated Monitoring
 - Monitoring & Measurement
 - Records
- Standards Based Management
 - Legal & Other Requirements
 - EMS Documentation
 - Document Control
- Performance Based Management
 - Structure & Responsibilities
 - Objectives & Targets
- Integrated Planning
 - Environmental Management Programs
- Integrated Assessment
 - Environmental Audits
 - Compliance Assurance
 - Management Review

Key Elements of Brookhaven's Environmental Management System



Brookhaven
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Figure 1a

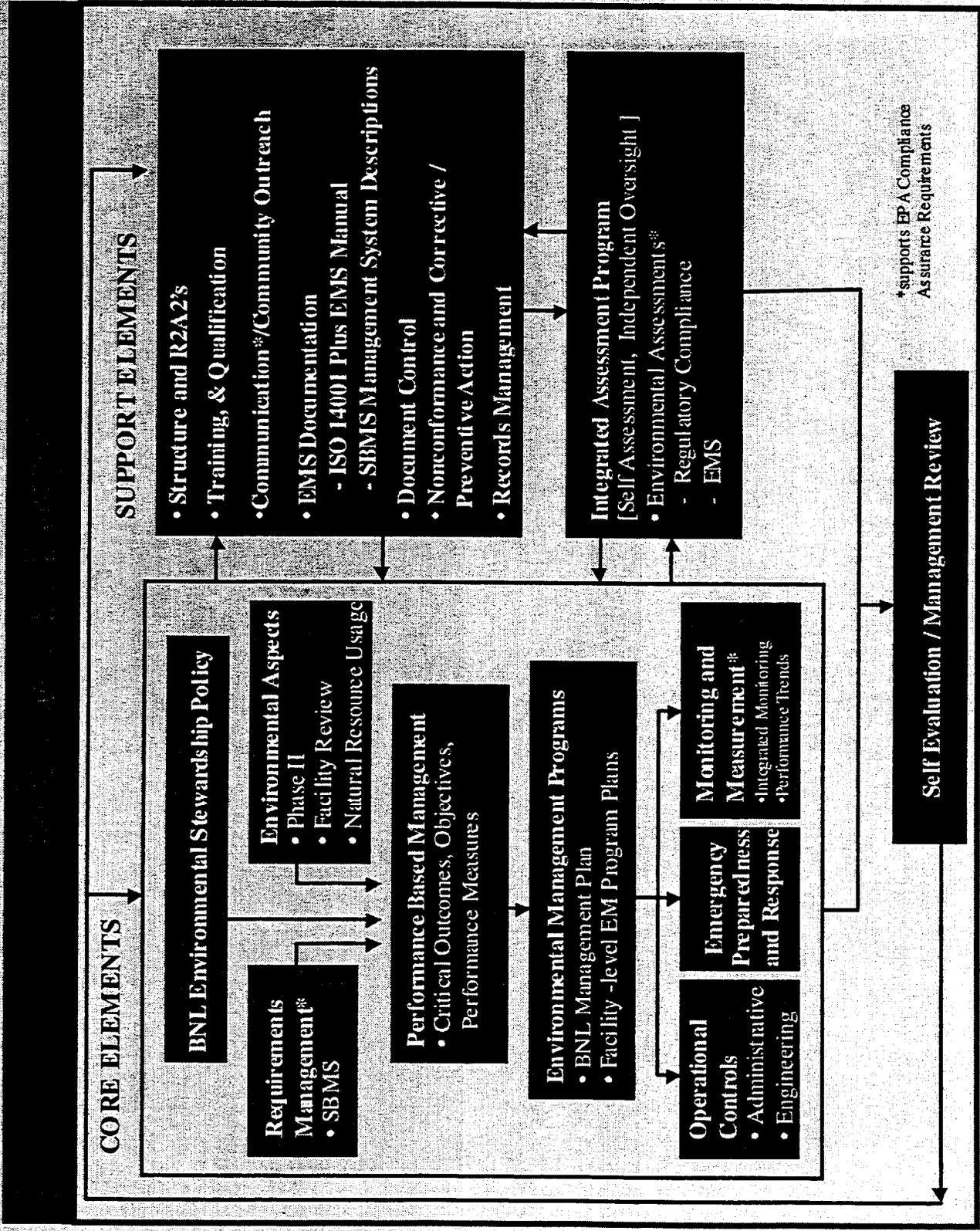


Figure 1b

- Enhance ISO requirements for compliance assurance, pollution prevention, and community outreach.
- Establish a process for nominating organizations that should pursue ISO 14001 registration.
- Obtain ISO 14001 registration for selected organizations.
- Provide lessons learned on EMS implementation for other DOE facilities.
- Self declare conformance to the ISO 14001 Standard for the Laboratory organization by FY 2000.
- Contribute to the achievement of BNL's critical outcomes for Operational Excellence, Environmental Stewardship, and Communications and Trust.

1.3.2 PROJECT OBJECTIVES

The project objective is to enhance environmental performance through the development and implementation of an EMS. This project supports the performance objective for "*Establishing the organizational and systems related infrastructure for ES&H and related management systems*" that is related to the critical outcome on Operational Excellence. To establish this system, the project will focus on the following principles:

- define the environmental policy and ensure management commitment
- formulate a plan to fulfill the environmental policy
- develop capabilities and support mechanisms to achieve the environmental policy
- establish performance objectives and targets,
- measure, monitor, and evaluate the Laboratory's environmental performance
- review and continually improve the EMS, to improve the Laboratory's overall environmental performance.

The project will begin by establishing key institutional level (Laboratory-wide) EMS program requirements, initiating implementation in pilot facilities, training senior management and select personnel involved in EMS implementation, and preparing for the first of five annual independent audits.

The EMS Project will accomplish the following specific objectives during this last three months of FY 1998:

- Integrate EMS requirements for external communications into Strategic Communications Plan.
- Review adequacy of the BNL Emergency Plan and institutional level protocols and incorporate EMS requirements for Emergency Preparedness and Response as needed.
- Integrate EMS requirements, with enhanced emphasis on compliance assurance, into the Self-Assessment program of the IAP Initiative.
- Integrate EMS requirements on Aspects & Impacts, Operational Controls, Monitoring and Measurement, and Pollution Prevention into Phase II Project Evaluation Project.
- Perform a gap analysis of pilot facility and laboratory programs.
- Initiate EMS implementation in three facilities.
- Develop model implementation plan for pilot facilities.
- Identify training requirements for EMS Project and deliver to Pilot Implementation Teams.
- Initiate associations with professional EMS organizations.

1.4 ASSUMPTIONS AND CONDITIONS

The following are assumptions that have been used to formulate the technical basis for the above project goals and objectives. The assumptions have been identified as:

- Critical: criteria that must be satisfied in order to conduct this project.
- Resource: criteria applied to labor, funding, and costs.
- Schedule: criteria applied to project logic, duration, and timing.

1.4.1 CRITICAL ASSUMPTIONS

- The scope of the project addresses the requirements listed in (I) the BSA/DOE contract (page 25, section (f) Commitments of the Contractor, subsection (2) ISO 14001) and (II) DOE/EPA MOA, Attachment 2A, Elements of Brookhaven National Laboratory's Environmental Management System.
- The Laboratory Director commits to the implementation of the BNL EMS on the schedule dictated by the DOE/BSA contract and EPA/DOE MOA.
- The Assistant Laboratory Director (ALD) for ESH&Q approves the project plan and supports the EMS Project Manager with guidance, oversight, and assistance as required.
- Resources required to implement this project will be formally assigned and/or committed to the project manager by cognizant line management.
- The criteria for the Phase II Process Evaluation Project for "highest priority" processes will be the basis for identifying the Phase III EMS requirement for "identifying aspects that can have significant impact", and thereby establish the foundation for the BNL EMS.
- The Phase II Process Evaluations shall provide the technical information at the facility/project level to satisfy the EMS requirements for identifying environmental aspects, impacts, operational controls, legal and other requirements, monitoring and measurement, and pollution prevention.
- DOE BHG will interface between EPA and BNL on Phase III MOA matters.
- DOE-BHG defines the scope and criteria for each of the annual audits required by the MOA consistent with the current version of this project plan and in consultation with the EMS Project Manager.
- Level 1 Managers (Associate/Assistant Laboratory Directors) will appoint a management representative on EMS for their directorate who shall serve as the focal point for the EMS Project Manager, support the Laboratory EMS and the EMS Project Plan, and be responsible for coordinating EMS implementation within their Directorate.
- BSA Initiatives (such as Integrated Assessment, SBMS, PBMS, Strategic Communications, and Integrated Planning) will be designed with EMS requirements incorporated and will be scheduled and implemented to meet EMS time constraints.
- The EMS Project Manager is a stakeholder in other BSA Initiatives and Laboratory programs that are related to EMS requirements, provides technical expertise on these requirements, makes recommendations for integrating the requirements, and provides input on procedures/protocols developed with respect to EMS requirements.
- Support organizations with lead responsibilities in EMS elements will complete implementation on a schedule consistent with the project objectives.
- Line implementation of the BNL EMS will be on a schedule dictated by this project plan.
- PNNL SBMS will be transported to BNL and adopted or customized for use at BNL on a schedule consistent with the EMS milestones.

- EMS project personnel will evaluate the costs and benefits of the Laboratory self-declaring conformance to ISO 14001 versus registering to the standard.

1.4.2 RESOURCE ASSUMPTIONS

- Resource estimates for line implementation of the EMS Program Requirements assume that each ALD establishes an EMS Program within their Directorate that is consistent with the Institutional EMS program requirements and uniformly implemented in the Departments/Divisions that they manage. The following additional assumptions were made: AGS operates under the RHIC EMS Program, Community Involvement/Public Affairs operates under the Director's Office EMS Program.
- The EMS Project Manager is dedicated to this project full time and has the following resources assigned and/or contributed to complete the tasks on the schedule dictated by this project plan:
 - Direct support: secretarial, project controls, environmental expertise, information management, and consultant services.
 - Incremental resources for training programs and consultant services.
 - Contributed resources matrixed to the EMS Project Manager from the following support organizations: the Central Training Office, the Quality Management Office, the Independent Oversight Office, and the Environmental Services Division.
 - Contributed resources from Line Management: Each ALD contributes resources needed to implement the EMS within their Directorate and provide input during the development of the Institutional level EMS Program Requirements.
- Project personnel and EMS Implementation Team members shall maintain cost accounting of resources required to implement the EMS and report these to the EMS Project Manager to enable refinement of estimates for subsequent facilities.
- Resource estimates included in this project plan are for the development of the Institutional Program, project controls and management, guidance and facilitation for pilot facility programs, internal and external communications initiatives, EMS specific training programs, coordination of project/program assessment activities, and project staff MST.
- ECRs will be available to perform process evaluations, assist line on technical aspects of EMS deployment, and pilot facilities will be completed first.
- Integrated Monitoring Initiative will include an environmental monitoring database designed to store both facility and environmental monitoring data in all matrices.
- MOA requirements for Community Outreach will be developed and implemented by the Public Affairs/Community Outreach Directorate via the Strategic Communications Plan.
- MOA requirements for Pollution Prevention will be implemented by the Phase II project and by the BNL P2 Program.
- Costs specifically related to the incremental effort needed to integrate EMS requirements into new BSA Initiatives (such as identifying and communicating EMS requirements; review and approval of deliverables) are included in the project costs, however the costs associated with the implementation of the BSA Initiatives themselves are not. For example, costs/resources associated with updating SBMS with EMS Program Documents will be borne by the SBMS project; resources to conduct Process Evaluations will be borne by the Phase II project.
- Facility and project level resources assigned to the EMS project are not committed to other initiatives that conflict with EMS priorities or compete for limited resources.
- Facility EMS Implementation Teams will be trained using EMS project funds.

- Facility resources will be available to implement the scheduled tasks in the Facility EMS Implementation Plan.
- Estimates were provided by EMS project team members and a selection of scientific department staff based on related experience. The resources required for Laboratory wide deployment were estimated as follows:
 - Estimate tasks and resources required to perform tasks,
 - develop a base program estimate for both administrative and technical divisions/departments,
 - adjust for numbers of employees and number of high priority processes in each division/department. (Estimates will be refined as the project progresses if needed.)
- The estimated cost of the EMS project does not incorporate efficiencies that will be pursued during project implementation, such as use of DOE Audit in Year 3 to accomplish registration process for selected facilities, use of DOE sponsored assistance for EMS tasks in the project plan, etc.

1.4.3 SCHEDULE ASSUMPTIONS

- There is no schedule or cost provision for any rework of EMS program development based on DOE or EPA comment or audit findings. The implementation of the Integrated Assessment System, a multi-level internal assessment program to self-examine, self-identify, and self-correct, will mitigate any substantive comment or finding that could impact schedule.
- Work on the EMS project will commence as follows: Project Initiative on 5/15/98, Pilot facility implementation on 7/1/98, Institutional Program Development on 7/1/98, EMS Project Staff will start on 7/1/98, Phase II Process Evaluations for pilot facilities on 8/1/98, Laboratory Deployment (through balance of Directorates) on 7/1/99.
- Program requirements for the Institutional EMS program will be defined by 4/30/99. Pilot Facility program implementation will be complete by 9/1/99.
- Schedule dates were determined by published plans for BSA initiatives and availability of resources, and developed to accommodate operational schedules. Changes to these published schedules will impact the EMS project schedule.
- Facilities with a high potential to impact the environment, as approved by DOE, complete EMS registration before the end of FY 2000; RHIC Project complete registration by end of FY 1999.
- The Independent Oversight Office will provide independent assessment of the following EMS programs using qualified auditors on the schedule dictated by this project plan: pilot facilities, Institutional Program, selected facility/project programs.
- The Laboratory will complete the EMS implementation by 7/00 and self declare conformance to ISO 14001 by end of FY 2000.

1.5 OUT YEAR SCOPE SUMMARY

Project scope for FY 1999 includes:

- Perform a gap analysis.
- Incorporate environmental performance objectives and performance measures (ISO Objectives and Targets) for FY 1999 into Level 1 and Level 2 Roles, Responsibilities, Authorities and Accountabilities (R2A2).
- Approve and Disseminate BNL Environmental Policy.

- Procure Internal EMS Auditor Training Course and deliver to the initial target audience.
- Procure EMS Overview Training Course and deliver to Level 1 through 3 Line Managers.
- Complete EMS Description Document and EMS Manual and publish in Standards Based Management System.
- Develop facility deployment task list.
- Draft FY 2000 Environmental Performance Objectives and Performance Measures
- Establish EMS Structure and Responsibility (R2A2 for all remaining staff.)
- Develop Environmental Management Program action plan for FY 2000.
- Develop Institutional EMS Program Requirements to laboratory via SBMS.
- Deliver EMS monitoring and compliance requirements for integration into Facility Use Agreements template.
- Enhance Training Policy and Procedures with EMS requirements.
- Revise General Employee Training and contractor vendor orientation.
- Deliver EMS requirements for Document Control and Records Management nonconformance and calibration for integration into Standards Based Management System requirements.
- Deliver EMS monitoring and reporting requirements for integration into Integrated Monitoring Initiative.
- Complete EMS Implementation in Pilot facilities.
- Develop EMS Communications Plan
- Initiate EMS implementation through Laboratory Directorate.
- Perform Self-Assessment of EMS Project.
- Coordinate Independent Assessment of Institutional EMS Program.
- Coordinate Independent Assessment of Pilot Facility EMS Program.
- Deliver EMS Overview, Internal Auditor, EMS Implementation training courses as Facilities initiate implementation.
- Host BSA Corporate Assessments or other independent audits as scheduled.
- Host DOE-BHG Year 1 Audit.
- Participate in Professional EMS Organizations.
- Procure ANSI-RAB accredited registrar.
- Obtain ISO 14001 Registration for RHIC Project facilities with a high potential to impact the environment.

Project scope for FY 2000 includes:

- Conduct Management Review Process for site-wide EMS Program.
- Develop FY 2001 Environmental Performance Objectives and Performance Measures
- Complete EMS implementation in balance of Laboratory Directorates.
- Complete Facility Level EMS Documentation in SBMS
- Continue deployment of EMS Communications Plan
- Develop continuing environmental training program.
- Perform self-assessment of EMS Project.
- Coordinate Independent Oversight Assessment of EMS Program in selected facilities and projects.
- Host DOE-BHG Year 2 Audit.
- Host BSA Corporate Assessments or other independent audits as scheduled.
- Self-declare conformance to ISO 14001 for Laboratory.
- Register select facilities to ISO 14001.

Project scope for FY 2001 includes:

- Transition program responsibilities to line organizations and management system owners.
- Establish program improvement guidance.
- Deliver continuing environmental training.
- Assess line management ownership of their EMS program, including continuous improvement responsibilities.
- Write final Project Report and closeout project.
- Host DOE-BHG Year 3, third party independent audit.

1.6 PROJECT TRANSITION ISSUES

The work performed under this project plan contributes its fair share to achieving the Laboratory critical outcomes, and as such serves the ESH&Q Directorate, the scientific and support directorates, and the Laboratory as a whole. It is envisioned that responsibility for the specific processes, products and services developed and delivered as requirements in either the Institutional EMS, the facility EMS programs, or the project programs, will transition to the respective Directorate, Department or Division, or Principal Investigator for implementation. It is also envisioned that responsibility for maintenance and continuous improvement of these program elements will be transferred to the respective management system owner as referenced in Table 1, *BNL Management System and the Respective EMS Program Elements*.

2.0 MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

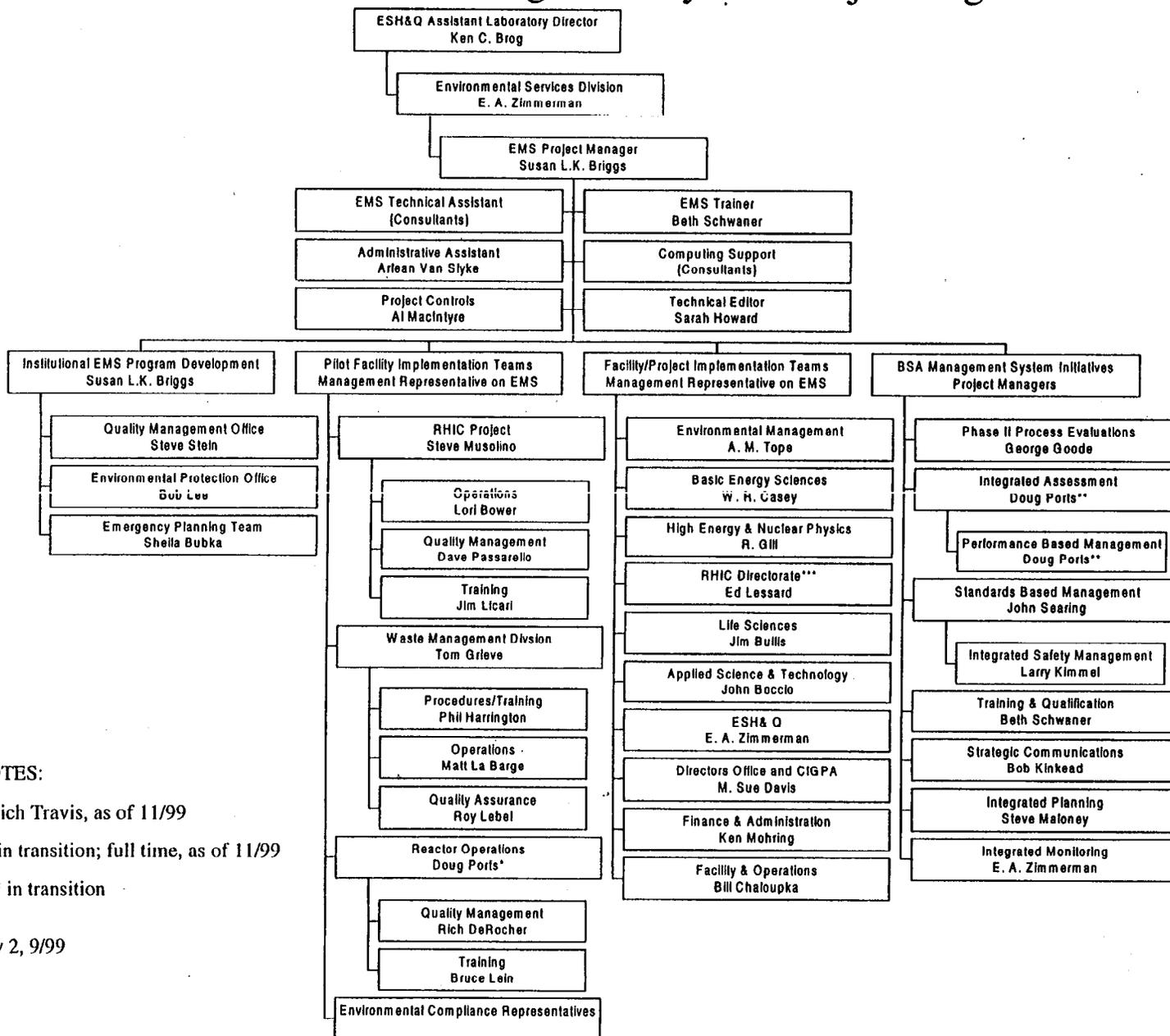
This project is organized to ensure project goals and objectives are achieved in a resource efficient manner and that the deliverables meet the requirements specified by the key stakeholders. The project organizational relationships are shown in Figure 2.

2.1 ORGANIZATIONAL RESPONSIBILITIES

2.1.1 PROJECT STAKEHOLDERS

The key project stakeholders are those who have specified the requirements and expectations for this project, and those that will implement the product developed by this project. The stakeholders will judge the level of project success. These stakeholders are:

BNL Environmental Management System Project Organization



NOTES:

* Rich Travis, as of 11/99

** in transition; full time, as of 11/99

*** in transition

Rev 2, 9/99

- The Environmental Protection Agency, Region II.
- The Department of Energy, BHG.
- The Laboratory Director and the Integration Council.

As the Laboratory Directorates are ultimately paying for the EMS program costs (both directly and indirectly), it is important that this project provide a resource and schedule efficient operation which assures effective program implementation, value-added benefits to the science and Laboratory programs, and contribution to achievement of the critical outcomes.

In addition to the organizational responsibilities outlined below, specific task responsibilities for EMS program implementation, both in a lead or support role and at the institutional or facility level, will be carried out in accordance with the responsibility matrix provided in Table 2.

2.1.2 EMS PROJECT MANAGER

The EMS Project Manager plans, coordinates, and directs project execution, including technical direction, project development and administration and change control. The project manager is dedicated full time to this project and is responsible for the technical quality, day to day management and control/reporting of the project activities as outlined in this project management plan. The EMS project manager is accountable to the Director of ESH&Q, through the ESD Division for the implementation of the EMS project.

The EMS Project Manager is responsible for the following:

- Defining the Institutional EMS Program costs, schedule baselines, and technical requirements.
- Developing the project management plan to guide project implementation.
- Controlling project baselines and providing overall project direction and guidance on EMS implementation.
- Preparing reports of project status and project performance to Laboratory management and DOE-BHG. (As there are no specific reports required by Attachment 2A of the MOA, the EMS project manager may provide, or the EPA may request, information on the EMS design, implementation, or progress. The EMS Project Manager will coordinate a timely response in the spirit of cooperation, as long as it does not interfere with achieving project objectives.)
- Incorporating project improvements and corrective actions into the project management plan.
- Administering project configuration management and project transition/closeout.

2.1.3 EMS PROJECT TEAM

The project team consists of the EMS Project Manager, the management system owners/project managers for each of the related BSA initiatives, the ALD Management Representatives on EMS, and project support personnel assigned to the EMS project. Management system owners/project managers on the BSA initiatives are responsible for completing commitments to the Institutional EMS program as defined by the project scope, cost and schedule baseline

TABLE 2. REQUIREMENTS AND RESPONSIBILITY MATRIX (CONT.)

		Institutional Level Program												Facility Project Level Program		
EMS Requirements	EMS Proj Staff	BNL Support Organization				Management System Project Managers								Mgmt. Rep on EMS	ECR	PI
		QMO	EP	EPT	Legal	ISMS	Ph2	IAMS	PBMS	SBMS	Comm	IMO	TQMS			
- Document Control	x	x								x		x		x		
- Operational Controls	x		x				x			x				x	x	x
- Emergency Preparedness	x			x		x				x	x			x	x	
CHECKING & CORRECTIVE ACTION																
- Monitoring & Measurement	x	x	x			x	x		x	x		x		x	x	
- Nonconf. & Corrective/ Protective Actions	x	x	x							x				x		
- Records	x	x	x							x		x	x	x		x
- Environmental Audits	x		x					x		x				x		x
- Management Review	x							x	x	x				x		

Key: EMS =Environmental Management System; QMO = Quality Management Office; EP = Environmental Professionals (from Environmental Protection Office and Waste Management Division); EPT = Emergency Planning Team, ESH Services Division; ISMS = Integrated Assessment Management System; PH2 = Process Evaluation Process; IAP = Integrated Assessment Program; PBMS = Performance Based Management System; SBMS = Standards Based Management System; Comm = Strategic Communications Initiative; IMO = Integrated Monitoring Office; TQS = Training and Qualification Management System; ECR = Environmental Compliance Representative; and PI = Principal Investigator.

assignments. The ALD management representatives serve as a focal point for the EMS Project Manager and are responsible for facilitating EMS implementation within the facilities and projects in their directorate in conformance with the Laboratory EMS Project Plan, including collecting cost accounts of EMS implementation. Project support staff are responsible for executing their assigned tasks on the schedule agreed to and specified in this project plan.

Project team members will meet with the EMS Project Manager, either one-on-one or as a group when necessary, on a periodic basis (bimonthly during first six months, monthly thereafter) to report on milestone progress, revise planning or request change control where required, and discuss corrective actions when needed. Bimonthly meetings will be scheduled for the EMS Project Team to meet, discuss implementation strategies, problems encountered, and events or activities related to EMS.

2.1.4 Pilot Facility and Directorate EMS Implementation Teams

The ALD and Management Representative on EMS, in consultation with facility managers, will establish an implementation team to expedite the Phase II process evaluations and to facilitate EMS implementation in their facilities. The management representative will follow a standard project implementation plan that has been customized to address facility "gaps" to guide EMS implementation within the Directorate..

The pilot facility working groups will be given opportunities to provide input on the Institutional EMS Program as it is being developed. Implementation teams can conserve resources by coordinating the development of EMS program requirements and sharing program deliverables with the other facilities. Prototypes developed by the pilot facilities will be available for other Directorates to use.

2.1.5 LABORATORY ESH/Q DIRECTORATE

The EMS project has been developed on behalf of the Laboratory to establish a management system that will ensure environmental protection, regulatory compliance, and continual improvement in environmental stewardship. This system resides in the ESH&Q Directorate, Environmental Services Division, but responsibility for implementation, maintenance, and improvement belongs to each ALD. The Director of ESH&Q is accountable to the Laboratory Director for the EMS program development and will provide oversight, guidance, and assistance to the EMS Project Manager, through the ESD Manager, to ensure project objectives are accomplished.

2.1.6 ASSOCIATE AND ASSISTANT LABORATORY DIRECTORS

The ALD's are responsible to commit the resources needed to implement the BNL EMS within their line organizations. These Level 1 managers shall appoint a Management Representative on EMS to serve on the Project Team and facilitate implementation of the EMS in the Departments/Divisions within their directorate. Most importantly, the ALD shall support and exhibit ownership of the Laboratory EMS and the EMS Project Plan objectives, and be responsible for EMS implementation and environmental performance in the facilities and projects within their line organization.

2.1.7 DEPARTMENT OF ENERGY - BHG

DOE-BHG is the focal point for interface between EPA and BNL. They are responsible for assigning their own resources to review and monitor EMS project progress. DOE-BHG is responsible for defining the scope, criteria and providing the resources for each of the annual audits required by the MOA. The audit scope shall be consistent with the current version of this project plan and be developed in consult with the BNL EMS Project Manager. DOE-BHG shall minimize the impacts of external assessments to the EMS project schedule by coordinating the audit scope to prevent redundancy, combining planned assessments to minimize resource expenditures to the extent practical and possible. Mr. J. Granzen has been identified as the EMS project point of contact in DOE-BHG.

2.1.8 ENVIRONMENTAL PROTECTION AGENCY - REGION II

EPA Region II will support timely reviews of submittals in conformance with the Audit Agreement, Attachment 2 of the MOA and in a manner that does not impede EMS project objectives and schedules. Even though there are no specific requirements for EMS reporting in Attachment 2A of the MOA, the EMS project manager may provide, or the EPA may request, EMS design, implementation, or progress information. The EPA Region II will accommodate a timely response in the spirit of cooperation and in a manner that minimizes interference with achieving other EPA program objectives. Mr. Y. Menczel has been identified as the EMS project point of contact in EPA- Region II.

2.2 PROJECT MANAGEMENT STAFFING, COMMUNICATION AND APPROVALS

2.2.1 PROJECT STAFFING

Susan L. K. Briggs will serve as the Project Manager for the EMS project. She will report to ESD Manager, E. A. Zimmerman, and ultimately to the ALD for ESH&Q, Kenneth C. Brog. Direct support for administrative assistance, A. Vanslyke; project controls, A. MacIntyre, contributed through Office of Management Services; information management; and environmental professional with EMS and regulatory compliance expertise will be identified. Support may be augmented using contracted personnel. The level of support required for each of these postings is based on the schedule and tasks identified in this project management plan. The funding for these positions will be an incremental resource that is formally assigned to the EMS project manager.

The management system owners/project managers for BSA initiatives and support organization personnel from the Quality Management Office, Independent Oversight Office, Environmental Services Division, Emergency Services Division, and CIGPA have lead roles in the development, enhancement, or implementation of EMS project elements. These resources will be assigned to the project via commitment authorizations.

Lastly, each ALD shall appoint a Management Representative on EMS and an implementation team to coordinate implementation of EMS Program Requirements in the Departments and Divisions in their line. These personnel will be matrixed to the EMS Project Manager to complete their respective tasks identified in this project plan. These resources will be assigned to the project via commitment authorizations.

2.2 PROJECT COMMUNICATIONS

Formal written communication with DOE-BHG will be made through the ALD for ESH&Q to the EMS Project Manager. Communications or agreements that can potentially affect the project baseline, scope, budget or schedule shall be documented in writing. A formal change control system is identified under Baseline Change Control.

Formal written communications with the EPA, Suffolk County Department of Health Services, New York State Department of Environmental Conservation, or other regulatory agencies on the EMS project will be made through and by DOE-BHG. Communications or verbal agreements that can potentially affect the project baseline or regulatory status of the project must be handled and processed through the DOE-BHG project contact.

Information on the EMS Project will be communicated to the news media by the Public Affairs Office after consultation with the EMS Project Manager. Communications with other pertinent stockholder groups or professional organizations can be made either by the Public Affairs Office or directly by the EMS Project Manager.

An overview of the frequency, notifications, and approvals for internal and external communications on the EMS project is provided in Table 3.

2.2.3 PROJECT APPROVALS

The ALD for ESH&Q shall approve the EMS Project Plan. The EMS Project Manager shall approve, baseline changes, and Institutional EMS related documentation prior to delivery to Laboratory management and DOE-BHG. The Management Representative on EMS shall approve all Directorate level action plan, and procedures developed to satisfy EMS program requirements. The Management Representative on EMS, in consult with their ALD, shall approve all status reports and environmental performance reports submitted to satisfy requirements set forth in this project plan. All subcontracts to perform scheduled tasks will be approved by the EMS Project Manager. A program management approval matrix is shown in Table 4.

3.0 PROJECT BASELINE INFORMATION

3.1 SCOPE BASELINE

The following sections provide summary descriptions of the scope of work for the EMS Project. The work elements are described in accordance with the project Work Breakdown Structure (WBS), as shown in Figure 3. The project WBS dictionary is included as Appendix 3.

TABLE 3 – COMMUNICATION MATRIX

Initiated By	Reported To										
	Internal								External		
	Impl. Team	Mgmt. Rep EMS	EMS Project Support Personnel	Mgmt. System Project Mgr.	EMS Project Mgr.	ESD Mgr	ESHQ ALD	ALD	Lab Dir. *	DOE BHG POC	EPA EMS POC
Implementation Team	-	2	5	5	4	6	6	5	6	8	8,9
Mgmt. Rep. on EMS	2	-	3	3	3	5	6	4	1	6	8,9
EMS Project Support Personnel	5	3	-	3	3	6	6	6	6	8	8,9
Mgmt. System Project Mgr.	6	3	3	-	4	5	5	5	5	6	8,9
EMS Project Mgr.	5	3	3	4	-	2	5	1	1	4	9
ESD Mgr.	5	5	5	4	2	-	5	5	5	5	9
ESH/Q ALD	5	5	5	5	1	5	-	5	5	5	5
ALD	5	1	5	5	5	5	5	-	5	5	8,9
Lab Directors*	5	5	5	5	5	5	5	5	-	5	5

Key: 1 = Quarterly; 2 = Weekly; 3 = Bi-weekly; 4 = Monthly; 5 = As Needed; 6 = Requires notification of EMS Project Manager; 7 = Informal 8 = Only with EMS Project Manager Approval; and 9 = Only with DOE-BHG Concurrence.

* Laboratory Director and Deputy Directors

TABLE 4 – APPROVAL MATRIX

Items Requiring Approval	Mgmt Rep EMS	Mgmt System Proj. Mgr.	EMS Project Support Personnel	EMS Proj. Mgr.	ESD Mgr	ESH/Q ALD	ESH Legal	Public Affairs	DOE-BHG Point of Contact
Budget Submittal/Estimates	2	3	2	1	2	2			
Project Management Plan	3	3	3	2	2	1			
Subcontracts	2			1					
PMP Baseline Changes	2	2	2	1	1	2			2
EMS Documentation: (Procedures, Directives, Records)									
Institutional Level	3	1	1	1					
Facility Level	1	2	2	2					
Project Level	1	2	2	2					
Bi-Monthly/Quarterly Reports	1	3	1	1					
Presentation or Correspondence (Sensitive/External*)		2	2	1	2	2	2	2	2
Presentation or Correspondence (Other/Internal*)		2	2	1					

*These are minimum requirements, management may request additional approval authority.

Key: 1 = Primary Approval; 2 = Concurrence; and 3 = Review Only

Figure 3
EMS Work Breakdown Structure

- 1 EMS PROJECT INITIATION
 - 1.1 Assign Project Manager
 - 1.2 Review Scope of EMS Project
 - 1.3 Develop Project Plan
 - 1.4 Obtain Management Commitment
 - 1.5 Establish EMS Project Team
 - 1.6 Establish Project Budget Account
- 2 ESTABLISH INSTITUTIONAL EMS
 - 2.1 Establish Environmental Policy (ISO 4.2)
 - 2.2 Establish Environmental Aspects/Impacts (ISO 4.3.1)
 - 2.3 Establish Legal & Other Requirements (ISO 4.3.2)
 - 2.3.2 develop BNL Requirements Management system
 - 2.3.5 identify baseline of applicable BNL Legal & other requirements
 - 2.3.6 augment protocol for Environmental Requirements
 - 2.3.6.1 establish internal communications for legal & other requirements
 - 2.3.6.2 Establish mechanism to maintain Requirements Management system up to date
 - 2.3.7 Establish Environmental & Waste Subject Areas in SBMS
 - 2.3.7.3 EPO/WMD: Adopt/revise FIFTEEN E Subject areas
 - 2.3.7.3.1 NEPA
 - 2.3.7.3.2 Underground Injection Control
 - 2.3.7.3.3 Liquid Effluents
 - 2.3.7.3.4 Pollution Prevention/Waste Minimization
 - 2.3.7.3.5 Drinking Water
 - 2.3.7.3.6 Non-Radioactive Airborne Emissions
 - 2.3.7.3.7 Radioactive Airborne Emissions
 - 2.3.7.3.8 Notification of Unexpected Releases
 - 2.3.7.3.9 Environmental Monitoring
 - 2.3.7.3.10 Toxic & Hazardous Material Storage
 - 2.3.7.3.11 Oil's & PCBs
 - 2.3.7.3.12 Medical Waste
 - 2.3.7.3.13 Low Level Radioactive Waste
 - 2.3.7.3.14 Mixed Waste
 - 2.3.7.3.15 Hazardous Waste
 - 2.4 Establish Objectives and Targets (ISO 4.3.3)
 - 2.5 Establish Environmental Management Program (ISO 4.3.4)
 - 2.6 Establish EMS Structure & Responsibility (ISO 4.4.1)
 - 2.7 Establish Training, Awareness and Competency (ISO 4.4.2)
 - 2.8 Establish Communications (ISO 4.4.3; EPA Community Outreach)
 - 2.9 Establish EMS Documentation (ISO 4.4.4)
 - 2.9.1 Create EMS Management System Document
 - 2.9.2 Review & approve EMS Management System Document
 - 2.9.3 Create EMS Manual
 - 2.9.4 Review & approve EMS Manual
 - 2.9.5 Create EMS Index
 - 2.9.6 Review & approve EMS Index

- 2.10 Establish Document Control (ISO 4.4.5)
- 2.11 Establish Operational Control (ISO 4.4.6)
- 2.12 Establish Emergency Preparedness and Response (ISO 4.4.7)
- 2.13 Establish Monitoring and Measurement (ISO 4.5.1, Compliance Assurance 2b)
- 2.14 Nonconformance & Corrective/Preventive Action (ISO 4.5.2, Compliance Assurance 3b & 3e)
- 2.15 Records (ISO 4.5.3)
- 2.16 Environmental Auditing (ISO 4.5.4; Compliance Assurance 3a, 3c, 3d, 3e)
- 2.17 Management Review (ISO 4.6)
- 3 Develop Facility EMS Pilot Program
 - 3.1 PREPARATIONS FOR PILOT FACILITIES
 - 3.2 Deploy EMS at Pilot Facilities
 - 3.2.1 RHIC
 - 3.2.2 Waste Management Division: WMD
 - 3.2.3 Reactor Operations
- 4 Deploy EMS Communication Program
 - 4.1 Develop EMS communications plan
 - 4.2 Implement EMS Communication Plan
 - 4.3 Participate in Professional EMS Organizations (trigger)
- 5 EMS TRAINING
 - 5.1 Identify training needs for EMS Project
 - 5.2 Provide Internal Auditor Training Course
 - 5.3 Provide EMS Implementation Course
 - 5.4 PROVIDE LEAD AUDITOR TRAINING COURSE
 - 5.5 Provide EMS Overview Course
 - 5.8 DEVELOP GENERAL EMPLOYEE ENVIRONMENTAL TRAINING
 - 5.9 UPDATE GET & CONTRACTOR VENDOR COURSE W/EMS INFORMATION
- 6 Assess Laboratory EMS Program
 - 6.1 Develop identification method for ISO-registered candidate facilities
 - 6.2 Perform Project Self Assessment
 - 6.3 Perform Internal Independent Assessment of EMS Program
 - 6.4 Host Batelle Corporate Assessment of EMS Program, as scheduled
 - 6.5 Host DOE Independent Audits (trigger)
 - 6.6 OBTAIN ISO REGISTRATION
- 7 Deploy Institutional EMS
 - 7.1 Deploy Policy
 - 7.2 Deploy Aspects/Impacts
 - 7.3 Deploy Legal & Other Requirements
 - 7.4 Deploy Objectives/Targets
 - 7.4.1 Develop Guidance Document for EMS Performance Measures Process
 - 7.4.2 Issue Performance Measures Guidance on SBMS Subject Area
 - 7.4.3 Review FY99 Performance Objectives/Measures Process
 - 7.4.4 Monitor ESD/WMD FY00 Goal Development
 - 7.4.5 Develop, Implement & Document Process for Developing Lab "E" Obj & Targets
 - 7.5 Deploy EM Program
 - 7.5.1 Establish Institutional FY 99 EM Program
 - 7.5.2 Integrate MSIP Environmental Program Initiatives
 - 7.5.3 Deploy CY 99 Pollution Prevention Program

- 7.5.4 Deploy CY 00 Pollution Prevention Program
- 7.5.5 Establish Institutional FY 00 EM Program
- 7.5.6 Develop Labwide System to Track Environmental Projects & Activities via OMS/MP
- 7.5.7 Integrate tracking/reporting process of "E" projects with CCATs/IIMS

- 7.6 Deploy EMS Structure & Responsibility
- 7.7 Deploy Training, Awareness and Competency
- 7.8 Deploy Communications
- 7.9 Deploy EMS Documentation
- 7.10 Deploy Document Control
- 7.11 Deploy Operational Controls
- 7.12 Deploy Emergency Preparedness & Response
- 7.13 Deploy Monitoring & Measurement
- 7.14 Deploy Nonconformance & Corrective/Preventive Action
- 7.15 Deploy Records
- 7.16 Deploy Environmental Auditing
- 7.17 Deploy Management Review Process
- 7.18 Facility Deployment
 - 7.18.1 APPLY LESSONS LEARNED FROM PILOTS
 - 7.18.2 EM Directorate: EM
 - 7.18.3 Facility & Operations: FO
 - 7.18.4 Basic Energy Sciences: BES
 - 7.18.5 RHIC Directorate: RHIC (CAD/AGS)
 - 7.18.6 Life Sciences: LS
 - 7.18.7 Applied Science & Technology: AS&T
 - 7.18.8 Environment, Safety, Health & Quality: ESH&Q
 - 7.18.9 Directors Office: DO/CIG&PA
 - 7.18.10 Finance & Administration: FA
 - 7.18.11 High Energy Nuclear Physics: HENP

8 Improve Program

- 8.1 Improve Institutional EMS Program
- 8.2 Improve EMS Program
- 8.3 IMPROVE ENVIRONMENTAL TRAINING PROGRAM

9 Transition/Closeout Project

- 9.1 write final project report
- 9.2 Develop Project Transition and Closeout Plan
- 9.3 revise R2A2

10 PROJECT SUPPORT

- 10.1 Track & Report Progress (over 2.5 years)
- 10.2 provide bi-monthly status reports to management (TRIGGER)
- 10.3 administer change control of Project Plan
- 10.4 provide quarterly reports to DOE (TRIGGER)
- 10.5 provide periodic reports to EPA

1.1 EMS PROJECT INITIATION (WBS 1.0)

This WBS work element provides for the administrative and planning activities for the EMS Project. Specifically the activities addressed in this Project Initiation WBS are:

- Assignment of Project Manager
- Review scope and requirements for BNL EMS and potential for integration into other BSA initiatives
- Development of EMS Project Management Plan
- Obtaining BSA commitment in terms of project approval, resource assignments, and funding
- Establishment of EMS Project Team
- Establish Project Budget Account

The EMS Project Manager shall serve as the primary point of contact and shall be responsible for the overall project direction, integration and milestone completion. The EMS project team shall be comprised of both assigned personnel and matrixed support to the project. The assigned project support personnel include an administrative assistant, project controls assistant, environmental professional on EMS and regulatory compliance, and computing support. The level of support required for each of these personnel is based on the schedule and tasks identified in this project management plan. The project also requires matrixed support to either develop and/or implement the program requirements identified in this project. (Refer to Table 2 for the areas of responsibility.) These areas of support are:

BNL Support Organization Personnel, including:

- Project Team Trainer from Central Training Office (CTO)
- Quality Engineering staff from Quality Management Office
- Environmental Professionals from Environmental Services Division; and Waste Management Division
- Emergency Planner from Emergency Services Division – Emergency Planning Team (EMSD-EPT)

Project Managers on BSA Initiatives, including:

- Phase II Process Evaluations
- Integrated Safety Management
- Standards Based Management
- Integrated Assessment Program

Performance Based Management

- Integrated Planning
- Strategic Communications
- Training and Qualification Management System
- Integrated Monitoring

Facility Implementation Teams, including:

- Management Representative on EMS
- Support personnel, such as operations personnel, ESH Coordinator, Quality Representative, and Training Coordinator, as determined by the Management Representative

The deliverables associated with this WBS element include an EMS Project Charter and Project Management Plan, commitment authorizations, and budget /account codes for the EMS project.

3.1.2 INSTITUTIONAL EMS PROGRAM (WBS 2.0)

This element involves the development of the BNL EMS program that provides the basic requirements and set of effective and efficient operational practices for environmental management at BNL for implementation in all facilities and projects at the laboratory. The EMS program elements include:

- Environmental Policy
- Environmental Aspects and Impacts
- Legal and Other Requirements
- Objectives and Targets
- Environmental Management Programs
- EMS Structure and Responsibility
- Training, Awareness, and Competency
- Communications
- EMS Documentation
- Document Control
- Operational Controls
- Emergency Preparedness and Response
- Monitoring and Measurement
- Nonconformance & Corrective/Preventive Actions
- Records
- Environmental Auditing
- Management Review

The overall strategy for developing the institutional program is to integrate the EMS requirements into the BSA management system initiatives being implemented at BNL. Where specific BSA initiatives have not been identified, existing BNL programs will be enhanced to incorporate the EMS requirements.

EMS project personnel will be responsible for communicating the EMS requirements, providing technical assistance, tracking progress, reviewing and approving the documented deliverables (SBMS documents such as Management System Description program descriptions, Subject Areas, or other documents, procedures, or records) to ensure conformance to the EMS requirements.

The project managers for the BSA initiatives, or support personnel for existing BNL programs, are responsible for incorporating the EMS requirements into the respective laboratory management system. The assigned project manager is also responsible for developing program description documents, subject areas and other documents as required by the EMS, in a format compatible with the BNL Standards Based Management System (SBMS).

All organizational units at BNL, including the pilot facilities, will be provided opportunities to review, test, and comment on the draft institutional programs.

At the conclusion of this work activity, BNL shall have a documented institutional EMS program as required by ISO 14001 that is integrated in the management systems established at the laboratory and conforms to EMS criteria in the MOA. Activities to implement the institutional EMS are covered under WBS 3.0, *Develop Facility EMS Pilot Program* and WBS 7.0, *Deploy Institutional EMS*. A summary of the specific strategy proposed, support personnel, and deliverables for each program element is provided below.

3.1.2.1 ENVIRONMENTAL POLICY

The strategy for developing the BNL Environmental Policy is to build on the work accomplished under the Management System Improvement Program (MSIP) WBS 1.3.10.2, *Environmental Mission, Vision, Values*. The ESD Manager will be responsible for delivering an approved laboratory Environmental Stewardship policy that meets the requirements of ISO 14001 and is consistent with other Laboratory management policies. EMS Project personnel will be responsible for publishing and communicating the approved environmental mission, vision, and values statement.

3.1.2.2 ENVIRONMENTAL ASPECTS AND IMPACTS

The strategy for identifying the activities, products or services (aspects) which have the potential to significantly impact the environment, both negatively and positively (impacts) is to build on the analysis conducted under the Phase II Process Evaluation Project and integrate the process with the ISM initiative. The Phase II project has established criteria for the "highest priority" processes. These processes will be used as a basis for significance and thus to defining the scope of the EMS project and establishing the foundation for the BNL EMS program. A SBMS subject area will be developed to describe the process for identifying environmental aspects that can have a significant impact. The ISM initiative will establish a process or facility and project level controls, through the work planning facility use and experimental safety reviews, for "analyzing ESH hazards/impacts" and keeping the information up to date in SBMS. Each project manager will be responsible for developing and documenting the respective procedures and protocols. EMS project personnel will be responsible for documenting the aspects and impacts procedures in SBMS.

3.1.2.3 LEGAL AND OTHER REQUIREMENTS

Three activities are included in this WBS: development of the BNL Requirements Management System, Phase II project identification of requirements related to specific processes, and development of environmental "subject areas" in SBMS.

The strategy for developing the BNL Requirements Management System is to adopt the PNNL Requirements Management System, and adapt it to BNL. A team made up of the environmental professionals from SBMS and Legal will be responsible for developing this system. The deliverables will include the subject area document describing the process and a listing of applicable environmental regulations.

The Phase II project will make regulatory determinations for each of the processes evaluated. The project manager will document the regulatory determination process including applicable compliance requirements.

Subject areas in the SBMS provide the requirements basis and associated procedures and records that must be implemented to comply with the Laboratory program requirements (comparable to the BNL ESH Standards and SEAPPMs). The strategy for developing the SBMS environmental compliance subject areas is to adopt the PNNL subject areas, customize as needed for applicable BNL requirements and operations, and develop subject area documents when no PNNL one exists. Environmental professionals in ESD and WMD, with input from line personnel, will be responsible for developing the subject areas in their specific areas of expertise.

3.1.2.4 OBJECTIVES AND TARGETS

The EMS requirements for objectives and targets will be integrated into the BNL Integrated Planning (IP) System and Performance Based Management System (PBMS) for establishing Laboratory critical outcomes, objectives, and performance measures. The strategy is to establish a process team headed by the IAP/PBMS Project Manager that includes line personnel, environmental professionals, and EMS Project personnel. The team will develop a process to establish annual objectives/performance measures. It will include a method to review environmental aspects/impacts, evaluate current performance and identify stakeholder issues, incorporate a process for flowing down requirements to relevant levels in the organization, and ensure consistency with the environmental policy and pollution prevention. The PBMS project manager will be responsible for documenting the process and associated procedures developed. The ESD personnel will be responsible for implementing the process and documenting the annual objectives and targets. The team will also participate in the process of developing FY00, and FY01 performance objectives and measures

3.1.2.5 ENVIRONMENTAL MANAGEMENT PROGRAM

The strategy for developing the Laboratory Environmental Management Program (i.e., an action plan to achieve the annual objectives and performance measures) will be to integrate the EMS requirements into the Integrated Planning System established at BNL. This system will be developed under the direction of senior Laboratory management. Key elements of the process will include review of Laboratory objectives and targets, current operational plans and initiatives (including the MSIP Environmental Program initiatives), regulatory commitments, and Pollution Prevention opportunities. The process will assign responsibility, actions and time frame for achieving objectives and targets. It will establish a tracking process, as well a mechanism for revising the action plans for new projects or changes in existing projects. The team will be responsible for developing and documenting the process. The Environmental subject matter experts, PBMS and IP staff will also be responsible for establishing the annual Institutional EM Program.

3.1.2.6 EMS STRUCTURE AND RESPONSIBILITY

The EMS Steward will establish a Working Group, comprised of EMS project manager, ESD and WMD managers, and the management representatives on EMS to develop the EMS structure, associated responsibilities, and reporting requirements. Mechanisms for reporting EMS status and environmental performance will be addressed. The EMS Steward will be responsible for obtaining management approval and documenting them in the SBMS as a management system description document.

1.2.7 TRAINING, AWARENESS, AND COMPETENCY

The EMS requirements for this program element will be integrated into the BNL Training and Qualification System (T&QS). The T&QS project manager together with the EMS project trainer will be responsible for updating the BNL Training Policy, procedures, and related documents as needed to reflect the EMS training requirements, specifically the job hazards/training requirements matrix, job training assessments, and competency requirements. They will also be responsible for developing a General Employee Environmental Protection Training course. Material from this course will be used to revise the BNL General Employee Training and Contractor/Vendor Orientation courses. The T&QS project manager will be responsible for coordinating the execution of these tasks and documenting this management system in SBMS.

3.1.2.8 COMMUNICATIONS

The strategy for implementing this EMS program element is to integrate EPA requirements for community outreach and ISO requirements for communications into the BNL Strategic Communications Initiative developed by Community Involvement, Government, Public Affairs (CIGPA) Directorate. The deputy for CIGPA will be responsible for coordinating the execution of these tasks, establishing a process that meets EMS requirements, and delivering documented internal and external communications procedures for inclusion in the SBMS as needed. The Directors Office will be responsible for establishing, documenting, and communicating the Laboratory-wide correspondence and commitments tracking system used, among other things, to track requests for information on environmental issues. The EMS project personnel will provide assistance and technical expertise on EMS program requirements. Each Management Representative on EMS will establish a channel for replying to external requests for environmental information related to their facilities. The process for internally communicating legal and other requirements will be established by the SBMS Project Manager as part of the Requirements Management System. Communication of specific regulatory requirements will be augmented by technical assistance provided by the Environmental Specialists in ESD and WMD.

3.1.2.9 EMS DOCUMENTATION

The EMS Project personnel will create the documents needed to satisfy the requirements of the BNL SBMS Document Hierarchy for EMS. This documentation will include an EMS Manual (program description) document and the EMS Management System description document. The EMS Manual describes the core elements of the BNL EMS, its interdependence on other management systems, and the institutional level documents, procedures and records that support the EMS. The EMS Manual will be compiled using the documents submitted by each of the project managers responsible for the Institutional EMS program elements. The EMS Management System Document will be developed in conformance with SBMS requirements. After the EMS project is implemented in each of the Laboratory Directorates, this EMS Manual will be amended to include the facility and level documentation for each Directorate, thus reflecting the BNL EMS document hierarchy.

3.1.2.10 DOCUMENT CONTROL

The existing Laboratory program for Document Control will be enhanced and revised to reflect the EMS SBMS requirements. The QM Office will provide support personnel to establish a working group of Quality Representatives and line personnel to review and either adopt or adapt the PNNL Document Control System. The QM Office will be responsible for facilitating the working group and delivering a written Document Control system for incorporation into SBMS.

3.1.2.11 OPERATIONAL CONTROLS

Three activities are included in this EMS program element: Phase II identification and evaluation of the adequacy of operational controls (both administrative and engineering controls) and pollution prevention opportunities, development of the ISM system for "identifying and implementing controls", and enhancement of the Pollution Prevention (P2) Program.

The Phase II project manager will be responsible for documenting the processes used to identify and evaluate operational controls and pollution prevention opportunities. The EMS Project Manager will be responsible for incorporating these processes and supplier/contractor requirements for operational control into BNL EMS procedures in a manner consistent with the ISM system. The ISM Project Manager will be responsible for updating the work planning documentation, as needed, in SBMS to reflect EMS requirements for operational controls. The Pollution Prevention Program Manager will be responsible for updating and enhancing the Laboratory P2 program to reflect the Phase II process, documenting the P2 program in SBMS, and orchestrating the implementation of the P2 opportunities identified. Lastly, the EMS project personnel will be responsible for coordinating the integration of these projects.

3.1.2.12 EMERGENCY PREPAREDNESS AND RESPONSE

The existing Laboratory Emergency Program will be enhanced and revised to incorporate the EMS requirements. Support personnel from the Emergency Services Division, Emergency Planning Team, will review the applicable PNNL subject areas and existing BNL response protocols (i.e., ESH Standards, Spill Response procedures and, BNL Spill Prevention and Control Plan). The Emergency Planning Team will be responsible for integrating these protocols and the EMS requirements into the Laboratory Emergency program, documenting the EMS requirements for Emergency Preparedness and Response in the SBMS format, and updating the associated Laboratory Emergency Program documents as needed (i.e., the BNL Emergency Plan, ESH Standards, and Emergency Training Program).

3.1.2.13 MONITORING AND MEASUREMENT

Five activities included in this WBS are: enhancement of the Laboratory Environmental Monitoring Program, evaluation of the applicability of the Phase II project, incorporation of monitoring requirements into the design of the Integrated Monitoring database, enhancement of the BNL equipment calibration program, and establishment of a lab-wide system to report periodically on environmental performance measures. The EMS requirements for measuring performance related to objectives and targets and evaluating regulatory compliance are covered under WBS 2.4 and 2.5 and WBS 2.16, respectively.

The Laboratory Environmental Monitoring Program will be reviewed and revised to ensure adequate sampling and analysis of facilities and projects that have the potential to impact the environment in order to incorporate EMS requirements for monitoring and measurement. The ESD and the Integrated Monitoring project manager will be responsible for developing and documenting the Laboratory program requirements in a format that is compatible with SBMS.

The Phase II project includes processes to make regulatory determinations and identify assessment, prevention and control requirements. EMS project personnel and Phase II project manager shall review these processes with respect to EMS monitoring and measurement requirements to determine how these processes satisfy the EMS requirements, and if so, document the protocols in SBMS.

The Integrated Monitoring Initiative, which has the responsibility to integrate and enhance the BNL database for environmental data will incorporate the EMS requirements for monitoring and measurement into the design of the database to ensure facilities have the capability to access their data on a timely basis. While the database is in its development phase, ESD shall provide semiannual reports of monitoring results to line personnel.

The existing Laboratory Calibration program will be enhanced and revised to reflect EMS and SBMS requirements. The QM Office will provide support personnel to establish a working group of Quality Representatives and line personnel to review and either adopt or adapt the PNNL calibration program. The QM Office will be responsible for facilitating the working group and delivering a Calibration System document for incorporation into SBMS.

The strategy for monitoring and reporting progress on the annual environmental objectives and performance measures will be to integrate the EMS requirements into the Integrated Planning System established at BNL. This system will be developed under the direction of senior Laboratory management. Key elements of the process will include tracking and reporting progress on the critical outcomes, objectives and performance measures. The IP staff are responsible for establishing the annual Institutional EM Program.

3.1.2.14 **NONCONFORMANCE AND CORRECTIVE/PREVENTIVE ACTION**

The existing Laboratory program for Nonconformance & Corrective/Preventive Action will be enhanced and revised to reflect the EMS requirements and SBMS. The QM Office will provide support personnel to establish a working group of Quality Representatives and line personnel to review and either adopt or adapt the PNNL "Resolving Quality Problems" subject area. The QM Office will be responsible for facilitating the working group and delivering a system document that meets the EMS criteria for nonconformance & corrective/preventive action and SBMS requirements.

3.1.2.15 **RECORDS**

The existing BNL and PNNL programs for records management shall be reviewed and a system developed for SBMS. This task will be performed by the Document Control working group established by the QM Office. Requirements for electronic records will be addressed. Identification of environmental records will be provided by the environmental professionals of ESD and documented in

each of the environmental compliance subject areas. Other records required by ISO 14001 shall also be identified in the respective subject areas.

3.1.2.16 ENVIRONMENTAL AUDITS

The strategy for developing the BNL EMS Audit element will address both an EMS and a regulatory compliance component. The requirements for the EMS audit will be based on the ISO 14001 standard; the requirements for the regulatory compliance audit will be based on the EPA Environmental Leadership Program (ELP) Compliance Audit Guidelines. The Integrated Assessment project manager will be responsible for developing the self-assessment program requirements that include EMS and regulatory compliance audits, and documenting in SBMS. The EMS project staff shall develop the subject area for environmental assessments in SBMS. Technical assistance will be provided by the environmental professionals, quality management staff, and EMS project personnel.

3.1.2.17 MANAGEMENT REVIEW

The strategy for developing this EMS element is to integrate the requirements for Management Review with the requirements for Performance Based Management System, Integrated Assessment Program and Integrated Planning initiatives. The project manager for these initiatives will be responsible for the overall structure and requirements for these systems and documenting them in SBMS. The EMS project staff shall develop the subject area for environmental assessments in SBMS. EMS project personnel will provide technical assistance and the EMS project manager will be responsible for conducting the Laboratory EMS Management Reviews in FY 99-01.

3.1.3 FACILITY EMS PILOT PROGRAM (WBS 3.0)

It will include the following:

- management support, both commitment and resources;
- adoption of the institutional EMS requirements; and
- project management and reporting activities.

Pilot programs will be used in the EMS project for the following three reasons:

- Enable facilities with a high potential to impact environment to expedite implementation and prepare for ISO registration.
- Provide line management input on the Institutional EMS program requirements as they are being developed.
- Develop case studies for EMS implementation and prototypes for Laboratory wide application.

Two facilities were recommended for the pilot program and one facility volunteered: Waste Management Division, Reactor Operations and RHIC Project, respectively. A uniform strategy for implementation was developed to facilitate deployment in the pilot facilities and eventual transferal to the balance of the laboratory. The implementation plan includes the following key elements:

- Obtain management commitment and establish an EMS Team
- Perform a gap analysis (at the facility level) and develop action plan
- Complete Phase II process evaluations and implement corrective action plan
- Test the Institutional EMS program requirements and provide feedback for improvement

- Implement Institutional EMS program
- Deploy Communications plan in their facilities
- Develop facility specific training program and train employees
- Assess readiness
- Procure registrar and obtain ISO registration.

The EMS Implementation Team, headed by the Management Representative on EMS, will be responsible for the pilot program implementation. Activities include:

- Establishment of an EMS Implementation Team R2A2
- Development of facility implementation strategy for the Institutional EMS Program requirements
- Performance of gap analysis and development of facility action plan
- Coordination of EMS and Phase II process evaluation implementation
- Interface with facility personnel responsible for related BSA initiatives; development of facility level EMS documentation
- Revision of facility training program and administration of employee training
- Participation in assessments (self assessment and independent assessments) and follow-up activities
- Procurement of ANSI-RAB registrar for ISO registration

The EMS project personnel will provide technical assistance to ensure success, including:

- EMS implementation guidance, reference materials, cost accounting protocol, and prototype training program
- EMS communication campaign
- Facility EMS documentation review and approval
- Independent assessment coordination (Independent Oversight Office, DOE, BSA Corporate)
- ISO registration support

3.1.4 EMS COMMUNICATIONS PLAN (WBS 4.0)

An EMS communications campaign will be developed and implemented to ensure employee awareness of the BNL EMS initiative and to share EMS information with external stakeholders, including EMS professional organizations. A communications plan will be developed for the EMS Project. CIGPA personnel are responsible for providing technical assistance in the development of the EMS Communications Plan, coordinating and implementing external communications, and publishing laboratory wide internal communications. EMS Project personnel are responsible for performing the following activities:

- Develop and document EMS Communications Plan
- Develop and distribute EMS brochures and posters.
- Provide EMS updates and technical expertise to CIGPA staff for internal and external publication
- Develop and deliver EMS presentations to Laboratory personnel, EMS professional organizations, and external stakeholders

3.1.5 EMS TRAINING (WBS 5.0)

EMS training will be provided in three general areas:

- EMS Awareness
- Job specific training
- Specialized EMS training

A general employee Environmental Protection Training course will be developed to provide an overview of the BNL EMS with particular emphasis on the ISO 14000 requirements, compliance assurance, roles, and responsibilities, and pollution prevention. Segments of this course material will be used to revise existing awareness training programs such as General Employee Training and Contractor/Vendor Orientation, (WBS 3.1.2.7) . This course material will be delivered to all BNL employees, contractors, guests and visiting scientists in a manner that is effective and efficient.

In addition, EMS Overview Training will provide background on the structure of an ISO 14001 EMS, convey BNL's environmental policy, and provide an overview on BNL's EMS Implementation strategy. The target audience is Level 1-3 Line Managers and ESH professionals.

Job specific training will be developed to train operations personnel whose job has the potential to impact the environment. (refer to WBS 3.1.3, Prepare for Training (Pilot Facility) Employees, and WBS 3.2). Facility personnel will develop the training program using a generic format and prototype provided by the EMS project trainer. The learning objective is to provide the target audience with knowledge of environmental impacts associated with their job, the consequences of these impacts (both positive and negative), and their responsibility to prevent, respond, and mitigate the occurrence of these impacts. Opportunities to reduce or eliminate the potential impact through pollution prevention and waste minimization techniques will also be addressed.

Lastly, EMS project personnel, the Management Representative on EMS and his/her implementation teams will be provided training specific to their EMS project implementation responsibilities. Two training courses that are appropriate for this target audience are:

- EMS Implementation Training for facility EMS Team members and EMS Project personnel
- Internal Environmental Auditor Training for Management Representatives on EMS (or designee) and select environmental professionals in ESD, IO staff, and QM staff

The option of procuring Internal Auditor Training and EMS Overview training courses with the optional Train-the-Trainer program will be considered to enable the delivery of training with implementation of EMS in each facility at minimum cost. The EMS Implementation Training course will be based on existing training materials, such as those provided by EPA and the National Science Foundation or other EMS consultants. The EMS Project trainer will be responsible for coordinating the EMS training activities during EMS project implementation.

3.1.6 EMS PROGRAM ASSESSMENTS (WBS 6.0)

Several mechanisms will be employed to assess the readiness of the BNL EMS program. In addition to the Gap Analyses (refer to WBS 3.2, *Deploy EMS Pilot Facilities* and 7.18, *Facility Deployment*) and the program for Self Assessment that will be implemented in the pilot program and facility/project

programs (refer to WBS 3.1.2, *Prepare for Assessment Activities*; 3.2, *Deploy EMS at Pilot Facilities*; and 7.18, *Facility Deployment*), this element provides for the following assessments:

- EMS Project Self-Assessments
- BNL Independent Assessment of Institutional EMS program
- BNL Independent Assessment of Pilot programs
- BNL Independent Assessment of Directorate EMS program
- BSA Corporate Oversight Assessment
- DOE Phase III Audits
- ISO Registration Audit for select facilities (refer to 3.1.3)
- Others, as other DOE audits

The EMS Project Manager will be responsible for conducting annual self assessments of the EMS Project, coordinating the BNL independent assessments of the Institutional program, the pilot programs, and the Directorate EMS program; and hosting all external audits of the EMS program during the tenure of the EMS project. The Independent Oversight Office and/or external consultants will conduct the above mentioned BNL independent assessments. BSA Corporate Oversight Assessments will be coordinated through the Director's Office. DOE Phase III Audits, as required by the EPA/DOE MOA, will be coordinated by DOE-BHG. The third year audit will be used as the independent audit for the Laboratory to self-declare conformance to ISO 14001. ISO registration audits will be coordinated through the EMS Project Manager, however the facilities requiring registration will pay for the costs of these audits, unless DOE-BHG agrees to have the third year audit (required by the MOA) conducted by an ISO accredited registrar. In this case the cost of the audit will be borne by DOE-BHG. Each assessment will be documented and a corrective action plan will be developed for any finding or non-conformance identified.

The EMS project manager will be responsible for scoping the BNL audit; the auditors will be responsible for writing the audit report; and the EMS project manager will be responsible for writing the corrective action plan with input from the respective project managers and management representatives on EMS.

To satisfy BSA/DOE contract requirements, the EMS project personnel in conjunction with the BNL NEPA coordinator will develop an identification process for nominating facilities that should pursue ISO registration. This process will be documented and the candidate facilities submitted to DOE for approval.

3.1.7 INSTITUTIONAL EMS PROGRAM DEPLOYMENT (WBS 7.0)

Deployment of the EMS Program throughout the Laboratory will be initiated in the second year of the project, after the Institutional Program requirements are established and the pilot projects are complete.

The degree to which each Department/Division adopts or adapts the Institutional EMS shall determine the costs of implementation. By developing a uniform management system for each Directorate, augmented with facility specific procedures only as required, implementation costs can be reduced. Development of a uniform management system for each Directorate will also increase the likelihood that the systems will conform when evaluated by an independent assessor. Therefore, it is proposed that each ALD establish an EMS within their Directorate that is consistent with the Institutional EMS Program requirements and uniformly implemented in the Departments/Divisions that they manage.

The approach used will follow the pilot program format (refer to Section 3.1.3), incorporating lessons learned by these pilot facilities. However, the following activities are not performed in this phase of the project implementation:

- Test and provide feedback in Institutional EMS Program (opportunities will be available to the facilities again during the Program Improvement phase)
- Develop job specific training program
- Procure registrar and obtain ISO registration.

EMS project personnel will be responsible for providing technical assistance to the facilities and projects and reviewing EMS documentation. Facility and project personnel will be responsible for implementing the institutional EMS program, documenting facility/project specific EMS documentation, training employees, and implementing all related BSA management system initiatives.

3.1.8 EMS PROGRAM IMPROVEMENT (WBS 8.0)

Specific program improvement activities that will be performed during implementation of the EMS project include:

- Review and revision of significant environmental aspects/impacts
- Review and revision of objectives and targets
- Lessons learned from pilot facilities
- Development of continuing environmental training program.
- Review and revision of Institutional EMS program requirements
- Updates to the BNL EMS Website with additional EMS web pages, links to the SBMS, and environmental database queries.

EMS Project personnel are responsible for coordinating the improvement initiatives during the EMS project implementation. Future improvements will be the responsibility of the EMS Management System Owner.

3.1.9 EMS PROJECT TRANSITION/ CLOSEOUT (WBS 9.0)

The activities associated with this element include transition of responsibility from EMS project personnel to management system owners and line management, and development of final project report. EMS project personnel will be responsible for revising R2A2 as required and writing the final project report.

3.1.10 EMS PROJECT SUPPORT (WBS 10.0)

Project support activities include the overall management and control of the project including schedule, resources (personnel), and funding. This element also includes reporting progress to the Laboratory Director through the ALD for ESH&Q, and to DOE-BHG Point of Contact.

3.2 SCHEDULE BASELINE

Key project activities are shown in an integrated Level and II schedule in Figure 4a and 4 b, respectively. A Level III Critical Patch schedule is provided in Figure 4C. These schedules include task and milestone commitments for the EMS project. These schedules will constitute the baseline planning for the project and used to measure and evaluate the EMS project performance. They shall

not be changed without the concurrence of the EMS Project Manager as prescribed in the Baseline Change procedure. The milestones will be used for control and reporting within the schedule baseline for the project. The model used to estimate project resource requirements at the facility level is included as Appendix 4. A detailed schedule is used for **internal purposes only** by EMS project personnel to guide deployment of the project, however, all Level III and lower milestones are subject to change by the designated lead that is assigned to the task.

3.2.1 MILESTONE COMMITMENTS

The scheduled milestone commitments are listed on the Milestone Control Log, Figure 5. The milestone dates listed in the control log are based on the schedule baseline developed for the project.

3.2.2 PROJECT DELIVERABLES

Deliverables for this project consist of Plans, EMS Documentation, and Progress Reports. These specific deliverables are listed below.

Plans:

- EMS Project Management Plan
- Facility EMS Action Plans

EMS Documentation:

- EMS Manual
- EMS Management System Description Documents (as per SBMS format)
- Facility EMS Documentation Index
- Facility specific procedures and records, as necessary, to satisfy EMS documentation requirements

Figure 4a

EPA Phase III:
Level 1 Schedule
9/99

**Brookhaven
Science Associates**

**Brookhaven
National Laboratory**

**EPA PHASE III:
EMS Project Level I Summary Schedule
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998				1999				2000				2001			
						Q1	Q2	Q3	Q4												
0	0	EPA PHASE III	1053 days	Thu 1/1/98	Tue 1/1/02																
1	1	EMS PROJECT INITIATION	178.2 days	Tue 4/28/98	Thu 12/31/98																
35	2	ESTABLISH INSTITUTIONAL EMS	219 days	Wed 7/1/98	Fri 4/30/99																
249	3	Develop Facility EMS Pilot Program	330 days	Wed 7/1/98	Thu 9/30/99																
427	4	Deploy EMS Communication Program	781 days	Thu 1/1/98	Mon 12/18/00																
479	5	EMS TRAINING	388 days	Mon 7/13/98	Fri 12/31/99																
513	6	Assess Laboratory EMS Program	951 days	Mon 5/25/98	Tue 1/1/02																
598	7	Deploy Institutional EMS	744 days	Mon 3/9/98	Mon 1/1/01																
1244	8	Improve Program	456 days	Mon 3/15/99	Thu 11/30/00																
1270	9	Transition/Closeout Project	132 days	Mon 7/3/00	Mon 1/1/01																
1275	10	PROJECT SUPPORT	639 days	Mon 8/3/98	Mon 1/1/01																

Project: EPA PHASE III Date: Mon 9/20/99	Task		Rolled Up Critical Task	
	Task Progress		Rolled Up Milestone	
	Critical Task		Baseline Summary	
	Critical Task Progress		Rolled Up Baseline	
	Baseline		Rolled Up Baseline Milestone	
	Milestone		Rolled Up Progress	
	Baseline Milestone		Split	
	Summary		External Tasks	
	Rolled Up Task		Project Summary	

Figure 4b

EPA Phase III:
Level 2 Schedule
9/99

**EPA PHASE III:
EMS Project Level II Summary Schedule
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998				1999				2000				2001			
						Q1	Q2	Q3	Q4												
0	0	EPA PHASE III	1053 days	Thu 1/1/98	Tue 1/1/02																
1	1	EMS PROJECT INITIATION	178.2 days	Tue 4/28/98	Thu 12/31/98																
2	1.1	Assign Project Manager	13.2 days	Tue 4/28/98	Fri 5/15/98																
5	1.2	Review Scope of EMS Project	53.33 days	Fri 5/1/98	Wed 7/15/98																
11	1.3	Develop Project Plan	100 days	Mon 6/1/98	Sun 10/18/98																
18	1.4	Obtain Management Commitment	128 days	Wed 7/8/98	Thu 12/31/98																
23	1.5	Establish EMS Project Team	85.6 days	Fri 6/5/98	Fri 10/2/98																
29	1.6	Establish Project Budget Account	75 days	Thu 6/18/98	Wed 9/30/98																
34	1.7	M3: PROJECT INITIATED	0 days	Thu 12/31/98	Thu 12/31/98																
35	2	ESTABLISH INSTITUTIONAL EMS	219 days	Wed 7/1/98	Fri 4/30/99																
36	2.1	Establish Environmental Policy (ISO 4.2)	22 days	Mon 11/2/98	Tue 12/1/98																
41	2.2	Establish Environmental Aspects/Impacts (ISO 4.3.1)	77 days	Mon 11/2/98	Tue 2/16/99																
51	2.3	Establish Legal & Other Requirements (ISO 4.3.2)	108 days	Mon 11/2/98	Wed 3/31/99																
81	2.4	Establish Objectives and Targets (ISO 4.3.3)	85 days	Mon 11/2/98	Fri 2/26/99																
97	2.5	Establish Environmental Management Program (ISO 4.3.4)	86 days	Fri 1/1/99	Fri 4/30/99																
112	2.6	Establish EMS Structure & Responsibility (ISO 4.4.1)	65 days	Mon 11/2/98	Fri 1/29/99																
123	2.7	Establish Training, Awareness and Competency (ISO 4.4.2)	85 days	Mon 11/2/98	Fri 2/26/99																
129	2.8	Establish Communications (ISO 4.4.3; EPA Community Outreach)	85 days	Mon 11/2/98	Sun 2/28/99																
136	2.9	Establish EMS Documentation (ISO 4.4.4)	110 days	Mon 11/30/98	Fri 4/30/99																
143	2.10	Establish Document Control (ISO 4.4.5)	88 days	Thu 10/1/98	Sat 1/30/99																
149	2.11	Establish Operational Control (ISO 4.4.6)	108 days	Mon 11/2/98	Wed 3/31/99																
165	2.12	Establish Emergency Preparedness and Response (ISO 4.4.7)	131 days	Mon 8/3/98	Mon 2/1/99																
176	2.13	Establish Monitoring and Measurement (ISO 4.5.1, Compliance Assurance 2b)	151 days	Mon 8/3/98	Fri 2/26/99																
198	2.14	Nonconformance & Corrective/Preventive Action (ISO 4.5.2, Compliance Assurance	154 days	Wed 7/1/98	Fri 1/29/99																

**EPA PHASE III:
EMS Project Level II Summary Schedule
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998				1999				2000				2001			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
208	2.15	Records (ISO 4.5.3)	183 days	Wed 7/1/98	Thu 3/11/99	7/1				3/11											
223	2.16	Environmental Auditing (ISO 4.5.4; Compliance Assurance 3a, 3c, 3d, 3e)	75 days	Mon 11/2/98	Fri 2/12/99			11/2		2/12											
236	2.17	Management Review (ISO 4.6)	75 days	Mon 11/2/98	Fri 2/12/99			11/2		2/12											
248	2.18	M2: INSTITUTIONAL EMS PROGRAM COMPLETE	0 days	Fri 4/30/99	Fri 4/30/99					★ 4/30											
249	3	Develop Facility EMS Pilot Program	330 days	Wed 7/1/98	Thu 9/30/99	7/1							9/30								
250	3.1	PREPARATIONS FOR PILOT FACILITIES	219 days	Wed 7/1/98	Fri 4/30/99	7/1				4/30											
264	3.2	Deploy EMS at Pilot Facilities	330 days	Wed 7/1/98	Thu 9/30/99	7/1							9/30								
265	3.2.1	RHIC	289 days	Wed 7/1/98	Thu 8/5/99	7/1							8/5								
318	3.2.2	Waste Management Division: WMD	267 days	Tue 9/1/98	Fri 9/3/99			9/1					9/3								
372	3.2.3	Reactor Operations	286 days	Tue 9/1/98	Thu 9/30/99			9/1					9/30								
427	4	Deploy EMS Communication Program	781 days	Thu 1/1/98	Mon 12/18/00														12/18		
428	4.1	Develop EMS communications plan	151.73 days	Fri 7/31/98	Fri 2/26/99			7/31		2/26											
434	4.2	Implement EMS Communication Plan	767 days	Thu 1/1/98	Tue 11/28/00														11/28		
472	4.3	Participate in Professional EMS Organizations (trigger)	654 days	Mon 6/29/98	Mon 12/18/00			6/29											12/18		
479	5	EMS TRAINING	388 days	Mon 7/13/98	Fri 12/31/99			7/13					12/31								
480	5.1	Identify training needs for EMS Project	56.47 days	Tue 7/14/98	Wed 9/30/98			7/14		9/30											
482	5.2	Provide Internal Auditor Training Course	286 days	Tue 9/1/98	Thu 9/30/99			9/1					9/30								
488	5.3	Provide EMS Implementation Course	366 days	Mon 7/13/98	Tue 11/30/99			7/13					11/30								
494	5.4	PROVIDE LEAD AUDITOR TRAINING COURSE	88 days	Thu 10/1/98	Fri 1/29/99			10/1		1/29											
498	5.5	Provide EMS Overview Course	300 days	Mon 7/13/98	Tue 8/31/99			7/13					8/31								
504	5.6	M3: PILOT PROJECT TEAMS TRAINING	0 days	Wed 3/31/99	Wed 3/31/99					★ 3/31											
505	5.7	M3: BALANCE OF PROJECT TEAM TRAINING	0 days	Fri 12/31/99	Fri 12/31/99								★ 12/31								
506	5.8	DEVELOP GENERAL EMPLOYEE ENVIRONMENTAL TRAINING	219 days	Fri 1/1/99	Sun 10/31/99			1/1					10/31								
512	5.9	UPDATE GET & CONTRACTOR VENDOR COURSE W/EMS INFORMATION	44 days	Sat 5/1/99	Tue 6/29/99					5/1			6/29								

**EPA PHASE III:
EMS Project Level II Summary Schedule
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998				1999				2000				2001							
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1			
688	7.17	Deploy Management Review Process	331 days	Thu 7/1/99	Fri 9/29/00						7/1														
695	7.18	Facility Deployment	314 days	Wed 4/28/99	Sat 7/1/00					4/28			7/1												
1243	7.19	M1: LABORATORY SELF DECLARES CONFORMANCE TO ISO	0 days	Sat 9/30/00	Sat 9/30/00												9/30								
1244	8	Improve Program	456 days	Mon 3/15/99	Thu 11/30/00									3/15											11/30
1245	8.1	Improve Institutional EMS Program	456 days	Mon 3/15/99	Thu 11/30/00									3/15											11/30
1262	8.2	Improve EMS Program	177.47 days	Wed 3/1/00	Tue 10/31/00												3/1								10/31
1265	8.3	IMPROVE ENVIRONMENTAL TRAINING PROGRAM	176 days	Mon 4/3/00	Thu 11/30/00												4/3								11/30
1270	9	Transition/Closeout Project	132 days	Mon 7/3/00	Mon 1/1/01												7/3								1/1
1271	9.1	write final project report	65 days	Tue 10/3/00	Mon 1/1/01												10/3								1/1
1272	9.2	Develop Project Transition and Closeout Plan	131 days	Mon 7/3/00	Sun 12/31/00												7/3								12/31
1273	9.3	revise R2A2	65 days	Mon 10/2/00	Fri 12/29/00												10/2								12/29
1274	9.4	M3: EMS PROJECT TRANSITIONED/ FINAL REPORT COMPLETED	0 days	Sun 12/31/00	Sun 12/31/00																				12/31
1275	10	PROJECT SUPPORT	639 days	Mon 8/3/98	Mon 1/1/01									8/3											1/1
1276	10.1	Track & Report Progress (over 2.5 years)	634 days	Mon 8/3/98	Mon 12/25/00									8/3											12/25
1277	10.2	provide bi-monthly status reports to management (TRIGGER)	529 days	Mon 11/30/98	Tue 11/28/00									11/30											11/28
1278	10.3	administer change control of Project Plan	529 days	Mon 11/30/98	Tue 11/28/00									11/30											11/28
1279	10.4	provide quarterly reports to DOE (TRIGGER)	529 days	Mon 11/30/98	Tue 11/28/00									11/30											11/28
1280	10.5	provide periodic reports to EPA	534 days	Mon 11/23/98	Tue 11/28/00									11/23											11/28
1281	10.6	M1: PROJECT COMPLETE: EMS OPERATIONAL	0 days	Mon 1/1/01	Mon 1/1/01																				1/1

**EPA PHASE III:
EMS Project Level II Summary Schedule
9/99**

Project: EPA PHASE III
Date: Mon 9/20/99

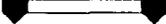
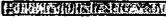
Task		Rolled Up Critical Task	
Task Progress		Rolled Up Milestone	
Critical Task		Baseline Summary	
Critical Task Progress		Rolled Up Baseline	
Baseline		Rolled Up Baseline Milestone	
Milestone		Rolled Up Progress	
Baseline Milestone		Split	
Summary		External Tasks	
Rolled Up Task		Project Summary	

Figure 4c

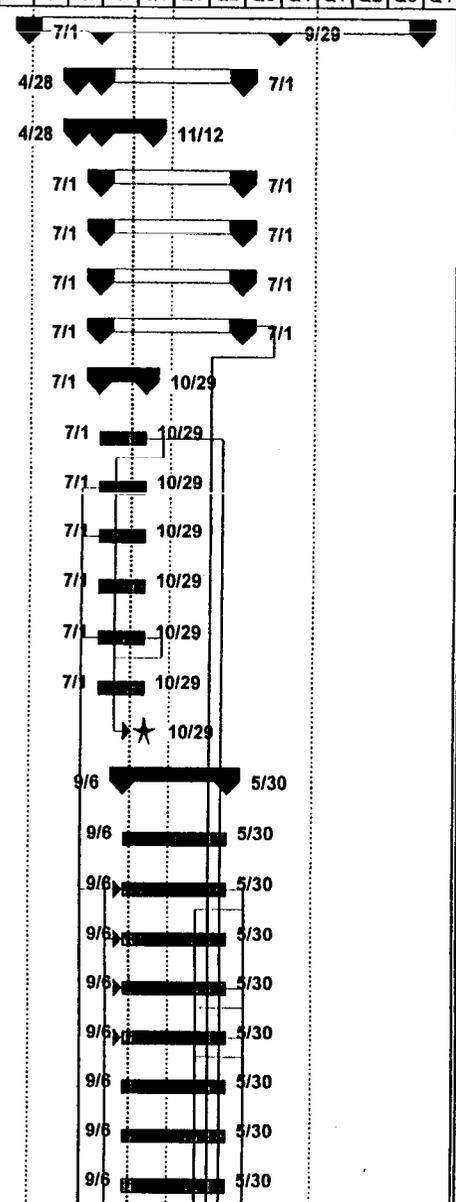
EPA Phase III:
Level 3 Schedule
9/99

**EPA PHASE III:
EMS Project Summary Critical Path
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998		1999				2000				2001					
						Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
0	0	EPA PHASE III	1053 days	Thu 1/1/98	Tue 1/1/02																
1	1	EMS PROJECT INITIATION	178.2 days	Tue 4/28/98	Thu 12/31/98																
35	2	ESTABLISH INSTITUTIONAL EMS	219 days	Wed 7/1/98	Fri 4/30/99																
249	3	Develop Facility EMS Pilot Program	330 days	Wed 7/1/98	Thu 9/30/99																
427	4	Deploy EMS Communication Program	781 days	Thu 1/1/98	Mon 12/18/00																
479	5	EMS TRAINING	388 days	Mon 7/13/98	Fri 12/31/99																
513	6	Assess Laboratory EMS Program	951 days	Mon 5/25/98	Tue 1/1/02																
598	7	Deploy Institutional EMS	744 days	Mon 3/9/98	Mon 1/1/01																
599	7.1	Deploy Policy	0 days	Fri 1/29/99	Fri 1/29/99																
600	7.2	Deploy Aspects/Impacts	198 days	Mon 2/1/99	Sun 10/31/99																
604	7.3	Deploy Legal & Other Requirements	178 days	Mon 3/1/99	Sun 10/31/99																
612	7.4	Deploy Objectives/Targets	530 days	Tue 6/30/98	Fri 6/30/00																
622	7.5	Deploy EM Program	662 days	Wed 7/1/98	Mon 1/1/01																
653	7.6	Deploy EMS Structure & Responsibility	20 days	Mon 1/4/99	Fri 1/29/99																
655	7.7	Deploy Training, Awareness and Competency	278 days	Tue 10/13/98	Sun 10/31/99																
656	7.8	Deploy Communications	0 days	Fri 2/26/99	Fri 2/26/99																
657	7.9	Deploy EMS Documentation	101 days	Mon 3/1/99	Thu 7/15/99																
667	7.10	Deploy Document Control	1 day	Wed 6/2/99	Wed 6/2/99																
669	7.11	Deploy Operational Controls	198 days	Mon 2/1/99	Sun 10/31/99																
672	7.12	Deploy Emergency Preparedness & Response	412 days	Mon 3/9/98	Thu 9/30/99																
677	7.13	Deploy Monitoring & Measurement	198 days	Thu 12/31/98	Thu 9/30/99																
683	7.14	Deploy Nonconformance & Corrective/Preventive Action	1 day	Wed 6/2/99	Wed 6/2/99																
685	7.15	Deploy Records	1 day	Wed 6/2/99	Wed 6/2/99																
687	7.16	Deploy Environmental Auditing	67 days	Wed 7/1/98	Thu 10/1/98																

**EPA PHASE III:
EMS Project Summary Critical Path
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998				1999				2000				2001			
						Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
688	7.17	Deploy Management Review Process	331 days	Thu 7/1/99	Fri 9/29/00																
695	7.18	Facility Deployment	314 days	Wed 4/28/99	Sat 7/1/00																
696	7.18.1	APPLY LESSONS LEARNED FROM PILOTS	145.47 days	Wed 4/28/99	Fri 11/12/99																
702	7.18.2	EM Directorate: EM	266 days	Thu 7/1/99	Sat 7/1/00																
756	7.18.3	Facility & Operations: FO	266 days	Thu 7/1/99	Sat 7/1/00																
810	7.18.4	Basic Energy Sciences: BES	266 days	Thu 7/1/99	Sat 7/1/00																
864	7.18.5	RHIC Directorate: RHIC (CAD/AGS)	266 days	Thu 7/1/99	Sat 7/1/00																
865	7.18.5.1	Project Planning: RHIC (CAD/AGS)	87 days	Thu 7/1/99	Fri 10/29/99																
866	7.18.5.1.1	*Establish EMS Team/R2A2	87 days	Thu 7/1/99	Fri 10/29/99																
867	7.18.5.1.2	Establish Cost Accounting System	87 days	Thu 7/1/99	Fri 10/29/99																
868	7.18.5.1.3	Define facilities/projects included in deployment	87 days	Thu 7/1/99	Fri 10/29/99																
869	7.18.5.1.4	Conduct Gap Analysis	87 days	Thu 7/1/99	Fri 10/29/99																
870	7.18.5.1.5	*Review Phase II Evaluation	87 days	Thu 7/1/99	Fri 10/29/99																
871	7.18.5.1.6	Develop Action Plan for WBS 2.0, Program Implementation	87 days	Thu 7/1/99	Fri 10/29/99																
872	7.18.5.1.7	M3:RHIC (CAD/AGS) PROJECT PLANNING COMPLETED	0 days	Fri 10/29/99	Fri 10/29/99																
873	7.18.5.2	PROGRAM IMPLEMENTATION: RHIC (CAD/AGS)	195 days	Mon 9/6/99	Tue 5/30/00																
874	7.18.5.2.1	Environmental Policy	195 days	Mon 9/6/99	Tue 5/30/00																
875	7.18.5.2.2	*Aspects and Impacts	195 days	Mon 9/6/99	Tue 5/30/00																
876	7.18.5.2.3	Legal & Other Requirements	195 days	Mon 9/6/99	Tue 5/30/00																
877	7.18.5.2.4	*Objectives and Targets	195 days	Mon 9/6/99	Tue 5/30/00																
878	7.18.5.2.5	*EM Program	195 days	Mon 9/6/99	Tue 5/30/00																
879	7.18.5.2.6	EMS Structure & Responsibility	195 days	Mon 9/6/99	Tue 5/30/00																
880	7.18.5.2.7	Training and competency	195 days	Mon 9/6/99	Tue 5/30/00																
881	7.18.5.2.8	Communications	195 days	Mon 9/6/99	Tue 5/30/00																



**EPA PHASE III:
EMS Project Summary Critical Path
9/99**

ID	WBS	Task Name	Duration	Start	Finish	1998				1999				2000				2001							
						Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
882	7.18.5.2.9	*EMS Documentation	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
883	7.18.5.2.10	Document Control	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
884	7.18.5.2.11	Operational Control	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
885	7.18.5.2.12	Emergency Preparedness and Response	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
886	7.18.5.2.13	*Monitoring and Measurement	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
887	7.18.5.2.14	NCR and Corrective/Preventative Action	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
888	7.18.5.2.15	Records	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
889	7.18.5.2.16	Environmental Audits	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
890	7.18.5.2.17	Management Review	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
891	7.18.5.2.18	Integrate EMS w/in Directorate	195 days	Mon 9/6/99	Tue 5/30/00					9/6															
892	7.18.5.2.19	M3: Program Implementation Complete: RHIC (CAD/AGS)	0 days	Tue 5/30/00	Tue 5/30/00																				
893	7.18.5.3	TRAINING: RHIC (CAD/AGS)	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
894	7.18.5.3.1	EMS Team Training	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
895	7.18.5.3.2	*General Environmental Protection Training	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
896	7.18.5.3.3	Job Specific EMS Training	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
897	7.18.5.3.4	EMS Management Overview Training	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
898	7.18.5.3.5	Internal EMS Assessor Training	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
899	7.18.5.3.6	Update Records	198 days	Thu 7/1/99	Thu 3/30/00					7/1															
900	7.18.5.3.7	M3: EMS Training Completed: RHIC (CAD/AGS)	0 days	Thu 3/30/00	Thu 3/30/00																				
901	7.18.5.4	Communicate EMS Initiative: RHIC (CAD/AGS)	220 days	Thu 7/1/99	Fri 4/28/00					7/1															
902	7.18.5.4.1	Conduct Division Kickoff Meeting	220 days	Thu 7/1/99	Fri 4/28/00					7/1															
903	7.18.5.4.2	Give EMS presentations	220 days	Thu 7/1/99	Fri 4/28/00					7/1															
904	7.18.5.4.3	Provide Status Updates to Management	220 days	Thu 7/1/99	Fri 4/28/00					7/1															
905	7.18.5.4.4	Brief staff on upcoming audits	220 days	Thu 7/1/99	Fri 4/28/00					7/1															

**EPA PHASE III:
EMS Project Summary Critical Path
9/99**

Project: EPA PHASE III
Date: Mon 9/20/99

Task		Rolled Up Critical Task	
Task Progress		Rolled Up Milestone	
Critical Task		Baseline Summary	
Critical Task Progress		Rolled Up Baseline	
Baseline		Rolled Up Baseline Milestone	
Milestone		Rolled Up Progress	
Baseline Milestone		Split	
Summary		External Tasks	
Rolled Up Task		Project Summary	

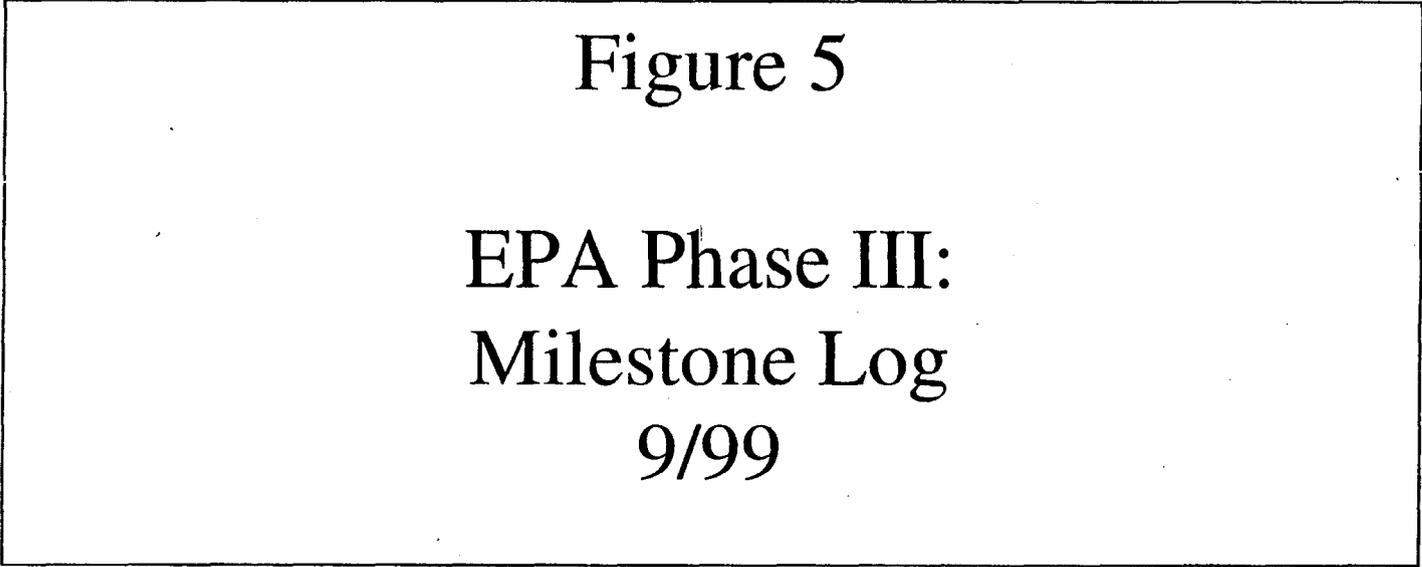


Figure 5

EPA Phase III:
Milestone Log
9/99

EMS Level 1 Milestones

WBS No.	Milestone Level	Description	Baseline Finish	Actual/Scheduled Finish	Completed
6.1.10	1	M1: Contract Recommendation to DOE for Facilities with high likelihood of env. Impact	9/30/98	9/30/98	Yes
6.5.3.3	1	M1: Year 3 DOE Independent Audit performed	9/26/00	9/26/00	No
6.6.3	1	M1: EMS Facilities Registered (RO, EM, BLIP, RHIC Dir.)	9/29/00	9/29/00	No
7.19	1	M1: LABORATORY SELF-DECLARES CONFORMANCE TO ISO	9/30/00	9/30/00	No
10.6	1	M1: PROJECT COMPLETE: EMS OPERATIONAL	1/1/01	1/1/01	No
Totals	5				

EMS Level 2 Milestones

WBS No.	Milestone Level	Description	Baseline Finish	Actual/Scheduled Finish	Completed
6.5.1.3	2	M2: Year 1 DOE Independent Audit Performed	10/30/98	10/30/98	Yes
1.4.4	2	M2: COMMITMENT AUTHORIZATIONS COMPLETED	12/31/98	12/31/98	Yes
2.18	2	M2: INSTITUTIONAL EMS PROGRAM COMPLETE	4/30/99	4/30/99	Yes
3.2.1.6.4	2	M2: RHIC PILOT IMPLEMENTATION COMPLETED	7/1/99	8/5/99	Yes
6.6.2.1.3	2	M2: RHIC Obtains ISO 14001 Registration	7/1/99	8/5/99	Yes
3.2.2.5.4	2	M2: WMD INDEPENDENTLY VERIFIED AS CONFORMING TO ISO 14001	9/1/99	9/3/99	Yes
3.2.2.6.4	2	M2:WMD PILOT IMPLEMENTATION COMPLETED	9/1/99	9/3/99	Yes
3.2.3.5.5	2	M2: RO INDEPENDENTLY VERIFIED AS CONFORMING TO ISO 14001	9/1/99	9/30/99	No
3.2.3.6.4	2	M2: RO PILOT IMPLEMENTATION COMPLETED	9/1/99	9/30/99	No
6.5.2.3	2	M2: Year 2 DOE Independent Audit Performed	10/6/99	10/6/99	No
7.18.12	2	M2: EMS FACILITY DEPLOYMENT COMPLETE	7/1/00	7/1/00	No
6.6.2.2.3	2	M2: RO Obtain ISO 14001 Registration	9/29/00	9/29/00	No
6.6.2.3.3	2	M2: EM Obtain ISO 14001 Registration	9/29/00	9/29/00	No
6.6.2.4.3	2	M2: RHIC Directorate Obtain ISO 14001 Registration	9/29/00	9/29/00	No
6.6.2.5.3	2	M2: BLIP Obtain ISO 14001 Registration	9/29/00	9/29/00	No
Totals:	16				

EMS Level 3 Milestones

WBS No.	Milestone Level	Description	Baseline Finish	Actual or Scheduled Finish	Completed
1.3.5	3	M3: EPA PHASE II PROJECT APPROVED: Project Charter	9/1/98	9/1/98	Yes
7.5.4.4	3	M3: CY 00 POLLUTION PREVENTION PROGRAM ESTABLISHED	10/6/98	10/6/98	Yes
1.3.6	3	M3: Present Project Plan to DOE	10/18/98	10/18/98	Yes
2.1.3	3	M3: EMS POLICY APPROVED/DOCUMENTED	11/2/98	12/1/98	Yes
1.7	3	M3: PROJECT INITIATED	12/31/98	12/31/98	Yes
2.15.3	3	M3: Records PROCEDURE ESTABLISHED	1/14/99	1/14/99	Yes
2.6.10	3	M3: EMS STRUCTURE & RESPONSIBILITY ESTABLISHED	1/29/99	1/29/99	Yes
2.14.3	3	M3: NONCONFORMANCE & CORRECTIVE ACTION PROCEDURE ESTABLISHED	1/29/99	1/29/99	Yes
4.2.1.5	3	M3: INSTITUTIONAL EMS POLICY DEPLOYED	1/29/99	1/29/99	Yes
2.10.5	3	M3: EMS DOCUMENT CONTROL ESTABLISHED	1/30/99	1/30/99	Yes
2.12.10	3	M3: EMERGENCY PREPAREDNESS REQUIREMENTS ESTABLISHED	2/1/99	2/1/99	Yes
2.16.5	3	M3: AUDITING & COMPLIANCE ASSURANCE PROTOCOLS ESTABLISHED	2/12/99	2/12/99	Yes
2.17.6	3	M3: MANAGEMENT REVIEW PROTOCOLS ESTABLISHED	2/12/99	2/12/99	Yes
2.2.9	3	M3: ENVIRONMENTAL ASPECTS/IMPACTS ESTABLISHED	2/16/99	2/16/99	Yes
7.5.2.6	3	M3: MSIP INITIATIVES INTEGRATED	2/26/99	2/26/99	Yes
2.4.8	3	M3: OBJECTIVES & TARGETS ESTABLISHED	2/26/99	2/26/99	Yes
2.5.7	3	M3: ENVIRONMENTAL MANAGEMENT PROGRAM ESTABLISHED	2/26/99	2/26/99	Yes
2.7.5	3	M3: TRAINING, AWARENESS, & COMPETENCY REQUIREMENTS ESTABLISHED	2/26/99	2/26/99	Yes
2.13.10	3	M3: MONITORING & MEASUREMENT PROTOCOLS ESTABLISHED	2/26/99	2/26/99	Yes
4.1.5	3	M3: EMS COMMUNICATIONS PLAN ESTABLISHED	2/26/99	2/26/99	Yes
2.8.6	3	M3: EMS COMMUNICATIONS PROCEDURE ESTABLISHED	2/28/99	2/28/99	Yes
2.15.5	3	M3: RECORDS PROTOCOL ESTABLISHED	3/11/99	3/11/99	Yes
7.5.3.4	3	M3: CY 99 POLLUTION PREVENTION PROGRAM ESTABLISHED	3/26/99	3/26/99	Yes
5.6	3	M3: PILOT PROJECT TEAMS TRAINING	3/31/99	3/31/99	Yes
2.3.7.4	3	M3: LEGAL REQUIREMENTS ESTABLISHED	3/31/99	3/31/99	Yes
2.11.6	3	M3: OPERATIONAL CONTROL GUIDANCE DOCUMENT ESTABLISHED	3/31/99	3/31/99	Yes
3.2.1.4.3	3	M3: RHIC EMS COMMUNICATIONS ESTABLISHED	4/1/99	4/1/99	Yes
7.5.1.2	3	M3: FY 99 EM PROGRAM ESTABLISHED	4/1/99	4/1/99	Yes
3.2.1.1.8	3	M3: RHIC PROJECT PLANNING COMPLETED	4/30/99	4/30/99	Yes
6.2.3	3	M3: FY 99 EMS SELF-ASSESSMENT COMPLETED	5/17/99	5/17/99	Yes
6.3.1.3	3	M3: INDEPENDENT AUDIT COMPLETED	5/31/99	5/31/99	Yes
3.2.2.1.9	3	M3: WMD PROJECT PLANNING COMPLETED	6/29/99	6/29/99	Yes
7.9.4	3	M3: EMS DOCUMENTATION REQUIREMENTS ESTABLISHED	7/15/99	7/15/99	Yes
3.2.1.2.6	3	M3: RHIC PROGRAM IMPLEMENTATION COMPLETED	7/30/99	7/30/99	Yes
3.2.1.5.3	3	M3: RHIC READINESS ASSESSMENT	7/30/99	7/30/99	Yes
3.2.1.3.7	3	M3: RHIC EMPLOYEES TRAINED	7/30/99	8/1/99	Yes
3.2.2.3.7	3	M3: WMD EMPLOYEES TRAINED	8/19/99	8/19/99	Yes
3.2.2.4.3	3	M3: WMD COMMUNICATIONS ESTABLISHED	8/31/99	8/31/99	Yes
3.2.2.2.5	3	M3: WMD PROGRAM IMPLEMENTATION COMPLETE	9/1/99	9/3/99	Yes
3.2.3.1.8	3	M3: RO PLANNING COMPLETED	9/1/99	9/30/99	No
3.2.3.2.6	3	M3: RO PROGRAM IMPLEMENTATION COMPLETE	9/1/99	9/30/99	No
3.2.3.3.7	3	M3: RO EMPLOYEES TRAINED	9/1/99	9/30/99	No
3.2.3.4.3	3	M3: RO COMMUNICATIONS ESTABLISHED	9/1/99	9/30/99	No
7.13.5	3	M3: SITEWIDE MONITORING PLANS INCLUDE EMS MONITORING REQUIREMENTS	9/1/99	9/30/99	No
7.17.1.2	3	M3: FY 99 MGMT REVIEW CONDUCTED	10/29/99	10/29/99	No
7.18.2.1.7	3	M3: EM PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.3.1.7	3	M3: FO PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.4.1.7	3	M3: BES PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.5.1.7	3	M3: RHIC (CAD/AGS) PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.6.1.7	3	M3: LS PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.7.1.7	3	M3: AS&T PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.8.1.7	3	M3: ESH&Q PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.9.1.7	3	M3: DO/CIG&PA PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.10.1.7	3	M3: FA PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.18.11.1.7	3	M3: HENP PROJECT PLANNING COMPLETED	10/29/99	10/29/99	No
7.2.3	3	M3: EMS ASPECTS/IMPACTS REQUIREMENTS DELIVERED TO ISM	10/31/99	10/31/99	No
7.3.4	3	M3: Institutional Legal Requirements Deployed	10/31/99	10/31/99	No
8.1.5.4	3	M3: IMPROVEMENTS TO INSTITUTIONAL EMS PROGRAM COMPLETED	10/31/99	10/31/99	No
5.7	3	M3: BALANCE OF PROJECT TEAM TRAINING	12/31/99	12/31/99	No
7.18.2.3.7	3	M3: EMS Training Completed: EM	3/30/00	3/30/00	No
7.18.3.3.7	3	M3: EMS Training Completed: FO	3/30/00	3/30/00	No
7.18.4.3.7	3	M3: EMS Training Completed: BES	3/30/00	3/30/00	No
7.18.5.3.7	3	M3: EMS Training Completed: RHIC (CAD/AGS)	3/30/00	3/30/00	No
7.18.6.3.7	3	M3: EMS Training Completed: LS	3/30/00	3/30/00	No
7.18.7.3.7	3	M3: EMS Training Completed: AS&T	3/30/00	3/30/00	No
7.18.8.3.7	3	M3: EMS Training Completed: ESH&Q	3/30/00	3/30/00	No
7.18.9.3.7	3	M3: EMS Training Completed: DO/CIG&PA	3/30/00	3/30/00	No

EMS Level 3 Milestones

WBS No.	Milestone Level	Description	Baseline Finish	Actual or Scheduled Finish	Completed
7.18.10.3.7	3	M3: EMS Training Completed: FA	3/30/00	3/30/00	No
7.18.11.3.7	3	M3: EMS Training Completed: HENP	3/30/00	3/30/00	No
7.5.8	3	M3: FY 00 EM PROGRAM ESTABLISHED	4/1/00	4/1/00	No
7.18.2.4.5	3	M3: Communicate EMS Initiatives Completed: EM	4/28/00	4/28/00	No
7.18.3.4.5	3	M3: Communicate EMS Initiatives Completed: FO	4/28/00	4/28/00	No
7.18.4.4.5	3	M3: Communicate EMS Initiatives Completed: BE'S	4/28/00	4/28/00	No
7.18.5.4.5	3	M3: Communicate EMS Initiatives Completed: RH C (CAD/AGS)	4/28/00	4/28/00	No
7.18.6.4.5	3	M3: Communicate EMS Initiatives Completed: LS	4/28/00	4/28/00	No
7.18.7.4.5	3	M3: Communicate EMS Initiatives Completed: AS&T	4/28/00	4/28/00	No
7.18.8.4.5	3	M3: Communicate EMS Initiatives Completed: ESH&Q	4/28/00	4/28/00	No
7.18.9.4.5	3	M3: Communicate EMS Initiatives Completed: DO/CIG&PA	4/28/00	4/28/00	No
7.18.10.4.5	3	M3: Communicate EMS Initiatives Completed: FA	4/28/00	4/28/00	No
7.18.11.4.5	3	M3: Communicate EMS Initiatives Completed: HENP	4/28/00	4/28/00	No
6.2.6	3	M3: FY 00 EMS SELF-ASSESSMENT COMPLETED	5/1/00	5/1/00	No
7.18.2.2.19	3	M3: Program Implementation Complete: EM	5/30/00	5/30/00	No
7.18.3.2.19	3	M3: Program Implementation Complete: FO	5/30/00	5/30/00	No
7.18.4.2.19	3	M3: Program Implementation Complete: BES	5/30/00	5/30/00	No
7.18.5.2.19	3	M3: Program Implementation Complete: RHIC (CAD/AGS)	5/30/00	5/30/00	No
7.18.6.2.19	3	M3: Program Implementation Complete: LS	5/30/00	5/30/00	No
7.18.7.2.19	3	M3: Program Implementation Complete: AS&T	5/30/00	5/30/00	No
7.18.8.2.19	3	M3: Program Implementation Complete: ESH&Q	5/30/00	5/30/00	No
7.18.9.2.19	3	M3: Program Implementation Complete: DO/CIG&PA	5/30/00	5/30/00	No
7.18.10.2.19	3	M3: Program Implementation Complete: FA	5/30/00	5/30/00	No
7.18.11.2.19	3	M3: Program Implementation Complete: HENP	5/30/00	5/30/00	No
7.18.2.5.4	3	M3: EMS DEPLOYED AT EM	6/30/00	6/30/00	No
7.18.2.6.5	3	M3: PROJECT SUPPORT COMPLETED: EM	6/30/00	6/30/00	No
7.18.3.5.4	3	M3: EMS DEPLOYED AT FO	6/30/00	6/30/00	No
7.18.3.6.5	3	M3: PROJECT SUPPORT COMPLETED: FO	6/30/00	6/30/00	No
7.18.4.5.4	3	M3: EMS DEPLOYED AT BES	6/30/00	6/30/00	No
7.18.4.6.5	3	M3: PROJECT SUPPORT COMPLETED: BES	6/30/00	6/30/00	No
7.18.5.5.4	3	M3: EMS DEPLOYED AT RHIC (CAD/AGS)	6/30/00	6/30/00	No
7.18.5.6.5	3	M3: PROJECT SUPPORT COMPLETED: RHIC (CAD/AGS)	6/30/00	6/30/00	No
7.18.6.5.4	3	M3: EMS DEPLOYED AT LS	6/30/00	6/30/00	No
7.18.6.6.5	3	M3: PROJECT SUPPORT COMPLETED: LS	6/30/00	6/30/00	No
7.18.7.5.4	3	M3: EMS DEPLOYED AT AS&T	6/30/00	6/30/00	No
7.18.7.6.5	3	M3: PROJECT SUPPORT COMPLETED: AS&T	6/30/00	6/30/00	No
7.18.8.5.4	3	M3: EMS DEPLOYED AT ESH&Q	6/30/00	6/30/00	No
7.18.8.6.5	3	M3: PROJECT SUPPORT COMPLETED: ESH&Q	6/30/00	6/30/00	No
7.18.9.5.4	3	M3: EMS DEPLOYED AT DO/CIG&PA	6/30/00	6/30/00	No
7.18.9.6.5	3	M3: PROJECT SUPPORT COMPLETED: DO/CIG&PA	6/30/00	6/30/00	No
7.18.10.5.4	3	M3: EMS DEPLOYED AT FA	6/30/00	6/30/00	No
7.18.10.6.5	3	M3: PROJECT SUPPORT COMPLETED: FA	6/30/00	6/30/00	No
7.18.11.5.4	3	M3: EMS DEPLOYED AT HENP	6/30/00	6/30/00	No
7.18.11.6.5	3	M3: PROJECT SUPPORT COMPLETED: HENP	6/30/00	6/30/00	No
7.17.2.2	3	M3: FY 00 MGMT REVIEW CONDUCTED	9/28/00	9/28/00	No
8.3.4	3	M3: ENVIRONMENTAL TRAINING IMPROVEMENTS	9/29/00	9/29/00	No
9.4	3	M3: EMS PROJECT TRANSITIONED/ FINAL REPORT COMPLETED	12/31/00	12/31/00	No
Totals	114				

Progress Reports:

- Bimonthly status reports to the ESD Manager
- Bimonthly meetings with DOE-BHG
- Quarterly status update meetings with BNL and DOE-BHG Senior Management

3.3 COST BASELINE

The cost baseline for this project is the application of dollars (cost) to scope (WBS) and schedule for the EMS Project effort. The cost baseline for the EMS Project is predicated on the estimated time and resources required to develop an Institutional EMS Program and to deploy this program and related EMS activities throughout BNL. The cost baseline is represented in Tables 5a-5e.

Project performance will be determined using Earned Value—the calculated value of work satisfactorily completed based on a target plan. Measuring earned value involves three key indicators:

- BCWS, or Budgeted Cost for Work Scheduled
- BCWP, or Budgeted Cost for Work Performed
- ACWP, or Actual Cost for Work Performed

By tracking BCWS, BCWP, and ACWP over time, past spending and schedule trends for the project, as well as a forecast of future costs, will be obtained. A database of EMS tasks and accounting provisions made to document the 'as-built' time required to complete an EMS task will be applied in an earned value format and used to forecast the 'to-go' time for remaining tasks. An earned value curve will be produced periodically to forecast schedule and resource progress for the EMS Project. The earned value assignments for the key project tasks is provided in Tables 6a – 6d.

3.3.1 MONTHLY COST PROJECTIONS

The monthly cost requirements for the scope and schedule baseline are included in Figure 6.

3.3.2 BASIS OF ESTIMATE

Project costs were estimated based on the activities planned for each task of the WBS. The resource assumptions identified in section 1.4 were applied. The estimates used for the

Institutional Program Requirements have been provided by the personnel expected to perform the activities. The Management Representatives on EMS at the pilot facilities developed a generic implementation plan with specific tasks and associated resources estimates assigned. These estimates, validated by personnel in a scientific department, were used to develop a model for estimating the costs for Laboratory wide deployment. The model took into account whether the facility was administrative or technical in nature in calculating a base program estimate. Facility specific factors related to the number of employees (for estimating general training and emergency drill resource requirements) and the number of high priority processes (for predicting additional time needed to address operational controls and facility specific training) were also included. Details of the cost estimates associated with the facility implementation plan are included in Appendix 4. However, actual cost accounting information on which to base these estimates is limited and therefore these estimates could contain an

Table 5a - e

**EPA Phase III:
TOTAL RESOURCE PROFILE
8/31/98**

Brookhaven
National Laboratory 1

EPA Phase III: Environmental Management System Summary Estimate

■ Resource Estimates

Current Detailed Estimate:

- | | |
|-----------------------------|----------|
| 1. Line Department Support: | \$ 1.75M |
| 2. Overhead Dept. Support:: | \$.38M |
| 3. Project Mgmt Support: | \$.61M |

\$2.74M

Table 5a

EPA Phase III: Environmental Management System Summary Resources by Fiscal Year

Table 5b

RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	TOTALS
COMMITMENT AUTHORIZATION SUPPORT	\$88,120	\$987,851	\$1,031,000	\$28,000	\$2,134,971
1) OVERHEAD STAFF	\$30,120	\$236,151	\$91,000	\$28,000	\$385,271
2) FACILITY SUPPORT	\$58,000	\$751,700	\$940,000	\$0	\$1,749,700
DIRECT PROJECT SUPPORT	\$30,000	\$331,384	\$222,000	\$25,000	\$608,384
TOTALS:	\$118,120	\$1,319,235	\$1,253,000	\$53,000	\$2,743,355

EPA Phase III: Environmental Management System Incremental Resources by Fiscal Year

Table 5c

RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	TOTALS
PROJECT MANAGER	\$25,000	\$100,000	\$100,000	\$25,000	\$250,000
PROJECT MANAGER INCREMENTAL	\$0	\$46,000	\$0	\$0	\$46,000
EMS TECHNICAL SUPPORT	\$0	\$100,000	\$100,000	\$0	\$200,000
PROJECT CONTROLS	\$5,000	\$23,384	\$22,000	\$0	\$50,384
TRAINING INCREMENTAL	\$0	\$22,000	\$0	\$0	\$22,000
ENVIR. PROT. OFFICE INCREMENTAL	\$0	\$40,000	\$0	\$0	\$40,000
TOTAL INCREMENTAL COSTS:	\$30,000	\$331,384	\$222,000	\$25,000	\$608,384

EPA Phase III: Environmental Management System Resource Detail: Commitment Authorizations

Table 5d

RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	TOTALS
COMMITMENT AUTHORIZATION SUPPORT	\$30,120	\$236,151	\$91,000	\$28,000	\$385,271
TRAINING	\$12,120	\$24,262	\$0	\$0	\$36,382
CENTRAL TRAINING OFFICE	\$1,400	\$4,262	\$0	\$0	\$5,662
SCHWANER	\$9,400	\$20,000	\$0	\$0	\$29,400
OSH TRAINING	\$1,320	\$0	\$0	\$0	\$1,320
EMERGENCY PLANNING	\$3,000	\$15,085	\$0	\$0	\$18,085
OTHER PROJECTS	\$0	\$48,000	\$37,000	\$0	\$85,000
OTHER OFFICE (QA, IO, IMS)	\$5,000	\$20,632	\$4,000	\$3,000	\$32,632
ENV. PROTECTION OFFICE SUPPORT	\$10,000	\$78,172	\$0	\$0	\$88,172
ESH SECRETARIAL	\$0	\$50,000	\$50,000	\$25,000	\$125,000

EPA Phase III: Environmental Management System Resource Detail: Facility Support

Table 5e

RESOURCE DESCRIPTION	FY 1998	FY 1999	FY 2000	FY 2001	TOTALS
FACILITY SUPPORT:	\$58,000	\$751,700	\$940,000	\$0	\$1,749,700
DEPARTMENT SUPPORT (WORKGROUPS)	\$13,000	\$24,700	\$0	\$0	\$37,700
PILOT FACILITIES	\$45,000	\$414,000	\$0	\$0	\$459,000
RHIC	\$24,000	\$117,000	\$0	\$0	\$141,000
HFBR	\$11,000	\$154,000	\$0	\$0	\$165,000
WASTE MGMT DIVISION	\$10,000	\$143,000	\$0	\$0	\$153,000
FACILITY OPERATIONS	\$0	\$57,000	\$170,000	\$0	\$227,000
LIFE SCIENCES	\$0	\$32,000	\$94,000	\$0	\$126,000
HIGH ENERGY PHYSICS	\$0	\$57,000	\$174,000	\$0	\$231,000
BASIC ENERGY & SCIENCES	\$0	\$37,000	\$112,000	\$0	\$149,000
APPLIED SCIENCE & TECHNOLOGY	\$0	\$50,000	\$148,000	\$0	\$198,000
ESH&Q	\$0	\$27,000	\$80,000	\$0	\$107,000
COMMUNICATIONS	\$0	\$22,000	\$70,000	\$0	\$92,000
FINANCE & ADMINISTRATION	\$0	\$31,000	\$92,000		\$123,000

uncertainty of +/- 30%. The project has been designed to collect actual cost data in order to revise and refine the estimates if necessary depending on the results of the pilot phase.

3.3.3 OVERVIEW OF COST ESTIMATION METHOD

The estimation method used to predict project costs was based on the WBS established for the project and the activities described to complete the scheduled goals, objectives, and milestone commitments and deliverables. An integrated resource loaded schedule was then prepared from current cost pricing data and project staffing requirements to develop the spending plan for the project. Resources were priced using a mean labor rate of 100K/year which includes indirect cost of general and administrative burdens. The resource estimates to maintain program in the out years is 400K/year.

Work Tasks	TASK VALUE (%)	Cost Estimate (\$K)
Institutional Program Requirements	15	180
Pilot Facility Deployed	15	478
Communication Initiatives	5	48
Training Initiatives	5	41
Program Assessed	20	42
Institutional Program Deployed & Improved	35	1,329
Project Management	5	626
TOTAL	100	2,744

4.0 PROJECT MANAGEMENT CONTROL SYSTEM

The project management control system that will be used for the EMS project consists of those project controls and related tools which collectively monitor and forecast progress against technical and project objectives. A critical project control assumption is that department resources are identified and matrixed to the EMS Project Manager for development of the Institutional EMS program development and implementation of facility specific and/or project specific EMS programs. **This project plans assumes that resources and expenditures necessary to support implementation of this project will be "committed" to the project manager via Commitment Authorizations which will be endorsed by Associate/Assistant Laboratory Director.** This plan will specifically identify the amount and time frame for resource expenditures. Those project support expenditures which include the project manager, project controls, secretarial, and support services as identified here-in will be proposed, approved, and established in a unique cost account for project tracking. The primary goal of this

management system is to ensure planning and implementation of the project work scope is performed in a technically competent yet cost- and schedule-effective manner.

TABLE 6b

**EMS Project Controls
Level 2 Earned Value - Institutional Program Requirements**

Work Tasks	TASK VALUE (%)	Costs (\$K)
Environmental Policy	5	.4
Environmental Aspects & Impacts	10	7.8
Legal & Other Requirements	20	83.0
Objectives and Targets	5	8.4
Environmental Management Programs	5	2.5
EMS Structure & Responsibility	2.5	.5
Training, Awareness & Competency	2.5	8.7
Communications	2.5	.9
EMS Documentation	10	.4
Document Control	2.5	8.7
Operational Controls	5	10.0
Emergency Preparedness & Response	2.5	5.9
Monitoring & Measurement	5	30.6
Nonconformance & Corrective/Preventive Actions	5	5.6
Records	2.5	.9
Environmental Auditing	10	2.5
Management Review	5	2.7
TOTAL	100	179.5

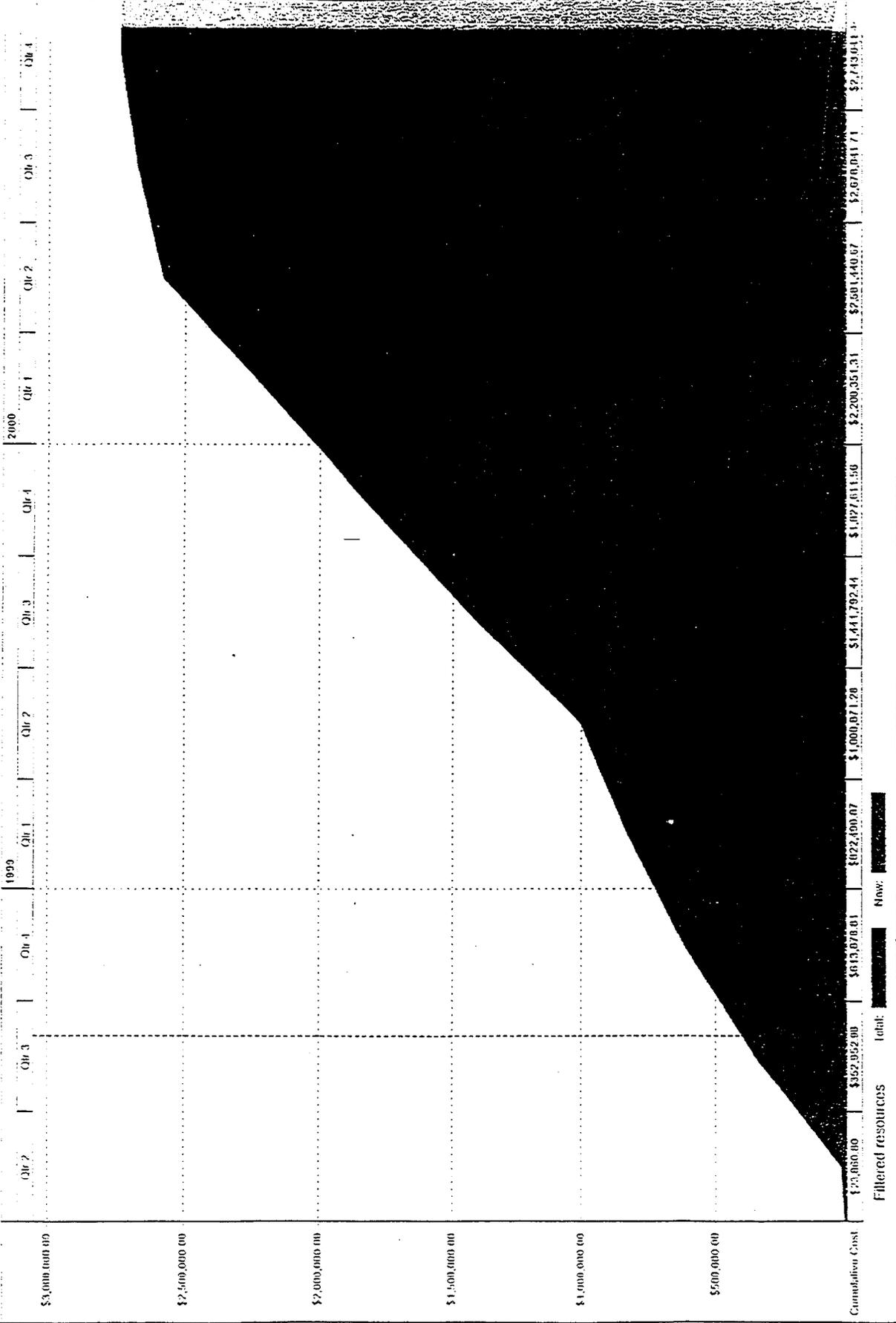
TABLE 6c		
EMS Project Controls		
Level 2 Earned Value – Facility Deployment		
Work Tasks	TASK VALUE (%)	Percentage of Costs (%)*
Project Planning	5	6.8
Program Implementation	40	31.7
Train Employees	10	18.5
Communicate EMS Initiative	10	7.2
Assess Readiness	25	22.7
Project Support	10	13.2
TOTAL	100	100

*Facility deployment costs are specific to the Directorate.

TABLE 6d		
EMS Project Controls		
Level 2 Earned Value - Institutional Program Deployment		
Work Tasks	TASK VALUE (%)	Costs (\$K)
Legal & Other Requirements	5	2.4
Objectives & Targets	15	6.2
Environmental Management Program	15	7.9
Training Initiatives	15	41
Communication Initiatives	10	48
Emergency Preparedness & Response	10	13.8
Management Review	10	3.7
Project Assessment Initiatives	15	42
Program Improvement	5	15.4
TOTAL	100	180.4

Figure 6

EPA PHASE III:
CUMULATIVE RESOURCE PROFILE
8/31/98



The management control system is designed to relate cost and schedule progress against a standard "work unit". The work units for the EMS project are the individual EMS program requirements of ISO 14001 (incorporating the EPA enhancements). Each work unit is a "direct charge" to the project and includes all specific costs required to develop and implement the individual EMS program requirements. The costs and schedule of the EMS project will be controlled at both the Institutional and Facility level. Indirect charges to the project will consist of project management and project support for performance of:

- Establishing clear communication channels for reporting on the project resources to the EMS project manager and project controls staff to ensure accurate progress reporting and timely notification for configuration management planning and execution.
- Using the WBS to define the project in detailed, manageable packages of work for establishing technical, cost, and schedule scope to be performed.
- Establishing and communicating roles, responsibilities, authorities and accountabilities to the project team.
- Providing an accurate, timely, and consistent method of accounting and assessing work performed and project status against planned work.
- Ensuring timely evaluation and analysis of project data by the project team to assist the project manager in identifying and resolving problems or changes to established baselines.
- Enabling control of project changes and timely preparation and initiation of project change requests to minimize the interruption of work performed.

1.1 COMMITMENT AUTHORIZATION

Commitment authorization will consist of an approved resource allocation form from each directorate that includes the individuals designated to develop and implement the EMS program within the facilities/projects in the Directorate along with the estimated hours, cost, and schedule for task performance. The agreement forms the basis of partnering between Project Manager and the Laboratory Directorate. After completion of each EMS program element by the Directorate working group, the EMS program deliverables will be submitted for review and tracking along with the identification of hours required for performance.

All deviations in planned/authorized work shall be approved in advance by the respective ALD and EMS Project Manager.

1.2 PROJECT REPORTING

Successful achievement and monitoring of project goals and objectives will be through regular communication of project performance, variance to baseline assumptions, along with a projection or forecast of actual project data applied to balance of project activity. This communication is critical for the project and stakeholders to accurately understand and affect the status and performance of the project.

4.2.1 STATUS REPORTS (INTERNAL)

Project support personnel will provide bimonthly status updates on their milestone progress for the first six months of the project and monthly for the remaining six months.. This status update should address the following as applicable:

- A description of any issues that the Project Manager should be made aware, that may impact cost or schedule, should be included for insertion in the EMS project bimonthly report.
- A summary statement of progress, and notification of any potential Baseline Change Proposal (if necessitated, an updated schedule, estimate, milestone schedule, and revised WBS dictionary if affected.)
- The milestone deliverables for the assigned EMS program element.
- A summary of hours spent in the assigned WBS element.
- An explanation of variances.
- Discussion of problems and corrective actions planned or taken.

The EMS Project Manager shall present a summary of this information to the ESD Manager

A project review will be held on alternate months. The EMS project team members and support personnel will present and review project status and review scheduled project activities for the upcoming two months.

EMS Project Team members are required to submit completed milestone deliverables for each EMS program element to the project manager as soon as they are completed. It is important that the actual hours be tracked in order to be able to refine the base estimate and forecast. Project management personnel will update the project database to reflect the status of completed tasks.

4.2.2 BIMONTHLY AND QUARTERLY STATUS UPDATE MEETINGS

Bimonthly meetings with the DOE-BHG EMS Point of Contact will be held to facilitate communication of project progress. Quarterly meetings will be conducted with BNL Senior Management, DOE-BHG, ALDs and Department/Division Managers of respective implementing organizations, and EMS project personnel. These meetings shall provide an assessment of the following:

- Progress highlights
- Milestone progress
- Cost summary
- Major problems or concerns
- Corrective Actions.
- Variances for cost and schedule.

4.2.3 PERFORMANCE MEASUREMENT AND REPORTING

Actual work progress will be routinely monitored and compared to established cost, schedule and technical baselines to determine if significant deviations are occurring from planned work and if these deviations will impact project deliverables or milestones. To accomplish this, the following activities will be conducted by project controls personnel:

- Track project progress and compare against baseline data on a bimonthly-monthly basis.

- Provide variance analysis based on Budgeted Cost of Work Scheduled for each EMS program element.
- Monitor trends in cost and schedule variance to determine need for corrective action or revised estimate rates.
- Report exceedances of variance threshold and changes in estimate at complete to EMS Project Manager.
- Provide summary reports on the BNL and DOE management at bimonthly and quarterly meetings.

3 BASELINE CHANGE CONTROL

This project plan including all attachments represents the project baseline for conducting the EMS project. As is the case for most projects, during the course of the project the potential exists for the project scope, resources, and schedule to change considerably as assumptions, parameters, or performance change. This project plan has been established to insert the appropriate management control points into the project process in order to identify the scope changes or project trends as soon as possible, and rectify them (if possible) by taking action to successfully address the change. The baseline change process identifies what magnitude of scope, resource, and schedule change necessitates approval by project participants or stakeholders. It is the duty of the project manager to keep the stakeholders informed and included in the decision making process and effectuate legitimate changes to the project baseline.

3.1 CHANGE IDENTIFICATION AND PROJECT VARIANCES

Typically, the baseline change driver is the technical scope and scope assumptions. However, this project will be driven by the extent to which the current institutional and facility programs need to be modified, documented, and implemented to conform to the BNL EMS requirements. In addition, there is a lack of experience and documented cost estimates for implementing an EMS at a DOE facility, specifically a national laboratory. Therefore, confidence in the resource estimate is initially limited but will improve as the project progresses into the pilot and implementation phases as cost accounting systems are implemented.

Also, since BSA is deploying several new initiatives to improve ESH performance yet has not resource loaded them in tandem through the line organizations, there is a potential for competing priorities on the staff whose expertise has been identified and are expected to be committed to this project. This further limits the confidence of the resource estimates put forth in this project plan. Lastly, the degree to which SBMS can be readily transferred to BNL and used for EMS documentation will affect the resource estimates provided. Therefore, an aggregate resource and schedule indicator for "performance" shall be included in the change identification and notification sequence.

A Baseline Change Proposal (BCP) will be implemented according to the management authorization matrix provided in Table 7. The criteria for submitting a BCP for approval in accordance with the above mentioned authorization matrix is describe in Table 8.

PROJECT RISK AND MITIGATION STRATEGIES

Two specific risks have been associated with the successful implementation of this project: resource limitations and BNL’s standing in the community.

TABLE 7 - EMS PROJECT MANAGEMENT APPROVAL MATRIX						
Category Classifications	MOA	Project Management Plan	Quarterly Performance Reports	Baseline Change: CAT 1	Baseline Change: CAT 2	Baseline Change: CAT 3
Category 1: DOE/EPA	x			x		
Category 2: BNL ESH/Q ALD		x	x	x	x	
Category 3: BNL Project Manager/ALD		x	x	x	x	x

TABLE 8- BASELINE CHANGE CRITERIA	
Category	Criteria
1	<ul style="list-style-type: none"> - Changes in the intent of the MOA - Any requested change to the 5 Level 1 Milestones (M1) - Notification if schedule forecast indicates a greater than two month slip to any Level 1 Milestone
2	<ul style="list-style-type: none"> - All criteria contained under Category 1 - Any requested change to the 15 Level 2 Milestones (M2) - Notification if schedule forecast indicates a greater than one month slip to any Level 2 Milestone - Notification if resource forecasts projects greater than 20% over TEC (Total Estimate at Completion)
3	<ul style="list-style-type: none"> - Project manager: All criteria contained under Categories 1 and 2 - Any requested change to the 114 Level 3 Milestones (M3) - Facility Manager/ALD: Notification if facility/project effort is not supporting the facility implementation plan and/or the overall EMS project schedule. - Facility Manager/ALD: Notification if project staff account is forecast over budget

As mentioned in Section 1.4, Assumptions and Conditions, the project is constrained in terms of time schedule and technical scope. The EPA/DOE MOA indirectly sets the timeline on EMS implementation by specifying the annual audit schedule, scope, and complete system audit in year

three of the MOA. This MOA also sets the technical scope by specifying the criteria and elements of the BNL EMS. Further definition of the technical scope and timeline associated with this project are reflected in the BSA/DOE Contract. It requires ISO 14001 registration for facilities that have a high potential to impact the environment and self-declaration of conformance to the standard for the Laboratory as a whole in FY 2000. The remaining variable to ensure completion of the project scope and deliverables is allocation of resources. BNL is currently under serious budgetary resource limitations at this time, and must rely on current staff to implement this project. At the same time, BSA is deploying several new initiatives focused on ESH improvement, each of which requires commitment of staff resources and may introduce conflicting priorities and competition for the limited staff with environmental expertise.

This constraint will be mitigated by implementing project management controls, including establishment of communication and reporting mechanisms, to enable the project manager to remain current with the project progress and affect change as necessary. Commitment authorizations shall be used as a mechanism to clearly communicate roles, responsibilities, deliverables, and estimated resource commitments between the EMS project manager and line managers of support staff working on this project. To the extent possible, milestones can be adjusted to accommodate short-term resource limitations. In addition, a cadre of external consultant services will be pursued to provide backup resources when milestone adjustments cannot be made for tasks identified in the critical path.

The second risk associated with this project is related to the criticism of BNL's environmental stewardship during the last two years. BNL must succeed in implementing an effective EMS and improving its environmental performance. To assure success, Laboratory management has committed to accomplishing the critical outcomes, of which implementation of this EMS is one. In addition, the project plan has used an integrated management approach to build EMS requirements into the design and deployment of related Laboratory management systems such as Integrated Safety, Standards Based Management, Performance Based Management, Integrated Assessment, and others. This will enable the Laboratory to institutionalize the values of environmental stewardship. Lastly, the pursuit of ISO registration will enable the Laboratory to quell the concerns expressed about environmental management in their facilities through independent verification and ensure the sustainability of these efforts.

.0 PROJECT SUPPORT

.1 ES&H

No specific ES&H hazards or controls are required for the development and implementation of the BNL EMS.

.2 QUALITY ASSURANCE

A graded approach will be used to apply QA requirements of DOE Order 5700.6c, Quality Assurance, to the EMS project. The applicable QA requirements that are addressed in this project plan include:

- Program, i.e., this project plan.
- Training and Qualification of EMS personnel

- Improvement
- Records
- Management Assessment
- Independent Assessment

5.3 RECORDS MANAGEMENT

Records for the BNL EMS will be identified, controlled, and dispositioned in accordance with the requirements and protocols developed as part of the Institutional level EMS program elements EMS Documentation (WBS 2.9), Document Control (WBS 2.10), and Records (WBS 2.15). The SBMS Project Manager will establish and execute the control procedures for the EMS hierarchy of documents maintained in SBMS.

5.4 SAFEGUARDS AND SECURITY

No specific Safeguards & Security measures are required for the development and implementation of the BNL EMS.

5.5 SUBCONTRACTS AND PROCUREMENT

Subcontracting is required and or anticipated* for the following types of services:

- EMS Overview Training Program for Senior Managers
- Internal Environmental Auditor Training Program for select support and facility staff
- Train the Trainer program for Internal Environmental Auditor Training Course
- Train the Trainer program for EMS Overview Training
- Regulatory Updates Service*
- RAB-ANSI Registrar for ISO 14001 registration
- Technical assistance

Standard BNL subcontracting and procurement procedures will be followed in the purchase of these services. All contracts associated with EMS Program implementation shall be approved by the EMS Project Manager.

5.6 PROJECT PERFORMANCE SELF-ASSESSMENT AND EVALUATION

Several mechanisms shall be used to assess the project performance in order to evaluate its success. These mechanisms include:

- Technical Review of EMS Project Plan
- Project Self Assessments including: (1) quarterly project management performance measures in terms of milestone completion and schedule adherence, and (2) annual performance measures of customer satisfaction with EMS deliverables and project support (3) internal assessment of program conformance
- BNL independent assessment of Institutional EMS to measure conformance to the elements and criteria listed in Attachment 2A of the MOA
- BNL independent assessment of Pilot Facilities EMS to measure conformance to the elements and criteria listed in Attachment 2A of the MOA

-
- ISO Registration Audit for Pilot Facilities
 - Periodic BSA Corporate Oversight of the EMS Project Plan and Implementation progress
 - DOE Phase III Annual Audits to gauge the progress and adequacy of the BNL EMS, including an independent third party audit of the entire EMS and Laboratory wide implementation to self-declare conformance to ISO 14001.

6.0 PROJECT CLOSEOUT

A transition plan leading to project closeout will be developed to effectively transfer responsibility from the EMS project manager to the responsible management system owner.

Staff who are involved with this project will be released and reassigned to their respective line managers when the deliverables they are responsible for are received, reviewed and approved.

APPENDIX 1
DOE/EPA Memorandum of Agreement

Appendix 2
Appendix 2a



United States
Environmental Protection Agency
Region 2
290 Broadway
New York, N.Y. 10007-1866



United States
Department of Energy
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585

APPENDIX 1

MEMORANDUM OF AGREEMENT BY AND BETWEEN THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND THE UNITED STATES DEPARTMENT OF ENERGY

This memorandum of agreement confirms the understandings reached by and between the United States Environmental Protection Agency ("EPA") and the United States Department of Energy ("DOE") regarding the operation and environmental management of the Brookhaven National Laboratory ("BNL") in Upton, New York. It is both EPA's and DOE's objective that the BNL be operated so as to maintain full compliance with applicable environmental requirements, and to protect the environment and the health and safety of the workers at the facility and the general public.

While DOE, as a generator of hazardous waste at BNL, is subject to various legal requirements (such as the requirements found at 40 C.F.R. § 262.11 or 6 N.Y.C.R.R. § 372.2(a)(2), directing every generator of solid waste to determine if that waste constitutes a hazardous waste), the commitments described below extend beyond such requirements and include a voluntary initiative on the part of DOE. The goal of these voluntary undertakings is to enhance environmental management at BNL through the development and implementation of an Environmental Management System ("EMS") that is focused on environmental compliance and emphasizes pollution prevention.

DOE will, in good faith and in an expeditious manner, complete the Phase II and Phase III provisions and schedules set forth in the two attachments to this memorandum of agreement. DOE has agreed to complete the Phase II site-wide process and activity evaluation and to conduct Phase III periodic audits of BNL's EMS.

ABRIDGED VERSION

The elements of the Phase II work and Workplan are set forth in Attachment 1, and the elements of the Phase III work are detailed in Attachment 2. Phase II overall activities are scheduled to begin on or before January 1, 1998, and high priority process reviews are scheduled to be completed within one year of the signing of this MOA. Other process reviews are scheduled to be completed by February 28, 2000. DOE will conduct Phase III activities (i.e. annual audits beginning in 1998) in accordance with the schedule specified in Attachment 2.

DOE's completion of the work in accordance with the provisions and schedules of the attachments to this memorandum remains the responsibility of DOE, and DOE agrees that it shall inform its management and operating contractor for BNL of this memorandum and its accompanying attachments, and shall further undertake all that is necessary for said contractor to fully carry out the provisions and schedules of said attachments.

This memorandum and its accompanying attachments may be modified with the written consent of both EPA and DOE. DOE or EPA may abrogate this memorandum or agreement by providing to the other party sixty (60) days written notice of its intent to do so. Further, if either DOE or EPA is unable to meet a deadline specified in either attachment, it shall, as soon as it learns that a delay will occur, notify in writing the other party of the delay, the reasons therefor and when it expects to provide the submission in question (e.g., report, record or comments). If any deadline is missed, such delay shall not automatically extend any later deadlines; for any subsequent late submissions, the notice provision concerning a belated submission discussed in this paragraph is also to be followed.

EPA and DOE acknowledge that this memorandum is not intended to serve as a listing of available rights or remedies, and it is not intended to create any rights or remedies. Nor is this memorandum intended to supersede or otherwise negate any conditions or requirements of any eventual formal agreement or decree, administrative or judicial, EPA and DOE might enter concerning this matter.

EPA and DOE agree that nothing herein is intended or is to be construed to permit either signatory, or the respective entity on whose behalf each is signing, to enforce any of the provisions of this memorandum or the attachments hereto.

Nothing herein is intended or is to be construed to prejudice EPA's right to enforce any applicable law with regard to the operation of the BNL, and nothing herein is intended or is to be construed to prejudice DOE's right to assert any defense under applicable law in any action EPA might bring in a court of competent jurisdiction to enforce any legal requirement with regard to the operation of BNL.

AGREED TO AND ACCEPTED ON
BEHALF OF THE UNITED STATES
ENVIRONMENTAL PROTECTION
AGENCY, REGION II

AGREED TO AND ACCEPTED ON
BEHALF OF THE UNITED STATES
DEPARTMENT OF ENERGY

Jeanne M. Fox
Regional Administrator
United States Environmental
Protection Agency, Region II

Martha Krebs, Director
Office of Energy Research
United States Department of Energy

Dated: March 23, 1998
Upton, New York

Dated: March 23, 1998
Upton, New York

Attachment 2
Environmental Management Systems Audit Agreement

I. Goals

The goal of this agreement is to develop a five-year audit program whereby the Department of Energy (DOE) can gauge the progress of the Brookhaven National Laboratory (BNL)¹ in implementing an effective Environmental Management System (EMS) which is designed to assure full compliance with regulatory requirements and to provide for continuous improvement in environmental stewardship. The audit process described below is structured to include three phases with specific progressive objectives for each phase. DOE's goals for the first two audits (Phase 1) are to provide BNL with constructive feedback on EMS implementation progress, and to comment on the soundness and completeness of BNL's planned improvements for future years. The goal of the third audit (Phase 2) is to (a) independently assess the entire EMS to determine whether its implementation by BNL meets the criteria defined in Attachment 2A of this Agreement, and (b) to identify any issues that may require further improvements or evaluations. It is the goal of BNL and DOE to have a fully implemented EMS in place prior to the third year audit. The goals of the last two audits of this program (Phase 3) are to verify that the EMS is being maintained, and that continuous improvement has been institutionalized.

II. Objectives

This agreement is for five (5) annual audits of BNL's progress in implementing an EMS, and conforming with the criteria identified in Attachment 2A. The first two audits will be conducted by the DOE and/or its consultants. The third audit will be conducted by an independent third party contracted by the DOE. Audits during the fourth and fifth years again will be conducted by the DOE and/or its consultants.

- A. Audit Years 1 and 2 (1998 and 1999). The following are the objectives of the first two audits to be conducted by the DOE and/or its consultants:
1. To verify progress on those elements addressed by BNL's EMS Plan contained in the Management Systems Improvement Program (MSIP) Plan for that audit year;
 2. To evaluate, where systems have been implemented, conformance to the criteria specified in Attachment 2A; and
 3. To review and comment on the EMS Plan for the following years. This will be done by confirming that the Plan addresses previously identified management system improvement needs and by validating, through field

¹ The use of "BNL" refers to the management and operating contractor for USDOE at the Brookhaven National Laboratory or the facility itself.

sampling, that the critical systems needs have been identified and included in the EMS Plan.

- B. Audit Year 3 (2000). The objective of the third year audit is to have a comprehensive third party review and assessment of BNL's EMS primarily to determine the following:
1. Whether the EMS conforms to the criteria specified in Attachment 2A;
 2. Whether the EMS has been properly implemented; and
 3. If there are areas that require further improvement or evaluation.
- C. Audit Years 4 and 5 (2001-2002). The final two audits will be conducted by the DOE and/or its consultants to determine the following:
1. Whether the EMS conforms to the criteria specified in Attachment 2A;
 2. Whether the EMS has been properly implemented;
 3. If there are areas that require further improvements or evaluation; and
 4. To assess whether the EMS is being properly maintained and whether a posture of continuous improvement has been achieved.

III. Agreement

Beginning in 1998, the DOE agrees to conduct and/or contract for third-party auditors to conduct the annual EMS audit at BNL in accordance with the provisions identified below for five (5) consecutive years. General provisions are identified in Section IV. For the third year, the additional provisions identified in Section V also apply. The DOE agrees to allow the Environmental Protection Agency (EPA) representatives, and representatives of the state and of local governments, to observe all EMS audits specified in this agreement, and have access to all related documentation. DOE agrees to brief interested outside parties prior to, and upon completion of, each audit. DOE agrees to provide copies of this agreement to these agencies and to all third-party auditors before they are retained to conduct any of the audits required by this Attachment 2. This Attachment is incorporated by reference into the cover Memorandum of Agreement between EPA Region II and DOE.

IV. General Provisions for all EMS Audits

- A. DOE agrees to plan and conduct, or have conducted, each EMS audit, except for the audit to be conducted in the third year. The third audit will be conducted by an independent third party in accord with these general provisions, as well as those described in Section V. All audits will be conducted in accordance with these general provisions, using ISO 14010 and 14011 and ASTM Provisional Standard 12-95 as supplemental guidance. Each audit's objectives will be as stated in Section II above. Each audit will encompass an evaluation of the

adequacy of implementation, from top management down, throughout each BNL Directorate, or its successor, to identify where further improvements should be made to the EMS. With respect to determining conformance with the criteria of Attachment 2A, the auditors will assess the following:

1. Whether there is a defined program or planned task for the EMS element;
 2. Whether the program or task has been implemented, is being maintained, and to what extent;
 3. Whether the program or task, including employee training, is effectively achieving its intended performance;
 4. Whether BNL is effectively communicating environmental requirements to affected parts of the organization, including visiting scientists/researchers; and,
 5. Whether there are observed deviations from BNL's written requirements or procedures.
- B. DOE will ensure that the auditors performing the EMS audits, required by this agreement, satisfy the requirements of ISO 14012. DOE will identify any and all site-specific training requirements for the auditors so they can effectively and safely conduct the required audits and will ensure that their training is completed prior to conducting the audit.
- C. DOE agrees to prepare and provide to EPA for review and comment an Audit Plan for each EMS audit at BNL; the Plan will be provided by March 31 of each year. The Plan will include a schedule for completing the audit reports and will include the items listed below. EPA agrees to send any comments to be considered by DOE within sixty (60) days of the submission of the Audit Plan. DOE agrees that the following items will be identified in each Audit Plan:
1. Audit criteria, scope, and objectives;
 2. Areas, functions and locations to be audited which are priorities, and why;
 3. Audit procedures, including root cause determinations for identified non-conformances;
 4. Auditors and demonstrate that their qualifications satisfy the requirements of ISO 14012. The plan will specifically address how objectivity and independence will be ensured for auditors who are DOE employees;
 5. The schedule for conducting and completing the audit;
 6. The date the audit report will be completed; and,
 7. Successive audit plans, after the first audit, also will include a review and evaluation of the implementation of the Action Plan (see Section IV E) for the previous audit.
- D. DOE agrees to prepare, or have prepared, an Audit Report for each audit. DOE

agrees that each Audit Report will be completed and provided to the EPA before the end of the calendar year in which the audit was conducted. EPA agrees to provide any comments to be considered by DOE within sixty (60) days of submission of the Audit Report. As a minimum, each Audit Report will:

1. Identify the audit teams' members;
2. State when the on-site audit was conducted;
3. Present the results of the evaluation, as required under Section IV A, above, and delineated in each respective Audit Plan;
4. Present the results of root-cause analyses for observed nonconformances and deficiencies; and,
5. Make recommendations for EMS improvements, including training.

E. DOE agrees to prepare or have prepared an Action Plan which will respond to each respective Audit Report's recommendations for EMS improvements. In each Action Plan, DOE agrees to do the following:

1. Address each finding (i.e., observed nonconformance or deficiency) in the respective Audit Report, and state how it will be addressed;
2. Identify plans to address broader issues arising from individual findings (i.e., address root-causes identified for specific non-conformances or address facility-wide issues); and,
3. Identify for each recommendation in the Audit Report those it intends to implement and/or plans to implement with modification(s). DOE agrees to explain in its Action Plan the rationale for not implementing recommended changes to the EMS.

DOE agrees to provide the Action Plan to EPA within sixty (60) days after preparing or receiving the Audit Report. EPA agrees to provide any comments to be considered by DOE within sixty (60) days of submission of the Action Plan.

V. Additional Provisions for the Third Year Independent Third-Party EMS Audit

A. DOE will arrange for, and fund, an independent, third-party EMS audit in the third year of this five-year audit agreement, in lieu of the DOE EMS audit, as described by the general provisions of this Agreement and defined by Section IV A, above. The scope of the audit will be determined by the third-party auditor(s) based, in part, on the results of the previous audits and in consultation with DOE and EPA. DOE agrees that the third-party auditors will meet the qualifications criteria and training requirements specified in Section IV B of this agreement. The auditors will prepare the Audit Plan to address the general provisions listed in Section IV A, above. DOE agrees to provide copies of this agreement to all third-party auditors before they are retained to conduct the audits. EPA agrees to

provide any comments to be considered by DOE within sixty (60) days of submission of the Audit Plan. The Plan will be prepared and provided in accordance with Section IV C, above.

- B. The independent third-party auditors will prepare a comprehensive Audit Report based on their audit and will provide the report concurrently to EPA and DOE in accord with the Audit Plan schedule. EPA agrees to provide any comments to be considered by DOE within sixty days (60) of submission of the Audit Report. DOE agrees that the Audit Report will contain the following:
1. Results of the program and evaluations of activity evaluations as described in Section IV D, Items 1 through 5; and,
 2. Areas of concern that merit further review or evaluation for potential environmental or regulatory impacts in the judgement of the independent third-party auditors.
- C. DOE agrees to prepare, or have prepared, an Action Plan which will respond to the Audit Report. In the Action Plan, DOE agrees to do the following:
1. Address each finding (i.e., observed nonconformance or deficiency) in the audit report and state how it will be addressed;
 2. Identify plans to address broader issues arising from individual findings (i.e., address root causes identified for specific non-conformances or address facility-wide issues); and,
 3. Identify for each recommendation in the Audit Report those it intends to implement and/or plans to implement with modification(s). DOE agrees to include in its Action Plan an explanation of its rationale for not implementing recommended changes to the EMS.

DOE agrees to provide the Action Plan to EPA within sixty (60) days after receiving the Audit Report. EPA agrees to provide any comments to be considered by DOE within sixty (60) days of submission of the Action Plan.

Attachment 2A

Elements of Brookhaven National Laboratory's Environmental Management System

I. Introduction

Brookhaven National Laboratory's (BNL's)¹ approach for managing environmental matters is embedded within a site-wide integrated system for Environment, Safety and Health (ES&H). BNL's Integrated Environment, Safety and Health Management System (IESHMS) will be a single, defined management system that integrates ES&H requirements into work planning and operational processes to effectively protect workers, the public, and the environment, and to comply with regulatory requirements. The elements of BNL's IESHMS are derived from the following sources:

- A. The philosophies, principles and requirements of the *DOE's Integrated Safety Management System Policy* (DOE P 450.4);
- B. The International Organization for Standardization (ISO) specifications and guidance for Environmental Management Systems (EMS) (ISO 14001 Standard); and
- C. There will be enhanced emphasis on compliance assurance, pollution prevention and community outreach.

The DOE's Integrated Safety Management System (ISMS) Policy (P 450.4) and ISO 14001 are incorporated by reference to this attachment; the key elements of these are given in Sections II and III, respectively. Section IV discusses the elements for enhanced focus on compliance assurance, pollution prevention and community outreach. Together these elements will form the basis of BNL's EMS, and compose the criteria for auditing the BNL EMS for the purpose of this agreement.

II. The Department of Energy Integrated Safety Management System

The Integrated Safety Management System Policy, which is consistent with, and complements, ISO 14001, is based on seven Guiding Principles and five Core Functions, described below:

- A. The Seven Guiding Principles form the conceptual framework that characterizes the principles, programs, and disciplines that are essential elements of a sound

¹ The use of "BNL" refers to the management and operating contractor for USDOE at the Brookhaven National Laboratory or the facility itself.

ES&H management system. These principles, as they relate to BNL, are:

1. **Line Management Responsibility for ES&H.** BNL's Line Management is directly responsible for protecting workers, the public, and the environment.
 2. **Clear Roles and Responsibilities.** Clear and unambiguous lines of authority and responsibility for ensuring environmental, safety, and health protection will be established and maintained by BNL at all organizational levels, including its contractors.
 3. **Competence Commensurate with Responsibilities.** BNL personnel will possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.
 4. **Balanced Priorities.** BNL will effectively allocate resources for environmental, safety, and health programs, and operations. Protecting workers, the public, and the environment will be a priority at BNL whenever activities are planned and carried out.
 5. **Identification of ES&H Standards and Requirements.** Before work is started, BNL will evaluate the associated environmental, safety, and health hazards; an agreed-upon set of requirements and standards for environment, safety and health will be established which, if properly implemented, will adequately assure that workers, the public, and the environment are protected from adverse consequences.
 6. **Hazard Controls Tailored to Work Being Performed.** BNL will tailor administrative and engineering controls to prevent and mitigate environmental, safety, and health hazards from work being performed.
 7. **Operations Authorization.** BNL will establish and agree upon the environmental, safety, and health conditions and requirements to be satisfied for operations to be initiated and conducted at BNL.
- B. The five ES&H management Core Functions defined in DOE P 450.4, supported by the Guiding Principles, provide the necessary framework for work at BNL that could potentially affect workers, the public, or the environment. These Core Functions are:
1. Define Scope of Work
 2. Analyze the Environmental, Safety, and Health Hazards
 3. Develop and Implement Controls for Environmental, Safety, and Health Hazards
 4. Perform Work within Controls
 5. Provide Feedback and Make Continuous Improvements

III. The International Organization for Standardization, Environmental Management Systems

An EMS is defined in ISO 14001 as "...the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy." BNL's EMS will be based upon specifications and guidance for the following five ISO 14001 EMS elements:

- A. BNL's top management will define the BNL's environmental policy [4.2]²

- B. BNL will formulate a plan to fulfill the environmental policy, which will include the following [4.3]:
 - 1. Environmental aspects and impacts [4.3.1]
 - 2. Legal and other requirements [4.3.2]
 - 3. Objectives and targets [4.3.3]
 - 4. Environmental management program [4.3.4]

- C. BNL will implement the plan and operate in a manner that achieves the plan's objectives and targets [4.4]:
 - 1. Structure and responsibility [4.4.1]
 - 2. Training, awareness and competence [4.4.2]
 - 3. Communication [4.4.3]
 - 4. Documentation of Environmental management system [4.4.4]
 - 5. Document control [4.4.5]
 - 6. Operational control [4.4.6]
 - 7. Emergency preparedness and response [4.4.7]

- D. BNL will have the following systems for checking the performance of its environmental programs, assuring compliance with regulatory requirements and assuring timely corrective actions and reporting [4.5]:
 - 1. Monitoring and measurement [4.5.1]
 - 2. Nonconformance and corrective and preventive action [4.5.2]

² Numbers in brackets [] refer to criteria in ISO 14001.

3. Records [4.5.3]

4. Environmental management system audit [4.5.4]

E. At predetermined intervals, BNL's top management will review the EMS to ensure its continuing suitability, adequacy and effectiveness [4.6].

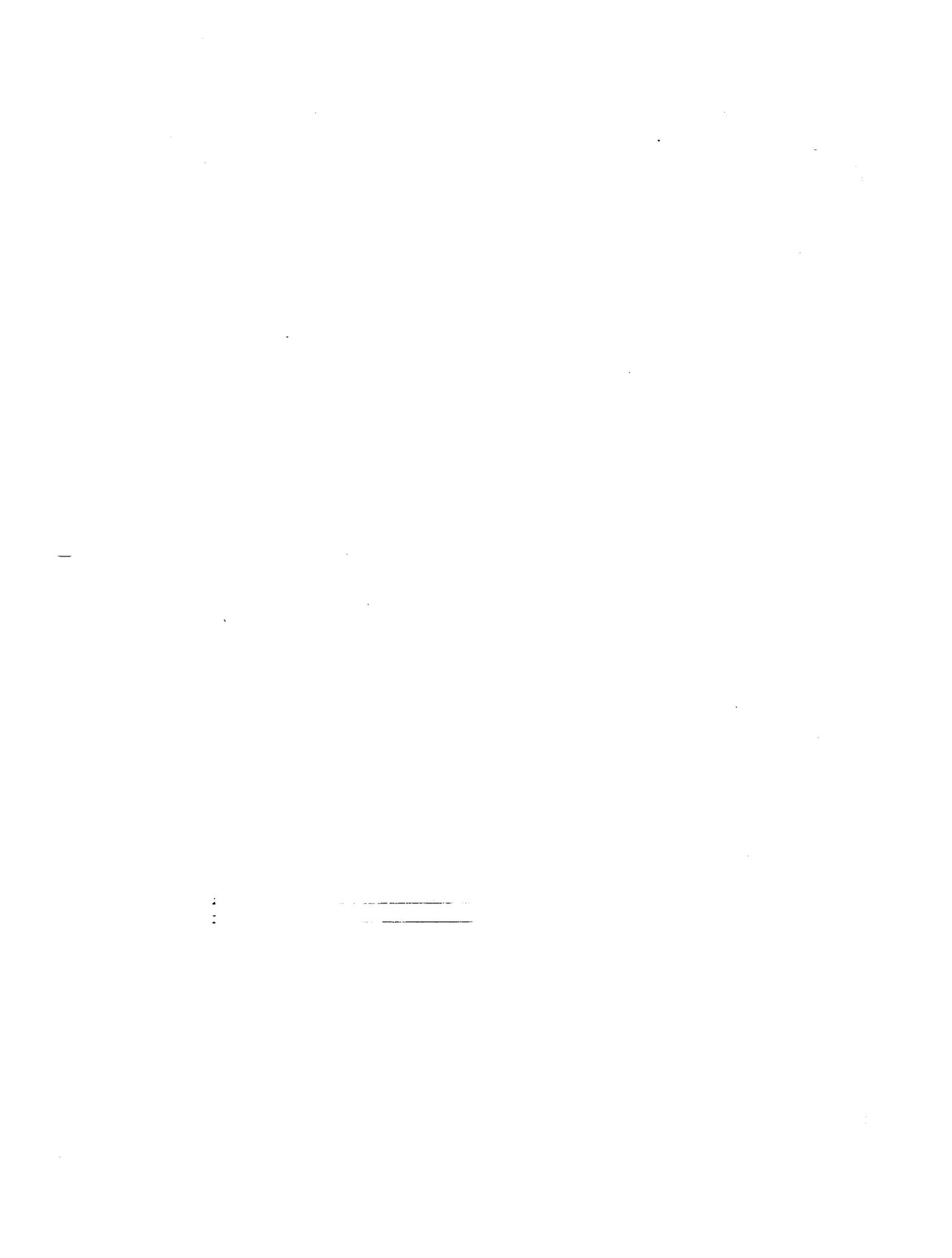
IV. Enhanced Emphasis on Compliance Assurance, Pollution Prevention and Community Outreach

BNL will enhance the overall management of ES&H with explicit focus on compliance assurance, pollution prevention, and community outreach.

A. Compliance Assurance: BNL's emphasis on compliance assurance will specifically encompass the four following elements:

1. Planning. BNL will establish appropriate programs and procedures to accomplish the following:
 - a. Identify, interpret, track and effectively communicate environmental requirements to BNL employees, visiting researchers, experimenters, contractors, and service providers. The scope includes prospectively identifying and obtaining information about changes and proposed changes in environmental requirements, and incorporating those changes into the EMS; and,
 - b. Anticipate, identify, implement, track, and complete activities necessary to meet legal and other requirements associated with the environmental impacts of its operations.
2. Implementing and Operation Control. BNL will:
 - a. Integrate regulatory requirements into facility operations, including those of on-site contractors; and,
 - b. Ensure that environmental reports required by federal and state regulations and policy are routinely prepared and submitted, as appropriate, on a timely basis.

3. Checking and Making Corrective Actions. BNL will implement self-assessment and corrective action programs which ensure the following:
 - a. Assess operations;
 - b. Report incidents and non-compliance; investigate them and follow-up;
 - c. Implement and coordinate compliance audits;
 - d. Identify and address root causes;
 - e. Provide prompt and complete follow-ups; and
 - f. Assign organizational personnel responsibilities.
 4. BNL will maintain a positive and proactive relationship with regulatory agencies.
- B. Pollution Prevention Program. BNL will develop an internal program for preventing, reducing, recycling, reusing, and minimizing waste and emissions, including procedures to substitute materials. The program will include mechanisms for identifying candidate materials to be considered by this program. As part of this program, BNL will develop objectives and targets for pollution prevention and track progress.
- C. Community Outreach. BNL's environmental policy statement will reflect BNL's commitment to provide outreach to the community. The environmental policy statement will be widely distributed and easily accessible throughout the facility and the surrounding community. BNL will have procedures and will demonstrate how it solicits, receives, documents, and responds to external communications regarding its environmental aspects and its environmental management system.





APPENDIX 2

ISO 14001 Environmental
Management System Standard

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INTERNATIONAL
STANDARD

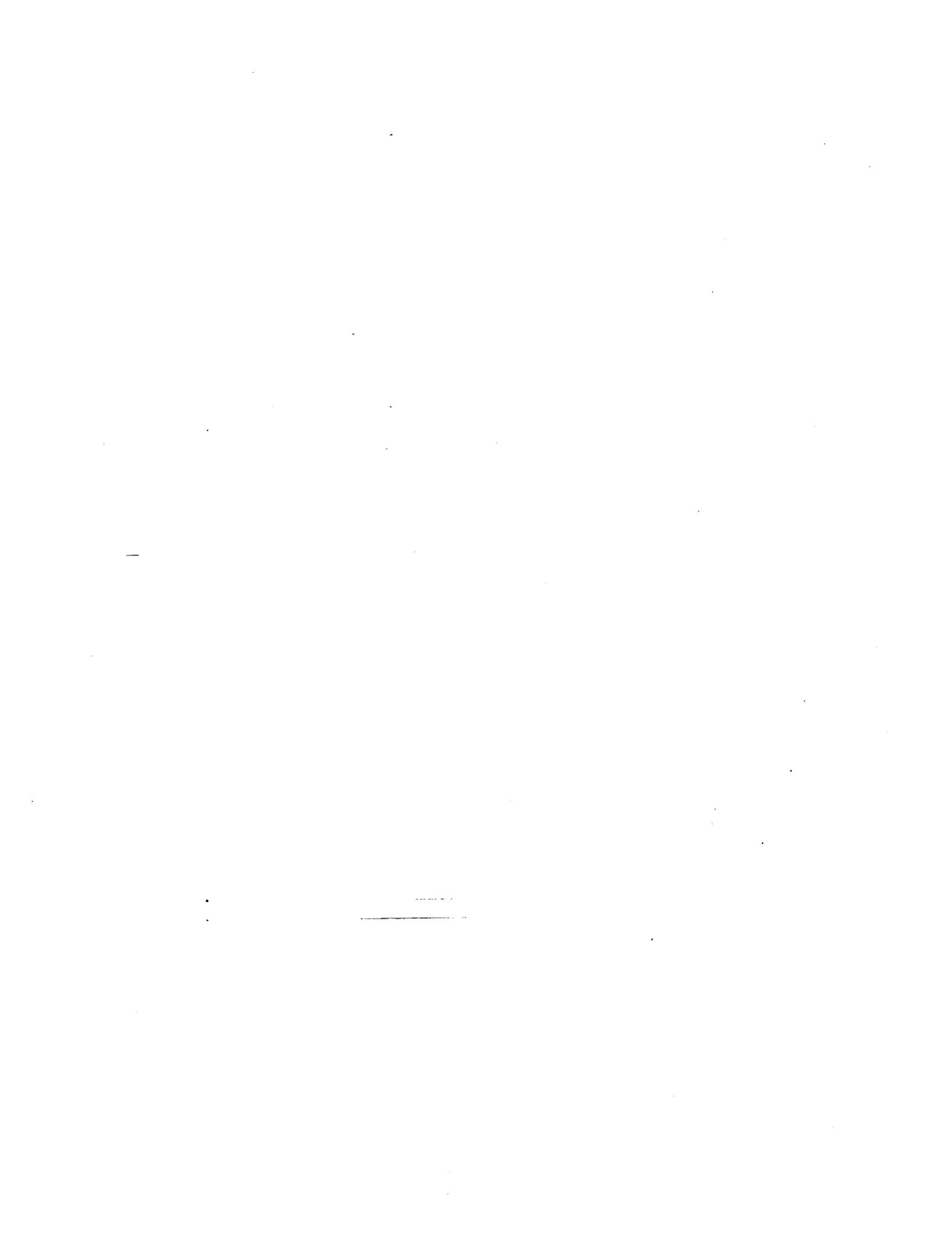
ISO
14001

First edition
1996-09-01

APPENDIX 2

Environmental management systems —
Specification with guidance for use

*Systemes de management environnemental — Specification et lignes
directrices pour son utilisation*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 14001 was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 1, *Environmental management systems*.

Annexes A, B and C of this International Standard are for information only.

Introduction

Organizations of all kinds are increasingly concerned to achieve and demonstrate sound environmental performance by controlling the impact of their activities, products or services on the environment, taking into account their environmental policy and objectives. They do so in the context of increasingly stringent legislation, the development of economic policies and other measures to foster environmental protection, and a general growth of concern from interested parties about environmental matters including sustainable development.

Many organizations have undertaken environmental "reviews" or "audits" to assess their environmental performance. On their own, however, these "reviews" and "audits" may not be sufficient to provide an organization with the assurance that its performance not only meets, but will continue to meet, its legal and policy requirements. To be effective, they need to be conducted within a structured management system and integrated with overall management activity.

International Standards covering environmental management are intended to provide organizations with the elements of an effective environmental management system which can be integrated with other management requirements, to assist organizations to achieve environmental and economic goals. These Standards, like other International Standards, are not intended to be used to create non-tariff trade barriers or to increase or change an organization's legal obligations.

This International Standard specifies the requirements of such an environmental management system. It has been written to be applicable to all types and sizes of organizations and to accommodate diverse geographical, cultural and social conditions. The basis of the approach is shown in figure 1. The success of the system depends on commitment from all levels and functions, especially from top management. A system of this kind enables an organization to establish, and assess the effectiveness of, procedures to set an environmental policy and objectives, achieve conformance with them, and demonstrate such conformance to others. The overall aim of this International Standard is to support environmental protection and prevention of pollution in balance with socio-economic needs. It should be noted that many of the requirements may be addressed concurrently or revisited at any time.

There is an important distinction between this specification which describes the requirements for certification/registration and/or self-declaration of an organization's environmental management system and a non-certifiable guideline intended to provide generic assistance to an organization for implementing or improving an environmental management system. Environmental management encompasses a full range of issues including those with strategic and competitive implications. Demonstration of successful implementation of this International Standard can be used by an organ-

ization to assure interested parties that an appropriate environmental management system is in place.

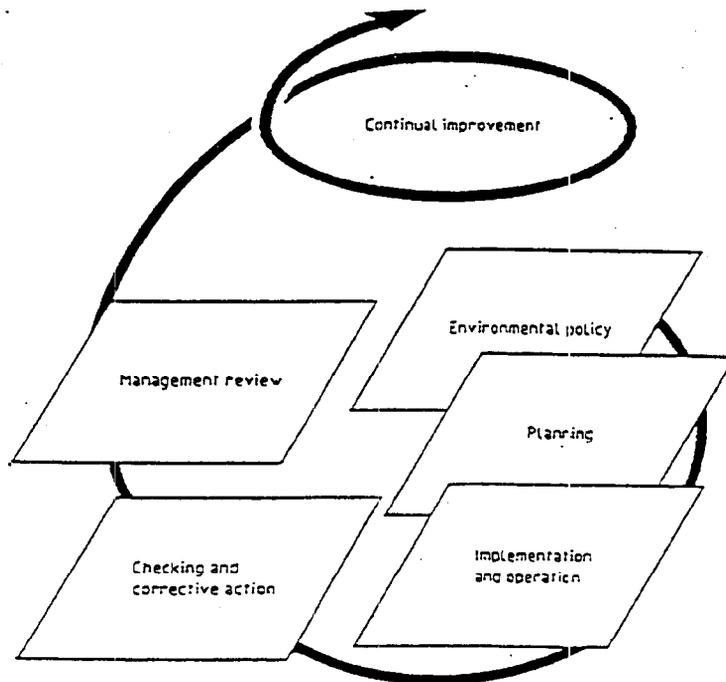


Figure 1 — Environmental management system model for this International Standard

Guidance on supporting environmental management techniques will be contained in other International Standards.

This International Standard contains only those requirements that may be objectively audited for certification/registration purposes and/or self-declaration purposes. Those organizations requiring more general guidance on a broad range of environmental management system issues should refer to ISO 14004:1996, *Environmental management systems — General guidelines on principles, systems and supporting techniques*.

It should be noted that this International Standard does not establish absolute requirements for environmental performance beyond commitment, in the policy, to compliance with applicable legislation and regulations and to continual improvement. Thus, two organizations carrying out similar activities but having different environmental performance may both comply with its requirements.

The adoption and implementation of a range of environmental management techniques in a systematic manner can contribute to optimal outcomes for all interested parties. However, adoption of this International Standard will not in itself guarantee optimal environmental outcomes. In order to achieve environmental objectives, the environmental management system should encourage organizations to consider implementation of the best available technology, where appropriate and where economically viable. In addition,

the cost effectiveness of such technology should be fully taken into account.

This International Standard is not intended to address, and does not include requirements for, aspects of occupational health and safety management; however, it does not seek to discourage an organization from developing integration of such management system elements. Nevertheless, the certification/registration process will only be applicable to aspects of the environmental management system.

This International Standard shares common management system principles with the ISO 9000 series of quality system Standards. Organizations may elect to use an existing management system consistent with the ISO 9000 series as a basis for its environmental management system. It should be understood, however, that the application of various elements of the management system may differ due to different purposes and different interested parties. While quality management systems deal with customer needs, environmental management systems address the needs of a broad range of interested parties and the evolving needs of society for environmental protection.—

The environmental management system requirements specified in this International Standard do not need to be established independently of existing management system elements. In some cases, it will be possible to comply with the requirements by adapting existing management system elements.

Environmental management systems — Specification with guidance for use

1 Scope

This International Standard specifies requirements for an environmental management system, to enable an organization to formulate a policy and objectives taking into account legislative requirements and information about significant environmental impacts. It applies to those environmental aspects which the organization can control and over which it can be expected to have an influence. It does not itself state specific environmental performance criteria.

This International Standard is applicable to any organization that wishes to

- a) implement, maintain and improve an environmental management system;
- b) assure itself of its conformance with its stated environmental policy;
- c) demonstrate such conformance to others;
- d) seek certification/registration of its environmental management system by an external organization;
- e) make a self-determination and self-declaration of conformance with this International Standard.

All the requirements in this International Standard are intended to be incorporated into any environmental management system. The extent of the application will depend on such factors as the environmental policy of the organization, the nature of its activities and the conditions in which it operates. This International Standard also provides, in annex A, informative guidance on the use of the specification.

The scope of any application of this International Standard must be clearly identified.

NOTE — For ease of use, the subclause of the specification and annex A have related numbers; thus, for example,

4.3.3. and A.3.3 both deal with environmental objectives and targets, and 4.5.4 and A.5.4 both deal with environmental management system audit.

2 Normative references

There are no normative references at present.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1

continual improvement

process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organization's environmental policy

NOTE — The process need not take place in all areas of activity simultaneously.

3.2

environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

NOTE — Surroundings in this context extend from within an organization to the global system.

3.3

environmental aspect

element of an organization's activities, products or services that can interact with the environment

NOTE — A significant environmental aspect is an environmental aspect that has or can have a significant environmental impact.

3.4**environmental impact**

any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services

3.5**environmental management system**

the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy

3.6**environmental management system audit**

a systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's environmental management system conforms to the environmental management system audit criteria set by the organization, and for communication of the results of this process to management

3.7**environmental objective**

overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable

3.8**environmental performance**

measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets

3.9**environmental policy**

statement by the organization of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets

3.10**environmental target**

detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives

3.11**interested party**

individual or group concerned with or affected by the environmental performance of an organization

3.12**organization**

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE — For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.13**prevention of pollution**

use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution

NOTE — The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs.

4 Environmental management system requirements

4.1 General requirements

The organization shall establish and maintain an environmental management system, the requirements of which are described in the whole of clause 4.

4.2 Environmental policy

Top management shall define the organization's environmental policy and ensure that it

- a) is appropriate to the nature, scale and environmental impacts of its activities, products or services;
- b) includes a commitment to continual improvement and prevention of pollution;
- c) includes a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organization subscribes;
- d) provides the framework for setting and reviewing environmental objectives and targets;
- e) is documented, implemented and maintained and communicated to all employees;
- f) is available to the public.

4.3 Planning

4.3.1 Environmental aspects

The organization shall establish and maintain (a) procedure(s) to identify the environmental aspects of its activities, products or services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects related to these significant impacts are considered in setting its environmental objectives.

The organization shall keep this information up-to-date.

4.3.2 Legal and other requirements

The organization shall establish and maintain a procedure to identify and have access to legal and other requirements to which the organization subscribes, that are applicable to the environmental aspects of its activities, products or services.

4.3.3 Objectives and targets

The organization shall establish and maintain documented environmental objectives and targets, at each relevant function and level within the organization.

When establishing and reviewing its objectives, an organization shall consider the legal and other requirements, its significant environmental aspects, its technological options and its financial, operational and business requirements, and the views of interested parties.

The objectives and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution.

4.3.4 Environmental management programme(s)

The organization shall establish and maintain (a) programme(s) for achieving its objectives and targets. It shall include

- a) designation of responsibility for achieving objectives and targets at each relevant function and level of the organization;
- b) the means and time-frame by which they are to be achieved.

If a project relates to new developments and new or modified activities, products or services, programme(s) shall be amended where relevant to ensure that environmental management applies to such projects.

4.4 Implementation and operation

4.4.1 Structure and responsibility

Roles, responsibility and authorities shall be defined, documented and communicated in order to facilitate effective environmental management.

Management shall provide resources essential to the implementation and control of the environmental management system. Resources include human resources and specialized skills, technology and financial resources.

The organization's top management shall appoint (a) specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for

- a) ensuring that environmental management system requirements are established, implemented and maintained in accordance with this International Standard;
- b) reporting on the performance of the environmental management system to top management for review and as a basis for improvement of the environmental management system.

4.4.2 Training, awareness and competence

The organization shall identify training needs. It shall require that all personnel whose work may create a significant impact upon the environment, have received appropriate training.

It shall establish and maintain procedures to make its employees or members at each relevant function and level aware of

- a) the importance of conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- b) the significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance;
- c) their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system, including emergency preparedness and response requirements;
- d) the potential consequences of departure from specified operating procedures.

Personnel performing the tasks which can cause significant environmental impacts shall be competent on

the basis of appropriate education, training and/or experience.

4.4.3 Communication

With regard to its environmental aspects and environmental management system, the organization shall establish and maintain procedures for

- a) internal communication between the various levels and functions of the organization;
- b) receiving, documenting and responding to relevant communication from external interested parties.

The organization shall consider processes for external communication on its significant environmental aspects and record its decision.

4.4.4 Environmental management system documentation

The organization shall establish and maintain information, in paper or electronic form, to

- a) describe the core elements of the management system and their interaction;
- b) provide direction to related documentation.

4.4.5 Document control

The organization shall establish and maintain procedures for controlling all documents required by this International Standard to ensure that

- a) they can be located;
- b) they are periodically reviewed, revised as necessary and approved for adequacy by authorized personnel;
- c) the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the environmental management system are performed;
- d) obsolete documents are promptly removed from all points of issue and points of use, or otherwise assured against unintended use;
- e) any obsolete documents retained for legal and/or knowledge preservation purposes are suitably identified.

Documentation shall be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner and retained for a specified period. Procedures and responsibilities shall be established and maintained concerning the creation and modification of the various types of document.

4.4.6 Operational control

The organization shall identify those operations and activities that are associated with the identified significant environmental aspects in line with its policy, objectives and targets. The organization shall plan these activities, including maintenance, in order to ensure that they are carried out under specified conditions by

- a) establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets;
- b) stipulating operating criteria in the procedures;
- c) establishing and maintaining procedures related to the identifiable significant environmental aspects of goods and services used by the organization and communicating relevant procedures and requirements to suppliers and contractors.

4.4.7 Emergency preparedness and response

The organization shall establish and maintain procedures to identify potential for and respond to accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them.

The organization shall review and revise, where necessary, its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations.

The organization shall also periodically test such procedures where practicable.

4.5 Checking and corrective action

4.5.1 Monitoring and measurement

The organization shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. This shall include the recording of information to track performance, relevant operational controls and conformance with the organization's environmental objectives and targets.

Monitoring equipment shall be calibrated and maintained and records of this process shall be retained according to the organization's procedures.

The organization shall establish and maintain a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations.

4.5.2 Nonconformance and corrective and preventive action

The organization shall establish and maintain procedures for defining responsibility and authority for handling and investigating nonconformance, taking action to mitigate any impacts caused and for initiating and completing corrective and preventive action.

Any corrective or preventive action taken to eliminate the causes of actual and potential nonconformances shall be appropriate to the magnitude of problems and commensurate with the environmental impact encountered.

The organization shall implement and record any changes in the documented procedures resulting from corrective and preventive action.

4.5.3 Records

The organization shall establish and maintain procedures for the identification, maintenance and disposition of environmental records. These records shall include training records and the results of audits and reviews.

Environmental records shall be legible, identifiable and traceable to the activity, product or service involved. Environmental records shall be stored and maintained in such a way that they are readily retrievable and protected against damage, deterioration or loss. Their retention times shall be established and recorded.

Records shall be maintained, as appropriate to the system and to the organization, to demonstrate conformance to the requirements of this International Standard.

4.5.4 Environmental management system audit

The organization shall establish and maintain (a) programme(s) and procedures for periodic environmental

management system audits to be carried out, in order to

- a) determine whether or not the environmental management system
 - 1) conforms to planned arrangements for environmental management including the requirements of this International Standard; and
 - 2) has been properly implemented and maintained; and
- b) provide information on the results of audits to management.

The organization's audit programme, including any schedule, shall be based on the environmental importance of the activity concerned and the results of previous audits. In order to be comprehensive, the audit procedures shall cover the audit scope, frequency and methodologies, as well as the responsibilities and requirements for conducting audits and reporting results.

4.6 Management review

The organization's top management shall, at intervals that it determines, review the environmental management system, to ensure its continuing suitability, adequacy and effectiveness. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation. This review shall be documented.

The management review shall address the possible need for changes to policy, objectives and other elements of the environmental management system, in the light of environmental management system audit results, changing circumstances and the commitment to continual improvement.

Annex A (informative)

Guidance on the use of the specification

This annex gives additional information on the requirements and is intended to avoid misinterpretation of the specification. This annex only addresses the environmental management system requirements contained in clause 4.

A.1 General requirements

It is intended that the implementation of an environmental management system described by the specification will result in improved environmental performance. The specification is based on the concept that the organization will periodically review and evaluate its environmental management system in order to identify opportunities for improvement and their implementation. Improvements in its environmental management system are intended to result in additional improvements in environmental performance.

The environmental management system provides a structured process for the achievement of continual improvement, the rate and extent of which will be determined by the organization in the light of economic and other circumstances. Although some improvement in environmental performance can be expected due to the adoption of a systematic approach, it should be understood that the environmental management system is a tool which enables the organization to achieve and systematically control the level of environmental performance that it sets itself. The establishment and operation of an environmental management system will not, in itself, necessarily result in an immediate reduction of adverse environmental impact.

An organization has the freedom and flexibility to define its boundaries and may choose to implement this International Standard with respect to the entire organization, or to specific operating units or activities of the organization. If this International Standard is implemented for a specific operating unit or activity, policies and procedures developed by other parts of the organization can be used to meet the requirements of this International Standard, provided that they are applicable to the specific operating unit or activity that will be subject to it. The level of detail and complexity of the environmental management system, the extent of documentation and the resources devoted to it will be dependent in the size of an organization and the nature of its activities. This may be the case in particular for small and medium-sized enterprises.

Integration of environmental matters with the overall management system can contribute to the effective implementation of the environmental management system, as well as to efficiency and to clarity of roles.

This International Standard contains management system requirements, based on the dynamic cyclical process of "plan, implement, check and review".

The system should enable an organization to

- a) establish an environmental policy appropriate to itself;
- b) identify the environmental aspects arising from the organization's past, existing or planned activities, products or services, to determine the environmental impacts of significance;
- c) identify the relevant legislative and regulatory requirements;
- d) identify priorities and set appropriate environmental objectives and targets;
- e) establish a structure and (a) programme(s) to implement the policy and achieve objectives and targets;
- f) facilitate planning, control, monitoring, corrective action, auditing and review activities to ensure both that the policy is complied with and that the environmental management system remains appropriate;
- g) be capable of adapting to changing circumstances.

A.2 Environmental policy

The environmental policy is the driver for implementing and improving the organization's environmental management system so that it can maintain and potentially improve its environmental performance. The policy should therefore reflect the commitment of top management to compliance with applicable laws and continual improvement. The policy forms the basis upon which the organization sets its objectives and targets. The policy should be sufficiently clear to be capable of being understood by internal and external interested parties and should be periodically reviewed and revised to reflect changing conditions and information. Its area of application should be clearly identifiable.

The organization's top management should define and document its environmental policy within the context of the environmental policy of any broader corporate body of which it is a part and with the endorsement of that body, if there is one.

NOTE — Top management may consist of an individual or group of individuals with executive responsibility for the organization.

A.3 Planning

A.3.1 Environmental aspects

Subclause 4.3.1 is intended to provide a process for an organization to identify significant environmental aspects that should be addressed as a priority by the organization's environmental management system. This process should take into account the cost and time of undertaking the analysis and the availability of reliable data. Information already developed for regulatory or other purposes may be used in this process. Organizations may also take into account the degree of practical control they may have over the environmental aspects being considered. Organizations should determine what their environmental aspects are, taking into account the inputs and outputs associated with their current and relevant past activities, products and/or services.

An organization with no existing environmental management system should, initially, establish its current position with regard to the environment by means of a review. The aim should be to consider all environmental aspects of the organization as a basis for establishing the environmental management system.

Those organizations with operating environmental management systems do not have to undertake such a review.

The review should cover four key areas:

- a) legislative and regulatory requirements;
- b) an identification of significant environmental aspects;
- c) an examination of all existing environmental management practices and procedures;
- d) an evaluation of feedback from the investigation of previous incidents.

In all cases, consideration should be given to normal and abnormal operations within the organization, and to potential emergency conditions.

A suitable approach to the review may include checklists, interviews, direct inspection and measurement,

results of previous audits or other reviews depending on the nature of the activities.

The process to identify the significant environmental aspects associated with the activities at operating units should, where relevant, consider,

- a) emissions to air;
- b) releases to water;
- c) waste management;
- d) contamination of land;
- e) use of raw materials and natural resources;
- f) other local environmental and community issues.

This process should consider normal operating conditions, shut-down and start-up conditions, as well as the realistic potential significant impacts associated with reasonably foreseeable or emergency situations.

The process is intended to identify significant environmental aspects associated with activities, products or services, and is not intended to require a detailed life cycle assessment. Organizations do not have to evaluate each product, component or raw material input. They may select categories of activities, products or services to identify those aspects most likely to have a significant impact.

The control and influence over the environmental aspects of products vary significantly, depending on the market situation of the organization. A contractor or supplier to the organization may have comparatively little control, while the organization responsible for product design can alter the aspects significantly by changing, for example, a single input material. Whilst recognizing that organizations may have limited control over the use and disposal of their products, they should consider, where practical, proper handling and disposal mechanisms. This provision is not intended to change or increase an organisation's legal obligations.

A.3.2 Legal and other requirements

Examples of other requirements to which the organization may subscribe are

- a) industry codes of practice;
- b) agreements with public authorities;
- c) non-regulatory guidelines.

A.3.3 Objectives and targets

The objectives should be specific and targets should be measurable wherever practicable, and where appropriate take preventative measures into account.

When considering their technological options, an organization may consider the use of the best available technology where economically viable, cost-effective and judged appropriate.

The reference to the financial requirements of the organization is not intended to imply that organizations are obliged to use environmental cost-accounting methodologies.

A.3.4 Environmental management programme(s)

The creation and use of one or more programmes is a key element to the successful implementation of an environmental management system. The programme should describe how the organization's objectives and targets will be achieved, including time-scales and personnel responsible for implementing the organization's environmental policy. This programme may be subdivided to address specific elements of the organization's operations. The programme should include an environmental review for new activities.

The programme may include, where appropriate and practical, consideration of planning, design, production, marketing and disposal stages. This may be undertaken for both current and new activities, products or services. For products this may address design, materials, production processes, use and ultimate disposal. For installations or significant modifications of processes this may address planning, design, construction, commissioning, operation and, at the appropriate time determined by the organization, decommissioning.

A.4 Implementation and operation

A.4.1 Structure and responsibility

The successful implementation of an environmental management system calls for the commitment of all employees of the organization. Environmental responsibilities therefore should not be seen as confined to the environmental function, but may also include other areas of an organization, such as operational management or staff functions other than environmental.

This commitment should begin at the highest levels of management. Accordingly, top management should establish the organization's environmental policy and ensure that the environmental management system is implemented. As part of this commitment, the top management should designate (a) specific management representative(s) with defined responsibility and authority for implementing the environmental management system. In large or complex organizations

there may be more than one designated representative. In small or medium sized enterprises, these responsibilities may be undertaken by one individual. Top management should also ensure that appropriate resources are provided to ensure that the environmental management system is implemented and maintained. It is also important that the key environmental management system responsibilities are well defined and communicated to the relevant personnel.

A.4.2 Training, awareness and competence

The organization should establish and maintain procedures for identifying training needs. The organization should also require that contractors working on its behalf are able to demonstrate that their employees have the requisite training.

Management should determine the level of experience, competence and training necessary to ensure the capability of personnel, especially those carrying out specialized environmental management functions.

A.4.3 Communication

Organizations should implement a procedure for receiving, documenting and responding to relevant information and requests from interested parties. This procedure may include a dialogue with interested parties and consideration of their relevant concerns. In some circumstances, responses to interested parties' concerns may include relevant information about the environmental impacts associated with the organization's operations. These procedures should also address necessary communications with public authorities regarding emergency planning and other relevant issues.

A.4.4 Environmental management system documentation

The level of detail of the documentation should be sufficient to describe the core elements of the environmental management system and their interaction and provide direction on where to obtain more detailed information on the operation of specific parts of the environmental management system. This documentation may be integrated with documentation of other systems implemented by the organization. It does not have to be in the form of a single manual.

Related documentation may include

- a) process information;
- b) organizational charts;

- c) internal standards and operational procedures;
- d) site emergency plans.

A.4.5 Document control

The intent of 4.4.5 is to ensure that organizations create and maintain documents in a manner sufficient to implement the environmental management system. However, the primary focus of organizations should be on the effective implementation of the environmental management system and on environmental performance and not on a complex documentation control system.

A.4.6 Operational control

Text may be included here in a future revision.

A.4.7 Emergency preparedness and response

Text may be included here in a future revision.

A.5 Checking and corrective action

A.5.1 Monitoring and measurement

Text may be included here in a future revision.

A.5.2 Nonconformance and corrective and preventive action

In establishing and maintaining procedures for investigating and correcting nonconformance, the organization should include these basic elements:

- a) identifying the cause of the nonconformance;
- b) identifying and implementing the necessary corrective action;
- c) implementing or modifying controls necessary to avoid repetition of the nonconformance;
- d) recording any changes in written procedures resulting from the corrective action.

Depending on the situation, this may be accomplished rapidly and with a minimum of formal planning or it may be a more complex and long-term activity. The associated documentation should be appropriate to the level of corrective action.

A.5.3 Records

Procedures for identification, maintenance and disposition of records should focus on those records needed for the implementation and operation of the

environmental management system and for recording the extent to which planned objectives and targets have been met.

Environmental records may include

- a) information on applicable environmental laws or other requirements;
- b) complaint records;
- c) training records;
- d) process information;
- e) product information;
- f) inspection, maintenance and calibration records;
- g) pertinent contractor and supplier information;
- h) incident reports;
- i) information on emergency preparedness and response;
- j) information on significant environmental aspects;
- k) audit results;
- l) management reviews.

Proper account should be taken of confidential business information.

A.5.4 Environmental management system audit

The audit programme and procedures should cover

- a) the activities and areas to be considered in audits;
- b) the frequency of audits;
- c) the responsibilities associated with managing and conducting audits;
- d) the communication of audit results;
- e) auditor competence;
- f) how audits will be conducted.

Audits may be performed by personnel from within the organization and/or by external persons selected by the organization. In either case, the persons conducting the audit should be in a position to do so impartially and objectively.

A.6 Management review

In order to maintain continual improvement, suitability and effectiveness of the environmental management system, and thereby its performance, the organization's management should review and evaluate the environmental management system at defined intervals. The scope of the review should be comprehen-

sive, though not all elements of an environmental management system need to be reviewed at once and the review process may take place over a period of time.

The review of the policy, objectives and procedures should be carried out by the level of management that defined them.

Reviews should include

a) results from audits;

b) the extent to which objectives and targets have been met;

c) the continuing suitability of the environmental management system in relation to changing conditions and information;

d) concerns amongst relevant interested parties.

Observations, conclusions and recommendations should be documented for necessary action.

Annex B
(informative)

Links between ISO 14001 and ISO 9001

Tables B.1 and B.2 identify links and broad technical correspondences between ISO 14001 and ISO 9001 and *vice versa*.

The objective of the comparison is to demonstrate the combinability of both systems to those organizations already operating one of these International Standards and which may wish to operate both.

A direct link between subclauses of the two International Standards has only been established if the two subclauses are largely congruent in requirements. Beyond that, many detailed cross-connections of minor relevance exist which could not be shown here.

Table B.1 — Correspondence between ISO 14001 and ISO 9001

ISO 14001:1996		ISO 9001:1994	
General requirements	4.1	4.2.1 1st sentence	General
Environmental policy	4.2	4.1.1	Quality policy
Planning			
Environmental aspects	4.3.1	—	
Legal and other requirements	4.3.2	— ¹⁾	
Objectives and targets	4.3.3	— ²⁾	
Environmental management programme(s)	4.3.4	—	
	—	4.2.3	Quality planning
Implementation and operation			
Structure and responsibility	4.4.1	4.1.2	Organization
Training, awareness and competence	4.4.2	4.1.8	Training
Communication	4.4.3	—	
Environmental management system documentation	4.4.4	4.2.1 without 1st sentence	General
Document control	4.4.5	4.5	Document and data control
Operational control	4.4.6	4.2.2	Quality system procedures
	4.4.6	4.3 ³⁾	Contract review
	4.4.6	4.4	Design control
	4.4.6	4.6	Purchasing
	4.4.6	4.7	Control of customer-supplied product
	4.4.6	4.9	Process control
	4.4.6	4.15	Handling, storage, packaging, preservation and delivery
	4.4.6	4.19	Servicing
	—	4.8	Product identification and traceability
Emergency preparedness and response	4.4.7	—	
Checking and corrective action			
Monitoring and measurement	4.5.1 1st and 3rd paragraphs	4.10	Inspection and testing
	—	4.12	Inspection and test status
	—	4.20	Statistical techniques
Monitoring and measurement	4.5.1 2nd paragraph	4.11	Control of inspection, measuring and test equipment
Nonconformance and corrective and preventive action	4.5.2 1st part of 1st sentence	4.13	Control of nonconforming product
Nonconformance and corrective and preventive action	4.5.2 without 1st part of 1st sentence	4.14	Corrective and preventive action
Records	4.5.3	4.16	Control of quality records
Environmental management system audit	4.5.4	4.17	Internal quality audits
Management review	4.6	4.1.3	Management review
1) Legal requirements addressed in ISO 9001, 4.4.4.			
2) Objectives addressed in ISO 9001, 4.1.1.			
3) Communication with the quality stakeholders (customers).			

Table B.2 — Correspondence between ISO 9001 and ISO 14001

ISO 9001:1994		ISO 14001:1996	
Management responsibility			
Quality policy	4.1.1 — — 1) — 2) —	4.2 4.3.1 4.3.2 4.3.3 4.3.4	Environmental policy Environmental aspects Legal and other requirements Objectives and targets Environmental management programme(s)
Organization	4.1.2	4.4.1	Structure and responsibility
Management review	4.1.3	4.6	Management review
Quality system			
General	4.2.1 1st sentence 4.2.1 without 1st sentence	4.1 4.4.4	General requirements Environmental management system documentation
Quality system procedures	4.2.2	4.4.6	Operational control
Quality planning	4.2.3	—	
Contract review	4.3 3)	4.4.5	Operational control
Design control	4.4	4.4.6	Operational control
Document and data control	4.5	4.4.5	Document control
Purchasing	4.5	4.4.6	Operational control
Control of customer-supplied product	4.7	4.4.6	Operational control
Product identification and traceability	4.8	—	
Process control	4.9	4.4.6	Operational control
Inspection and testing	4.10	4.5.1 1st and 3rd paragraphs	Monitoring and measurement
Control of inspection, measuring and test equipment	4.11	4.5.1 2nd paragraph	Monitoring and measurement
Inspection and test status	4.12	—	
Control of nonconforming product	4.13	4.5.2 1st part of 1st sentence	Nonconformance and corrective and preventive action
Corrective and preventive action	4.14	4.5.2 without 1st part of 1st sentence	Nonconformance and corrective and preventive action
—	—	4.4.7	Emergency preparedness and response
Handling, storage, packaging, preservation and delivery	4.15	4.4.6	Operational control
Control of quality records	4.16	4.5.3	Records
Internal quality audits	4.17	4.5.4	Environmental management system audit
Training	4.18	4.4.2	Training, awareness and competence
Servicing	4.19	4.4.6	Operational control
Statistical techniques	4.20	—	
—	—	4.4.3	Communication

1) Legal requirements addressed in ISO 9001, 4.4.4.

2) Objectives addressed in ISO 9001, 4.1.1.

3) Communication with the quality stakeholders (customers).

Annex C (informative)

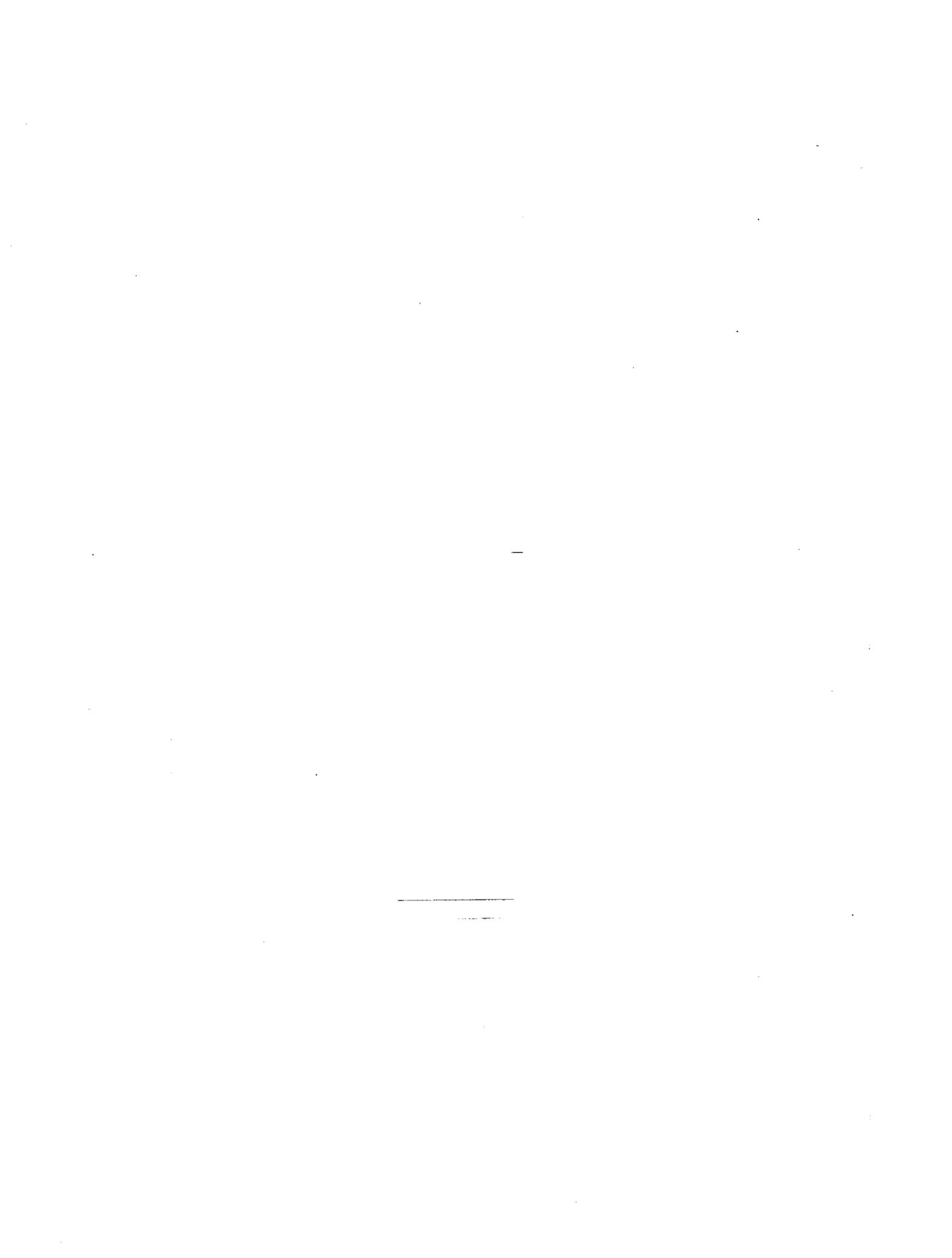
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- [4] ISO 9000-4:1993, *Quality management and quality assurance standards — Part 4: Guide to dependability programme management.*
- [5] ISO 9001:1994, *Quality systems — Model for quality assurance in design, development, production, installation and servicing.*
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- [7] ISO 14010:1996, *Guidelines for environmental auditing — General principles.*
- [8] ISO 14011:1996, *Guidelines for environmental auditing — Audit procedures — Auditing of environmental management systems.*
- [9] ISO 14012:1996, *Guidelines for environmental auditing — Qualification criteria for environmental auditors.*

APPENDIX 3
WBS Dictionary

**Brookhaven
Science Associates**

**Brookhaven
National Laboratory**



BNL ENVIRONMENTAL MANAGEMENT SYSTEM PROJECT

Work Breakdown Structure

1.0 EMS Project Initiation

This WBS describes the administrative and planning activities for the EMS Project, which are described below. The EMS Project manager and the ALD ES&H/Q have responsibility for completion of these subtasks. The **deliverables** associated with this WBS element include:

- EMS Project Manager Roles, Responsibilities, Authorities, and Accountabilities (R2A2)
- Approved, resource loaded EMS Project Management Plan,
- Approved Project Charter,
- Approved commitment authorizations,
- Authorized budget and account codes for the EMS project.

1.1 Assign Project Manager

The ALD for ES&H/Q will assign the EMS Project Manager and define his/her roles, responsibility, authorities, and accountabilities.

1.2 Review Scope of EMS Project

The EMS Project Manager will study the BSA management initiatives, the drivers for the BNL EMS (DOE/EPA Memorandum of Agreement and DOE/BSA Contract) and case studies of EMS implementation at other sites. The project manager will establish a point of contact with DOE-BHG and seek pilot facilities to participate in the EMS project.

1.3 Develop Project Plan

The EMS Project Manager will develop a draft project management plan, consistent with DOE-BHG request and BSA expectation. After review and comment from BNL subject matter experts and EMS project participants, the plan will be submitted to the ALD ES&H/Q for approval.

1.4 Obtain Management Commitment

The ALD ES&H/Q will present an overview of the EMS Project to the Integration Council. The EMS project manager will develop a Project Charter that includes an overview of the project and resource requirement summaries. It will be submitted to the ALD ES&H/Q and Laboratory Director for approval and to Director of Budget for

concurrence. The EMS Project Manager will develop commitment authorizations describing the tasks, schedule, and level of support estimated required by BNL departments/divisions to implement the EMS. These commitment authorizations will be submitted to the respective ALD for approval.

1.5 Establish EMS Project Team

The EMS Project Manager will establish the EMS Project Team utilizing both assigned personnel and matrixed support. The assigned project support personnel include an administrative assistant, project controls assistant, project team trainer, environmental professional on EMS and regulatory compliance, and computing support. The project also requires matrixed support to either develop and/or implement the program requirements. These include BNL Support Organizational Personnel, Project Managers on related BSA Initiatives, and Pilot Facility Implementation Teams. As additional directorates initiate implementation of an EMS, the EMS Project Team will be expanded to include their implementation team members.

1.6 Establish Project Budget Account

The EMS Project Manager will resource load the EMS Project Plan using cost estimates for completing the identified tasks. The respective EMS Project Team personnel will provide estimates. The required resources for EMS deployment in the directorates will be estimated using a model developed by the pilot facilities and the EMS Project Manager. Input by scientific department personnel will be sought to validate the model estimates. Final estimates will be generated using facility specific data. Once the EMS Charter is approved, the EMS Project Manager will obtain an account/budget line and authorization from the BNL Budget Office.

2.0 Establish Institutional EMS Program Requirements

This WBS describes the tasks and assignments related to the development of the BNL Institutional EMS program. The Institutional EMS Program defines the basic requirements for environmental management at BNL and provides a set of effective and efficient operational practices for implementation in all facilities and projects at the Laboratory. The overall strategy for developing the institutional program is to integrate the EMS requirements (the ISO 14001 Standard requirements and the EPA requirements for compliance assurance, pollution prevention, and community outreach) into the BSA management system initiatives being implemented at BNL. Where specific BSA initiatives have not been identified, existing BNL programs will be enhanced to incorporate the EMS requirements.

EMS project personnel will be responsible for communicating the EMS requirements to the Project Team members, providing technical assistance, tracking progress, and lastly, reviewing and approving the documented deliverables (process description documents, procedures, records) to ensure conformance to the EMS requirements.

The project managers (for the BSA initiatives) and support personnel (for the existing BNL programs) are responsible for incorporating the EMS requirements into the respective laboratory management system. The assigned personnel are also responsible for developing program documents, procedures and records as required by the EMS, in a format compatible with the BNL Standards Based Management System (SBMS). Lastly, assigned personnel are responsible for submitting the documents, procedures, etc to the EMS Project manager for review and approval with respect to conformance to ISO/EMS requirements.

The overall strategy used to develop the Institutional Program requirements will be to establish a working group of representative line personnel (supervisory and operations) who, by virtue of their work are key customers and will be responsible for implementing the requirements. This working group will be augmented with subject matter experts who will provide the group with technical expertise on legal and other requirements associated with the program element. The working group members will be responsible for seeking input from other affected operations personnel both within and outside their direct line, their management (including their Department Chair/Division Manager and ALD) and the pilot facilities implementation teams if needed. They will also be responsible for providing these parties with opportunities to review, test, and comment on the draft institutional program procedures. The assigned lead is responsible for coordinating the activities of the working group to ensure that the expected deliverables are produced in conformance with the requirements of the BNL EMS on the timeframe identified in the BNL EMS Project Schedule.

At the conclusion of this work activity, BNL shall have a documented institutional level EMS program that is integrated in the management systems established at the laboratory and conforms to EMS criteria in the MOA. Activities to implement the institutional EMS are covered under WBS 3.0, *Develop Facility EMS Pilot Program* and WBS 7.0, *Develop Institutional EMS*. A summary of the specific strategy proposed, support personnel, and deliverables for each program element is provided below.

2.1 Establish Environmental Policy

The strategy for developing the BNL Environmental Policy is to build on the work accomplished under the Management System Improvement Program (MSIP) WBS 1.3.10.2, *Environmental Mission, Vision, Values*, and integrate it into the Laboratory ES&H Policy. This was developed by a working group of representative line personnel with input from all levels of the organization (via workshops and employee survey) and already represents the Laboratory consensus.

The EMS Project Manager is responsible for communicating ISO requirements for EMS Policy to the ESD Manager. The ESD Manager will draft a proposed EMS policy that meets the requirements of ISO 14001 and is consistent with other Laboratory policies and work with the Laboratory Directorate to obtain approval.

The final version of the Environmental Policy will be presented to the ISM Project Manager for incorporation into the ESH Policy.

EMS Project personnel will be responsible for publishing it in the applicable sections of the EMS Management System Description Document and making it available to the public (through the EMS Website, SBMS, and publication in annual Site Environmental Report).

2.2 Establish Environmental Aspects/Impacts

The strategy for identifying the activities, products or services (aspects) which have the potential to significantly impact the environment, both negatively and positively is to integrate the EMS requirements into the Phase II Process Evaluation Project and the ISM initiative. The Phase II project has performed an inventory of processes at BNL and has established criteria for "high priority" processes. This inventory will be used to form the basis of "the organizations activities with environmental aspects" and the criteria will be used as a basis for determining "significant impact". Other compliance criteria may be added as appropriate. The scope and applicability of the EMS project will be defined as the Phase II activities, products, and services that meet these criteria. The Phase II Process Evaluations will provide the technical basis for the EMS Program. Expansion of the scope and applicability of the EMS Program will be implemented during the program improvement cycles.

A SBMS procedure will be developed to describe the process for identifying and documenting environmental aspects that can have a significant impact.

The ISM initiative will establish work planning and control protocols for "analyzing ESH hazards/impacts" at both the facility and project levels (such as facility use agreements, experimental safety reviews, and work planning). EMS requirements for identifying aspects that can significantly impact the environment will be incorporated into these protocols, thereby keeping the baseline information provided by Phase II up to date with new processes and/or modifications to existing processes.

Each project manager (Phase II EMS and ISM) will be responsible for developing and documenting the respective procedures and protocols. EMS project personnel will be responsible for documenting the aspects and impacts in SBMS.

2.3 Establish Legal & Other Requirements

This element incorporates both the ISO requirement for Legal and Other Requirements and the related EPA criteria under Compliance Assurance. Procedures and/or documents created in these subtasks shall address both of these requirements.

The EMS Project Manager is responsible for communicating ISO and compliance assurance requirements to project team members working on this WBS.

The SBMS Project Manager will develop a Requirements Management System. The strategy for developing the BNL Requirements Management System is to adopt the PNNL Requirements Management System and adapt it to BNL. The SBMS Project Manager has the lead for defining and documenting the structure for the Institutional Requirements Management System and customizing this system with BNL environmental requirements. The environmental professionals from ESD will be responsible for identifying the BNL specific requirements. The deliverables will include a requirements management procedure (in SBMS format) and a list of applicable regulatory requirements.

ESD Management and key personnel shall establish mechanisms for internal communication with line personnel on regulatory requirements. These will include process evaluation, facility use agreement, direct communication, and/or BNL web intranet. The process developed shall ensure that there is a mechanism to enable facility managers to be knowledgeable of legal and other requirements that apply to their facility operation.

The SME in ESD and WMD shall develop a process for proactively identifying new regulations and/or changes to regulations in order to evaluate the impact to Laboratory operations and communicate any changes in requirements, including regulatory, to the affected personnel in a timely manner.

2.3.1 Establish Environmental Compliance Subject Areas in SBMS

Subject areas provide the requirement basis and identify the associated procedures and records that must be implemented to comply with the Laboratory regulatory requirements (comparable to the BNL ESH Standards and SEAPPMs). The strategy for developing the SBMS environmental compliance subject areas is to adopt the PNNL subject areas, customize as needed for applicable BNL requirements and operations, and develop new subject area documents when no PNNL one exists. Environmental professionals in ESD will establish working groups of line personnel to develop these subject areas. The deliverable includes "subject area" documents that conform with SBMS format requirements, addressing the following environmental functional areas:

- NEPA
- Underground Injection Control
- Liquid Effluents
- Pollution Prevention/Waste Minimization
- Drinking Water
- Non-Radioactive Airborne Emissions
- Radioactive Airborne Emissions
- Notification of Unexpected Releases
- Environmental Monitoring
- Toxic & Hazardous Material Storage
- Oil's & PCBs
- Medical Waste
- Low Level Radioactive Waste

- Mixed Waste
- Hazardous Waste

2.4 Establish Objectives and Targets

The EMS requirements for objectives and targets will be integrated into the BNL Integrated Planning (IP) and Performance Based Management System (PBMS) utilizing the process to establish critical outcomes, performance objectives and performance measures. The strategy is to establish a process team headed by the IP/PBMS Project Managers that includes line personnel, environmental professionals, and EMS Project personnel. The team will develop a process for addressing the following technical EMS requirements:

- evaluating existing performance objectives/measures and contract performance measures,
- reviewing environmental aspects/impacts,
- including a review of regulatory commitments & compliance assurance requirements,
- including line personnel, regulator and stakeholder input, and
- ensuring consistency with the environmental policy, pollution prevention, and continual improvement.
- communicating to line personnel,

The team will also include in this process a mechanism to address the following administrative requirements:

- incorporating a process for flowing down requirements to relevant levels in the organization,
- including a revision process,
- including an approval process,
- including a tracking/reporting process.

The PBMS project manager will be responsible for documenting the process in a format that conforms with SBMS requirements.

[The ESD Manager will be responsible for executing the process and documenting the annual environmental objectives/measures when developing FY00 and FY01 performance objectives and measures-as-part-of WBS 7.4]

2.5 Establish Environmental Management Programs

The strategy for developing the Laboratory Environmental Management Program (an action plan to achieve the objectives) will be to integrate the EMS requirements into the Integrated Planning System established at BNL. The Integrated Planning project manager will design a process for BNL that defines and documents the requirements for identifying, implementing, and tracking activities, schedule and costs of actions necessary for the Laboratory to achieve its critical outcomes, objectives, and performance measures.

The Laboratory level process will address the following EMS technical requirements:

- covers the Laboratory environmental objectives and measures,
- addresses current operational plans and initiatives (including the MSIP Environmental Program initiatives, ESH&I Planning process and department/division planning processes), regulatory commitments, and Pollution Prevention opportunities,
- incorporate a process to assign responsibility and identify the means and time frame for achieving objectives and targets,
- establish a tracking process & change control,
- establish a mechanism for revising the action plans to address new projects or changes in existing projects.

The Management Planning project manager will be responsible for documenting the process. The EMS Project Manager will develop and document a process for facilities and projects to identify and document their EM programs (action plans to achieve their Directorate specific environmental objectives). The process will meet the above requirements and be compatible with the Laboratory level to enable linking and tracking (as deemed appropriate by DP Manager).

[The ESD personnel will be responsible for establishing the FY99/00 Institutional EM Program as part of WBS 7.5.]

2.6 Establish EMS Structure and Responsibility

The EMS Steward is responsible for establishing a working group comprised of ESD and WMD managers and management representatives on EMS to develop the EMS program structure, associated responsibilities, and routine reporting on the Laboratory environmental performance.

The ESD Manager will be responsible for documenting these requirements into the appropriate EMS Management System Description Document(s) and obtaining management approval.

EMS Project Team responsibilities and reporting requirements addressing the frequency, content and format for reporting EMS progress including project performance measures will be defined by the EMS Project Manager and documented in this EMS PMP.

[Deployment of status reports to management are covered under WBS 10.0]

2.7 Establish Training, Awareness, and Competency

2.7.1 Update Training Policy and Procedures

The EMS requirements for this program element are intended to be integrated into the BSA Initiative, Training and Qualification System (T&QS). The T&QS project manager, with guidance by the EMS project trainer, will be responsible for adopting/adapting either the PNNL T&QS or the BNL Training Policy and procedures and updating it to

meet the EMS requirements for training, awareness and competency. Specific items to be addressed include the competency requirements and updating the job hazards/training requirements matrix with environmental hazard information. If the T&QS has not been deployed, the responsibility for this task will lie with the BNL Central Training Office. The T&QS project manager (or CTO Manager) is responsible for documenting this management system and associated procedures in a format compatible with SBMS.

2.8 Establish Communications

The strategy for implementing this EMS program element is to integrate EPA requirements for community outreach and ISO requirements for communications into the BNL Strategic Communications Initiative developed by Community Involvement, Government, Public Affairs (CIGPA) Directorate. The EMS Project Manager is responsible for communicating ISO requirements to CIGPA, reviewing the current Strategic Communications Initiative for conformance to EMS requirements, and providing assistance in the development of procedures required by the EMS. The CIGPA is responsible for developing an External and Internal Communication procedure that meets the requirements of EMS, implementing them at the Institutional Level, and documenting them in a format compatible with SBMS. [Refer to WBS 4.0 for EMS Project Communications Initiatives.]

The Directors' Office is responsible for establishing a Laboratory level process for tracking correspondence and commitments to external parties. The EMS Project Manager will provide technical assistance as needed to ensure this system meets ISO requirements for receiving, responding, and tracking requests for information on environmental issues. The Directors' Office is responsible for documenting the system in SBMS format.

NOTE: The Management Representative on EMS will establish a channel for replying to external requests for environmental information related to their facilities. [The process for internally communicating legal and other requirements will be established by the SBMS Project Manager as part of the Requirements Management System, with technical assistance provided by the Environmental Specialists, refer to WBS 2.3.]

2.9 Establish EMS Documentation

The members of the EMS Project Team, as assigned in this project plan, will create the documents needed to satisfy the requirements of the BNL SBMS Document Hierarchy for EMS. The SBMS Project manager is responsible for providing guidance and directives on the SBMS format requirements to the EMS Project Team members.

The ESD Manager will develop an EMS Management System Document and obtain approval in conformance with SBMS requirements.

An EMS program description document will be created to meet ISO 14001 requirements for an EMS Manual. This document will describe the core elements of the BNL EMS, its interdependence on other management systems, and include a "roadmap" to institutional level environmental documents, procedures and records. The EMS Manual will be compiled using the documentation submitted by each of the project managers responsible for the Institutional EMS program elements. The EMS Project Manager is responsible for creating this document and obtaining approval for SBMS.

The EMS Project Manager is responsible for reviewing all required EMS documents to ensure conformance with ISO/EMS program requirements. The EMS Project Manager or EMS Specialist in consult with the SBMS Project Manager will populate the SBMS/EMS Hierarchy of documents with required EMS documents. The SBMS Project Manager will be responsible for maintaining document control.

2.10 Establish Document Control

The existing Laboratory program for Document Control will be enhanced and revised to reflect the EMS requirements and SBMS. The QM Office will provide support personnel to establish a working group of Quality Representatives and line personnel to review and either adopt or adapt the PNNL Document Control System. The QM Office will be responsible for facilitating the working group and delivering a written Document Control system compatible with SBMS.

2.11 Establish Operational Controls

The activities included in this EMS program element address the identification and evaluation of adequacy of operational controls (both administrative and engineering controls) and pollution prevention opportunities. The process developed in Phase II project will provide the basis for the ISM system for "identifying and implementing controls", and enhances the Pollution Prevention (P2) Program.

2.11.1 Establish Institutional Level Operational Controls Process

The EMS Project Manager will communicate ISO requirements to the ISM Project Manager and review the work planning process. The ISM Project Manager will integrate ISO Operational Controls requirements, and related Compliance Assurance requirements into the work planning process. The specific key elements to be included in the process include:

- Incorporate planning activities
- Incorporate maintenance activities
- Incorporate procedural requirements
- Incorporate operating limits
- Establish controls on goods and services procured for use, including documentation of communications with suppliers/contractors.

The ISM Project Manager shall document the Laboratory's operational control process, including the process for communicating controls on suppliers/contractors, in a format compatible with SBMS.

2.11.2 Establish Industrial (Facility) Requirements Management Process

The Phase II project will make assessment, prevention and control evaluations for each of the high priority processes. The Phase II project manager will document the assessment, prevention and control evaluation process (in SBMS format) for evaluating the adequacy of operational controls and pollution prevention opportunities.. The project manager will also be responsible for providing a list of processes evaluated

2.11.3 Establish Project Level Operational Controls Process

The EMS Project Manager will communicate ISO requirements to the ISM Project Manager and review the experimental safety review process. The ISM Project Manager will integrate ISO Operational Controls requirements, and related Compliance Assurance requirements into the experimental safety review process. The specific key elements to be included in the process include:

- Incorporate planning activities
- Incorporate procedural requirements
- Incorporate operating limits
- Establish controls on goods and services procured for use, including documentation of communications with suppliers/contractors.

The ISM Project Manager shall document the Laboratory's operational control process, including the process for communicating controls on suppliers/contractors, in a format compatible with SBMS.

2.11.4 Incorporate EMS Operational Controls into Facility Use Agreements

The EMS Project Manager will communicate ISO requirements to the ISM Project Manager and review the process to establish facility use agreements. The ISM Project Manager will integrate ISO Operational Controls and related Compliance Assurance requirements into the facility use agreement process as needed. The process developed shall ensure that there is a mechanism to

- enable facility managers to be knowledgeable of operational controls that apply to their facility operation,
- link these applicable requirements to the facility use agreement (or other appropriate mechanism)
- ensure users of the facilities are aware of the operational control requirements that apply to the facility in which they work.

The ISM Project Manager shall document the Laboratory's facility use agreement process in a format compatible with SBMS.

2.12 Establish Emergency Preparedness and Response

The EMS Project Manager will communicate ISO requirements on emergency preparedness and response to the respective EMS Project personnel.

The existing Laboratory Emergency Program will be enhanced and revised to incorporate the EMS requirements. Support personnel from the Emergency Services Division, Emergency Planning Team, will review the existing BNL response protocols (ie., ESH Standards, ESH Service Division-Environmental Protection Office Spill Response procedure, BNL Spill Prevention and Control Plan, and occurrence reporting systems. The Emergency Planning Team will be responsible for integrating these protocols and the EMS requirements into the Laboratory Emergency program, documenting the EMS requirements for Emergency Preparedness and Response in the SBMS format, and updating the associated Laboratory Emergency Program documents as needed (ie., the BNL Emergency Plan, ESH Standards, and Emergency Training Program). The SBMS Project Manager is responsible for documenting these systems in the SBMS.

[Also related to this effort, and included in WBS 7.12, is the incorporation of facility level requirements for Local Emergency Plans, revision of the Fire/Rescue Run books to reflect any additional hazards identified during the Phase II process evaluations, and the review and testing (ie., drills) of Department Local Emergency plans.]

2.13 Establish Monitoring and Measurement

The Laboratory Environmental Monitoring Program will be reviewed and revised to provide facilities and projects with sampling and analysis requirements for processes that have the potential to impact the environment thereby incorporating EMS requirements for monitoring and measurement.

The process shall address the following technical elements:

- Timely compliance to monitoring/reporting requirements
- Monitoring requirements for operations
- Records and reporting requirements

ESD and the Integrated Monitoring project manager will be responsible for developing and documenting the Laboratory program requirements in a format that is compatible with SBMS. Deliverables include a SBMS subject area for environmental monitoring.

The Phase II project includes processes to make regulatory determinations and identify assessment, prevention and control requirements. EMS project personnel and Phase II project manager shall review these processes with respect to EMS monitoring and measurement requirements to determine how these processes satisfy the EMS requirements, and if so, the Phase II Project Manager shall document the protocols in SBMS.

2.13.1 Develop EIMS

The Integrated Monitoring Initiative, which has the responsibility to develop an integrated database for environmental data under MSIP 1.3.10.3.9, will incorporate the EMS requirements for monitoring and measurement into the design of the database to ensure facilities have the capability to access their data. The Integrated Monitoring Project Manager shall document database descriptions addressing access, records management, and data validation

2.13.2 Develop Calibration Standard

The existing Laboratory Calibration program will be enhanced and revised to reflect EMS and SBMS requirements. The QM Office will provide support personnel to establish a working group of Quality Representatives and line personnel to review and either adopt or adapt the PNNL calibration program. The QM Office will be responsible for facilitating the working group and delivering a Calibration System document for incorporation into SBMS.

[The EMS requirements for measuring performance related to objectives and targets and evaluating regulatory compliance are covered under WBS 2.4 and WBS 2.16, respectively.]

2.14 Establish Nonconformance & Corrective/Preventive Actions

The existing Laboratory program for Nonconformance & Corrective/Preventive Action will be enhanced and revised to reflect the EMS requirements and SBMS. The QM Office will provide support personnel to establish a working group of Quality Representatives and line personnel to review and either adopt or adapt the PNNL "Resolving Quality Problems" subject area. The QM Office will be responsible for facilitating the working group and delivering a system document that meets the EMS criteria for nonconformance & corrective/preventive action and can be incorporated into SBMS.

2.15 Establish Records

The approach that will be used to address this EMS element is to integrate these requirements with the document control requirements and monitoring and measurement requirements in order to develop one system to establish and maintain documents and records, both hardcopy and electronic. The existing BNL and PNNL programs for records management shall be reviewed and a system developed for SBMS. This task will be performed by the Document Control working group established by the QM Office. Technical expertise for identifying required environmental records will be provided by the environmental professionals of ESD and documented in the respective subject areas in SBMS. Requirements for electronic records will be addressed and incorporated in the Integrated Monitoring Initiative as that program develops.

2.16 Establish Environmental Auditing

This BNL EMS Audit element will include both an EMS and a regulatory compliance component. The requirements for the EMS audit will be based on the ISO 14001 standard; the requirements for the regulatory compliance audit will be based on the EPA Environmental Leadership Program (ELP) Compliance Audit Guidelines. The Integrated Assessment project manager will be responsible for developing the overarching audit program requirements, integrating them in the self-assessment program, and documenting the protocols and tools in SBMS. Technical assistance in terms of procedures and EMS/Compliance Audit "tools" such as planning audits, training assessors, investigating causal factors, and establishing appropriate corrective action, and tracking closure of action items will be provided by the environmental professionals, quality management staff, and EMS project personnel.

2.17 Establish Management Review

The strategy for developing this EMS element is to integrate the requirements for Management Review into the Integrated Assessment Program. The process will be developed to address the following technical requirements:

- Establish frequency
- Identify performance data to be presented and evaluated
- Establish Management Review Report format and documentation requirements
- Establish guidance for assessing effectiveness, adequacy, and suitability of EMS, and making recommendations to revise policy, objectives, or targets

The EMS project manager will be responsible for incorporating the requirements into environmental assessment subject areas and documenting the systems in SBMS. EMS project personnel will provide technical assistance.

3.0 Facility EMS Pilot Program

Three facilities will participate in the pilot programs: RHIC, WMD, RD. The pilot program has been established for the following reasons:

- Enable facilities with a high potential to impact environment to expedite implementation and prepare for ISO registration.
- Provide line management input on the Institutional EMS program requirements as they are being developed.
- Develop case studies for EMS implementation and prototypes for Laboratory wide application.

This WBS is comprised of four major elements: Preparations for pilot facilities, and implementation plans for each of the three pilot facilities: RHIC, WMD, RD. The EMS Project Team is assisting the pilot facilities in preparations for the development and deployment of key EMS program elements. A uniform strategy for implementation was

developed by the pilot facilities to facilitate deployment, maximize synergy in effort, and test applicability for eventual transferal to the balance of the laboratory.

3.1 Preparations for Pilot Facilities

The EMS project personnel will provide technical assistance to ensure success in development and deployment of the EMS Program in the pilot facilities.

3.1.1 Obtain Management Commitment

The EMS Project Manager shall contact the Environmental specialist and associated ALD/Department Chair to provide an overview of the EMS Project and seek participation in the pilot process. The deliverable is commitment by the ALD/Department Chair to participate and support the EMS Project and assign a Management Representative on EMS to serve as a point of contact on the EMS Project Team.

3.1.2 Establish EMS Team

The EMS Project Manager will provide guidance and reference materials on EMS Project Implementation to the Management Representatives on EMS in the following areas:

- Gap Analysis
- Cost accounting
- Implementation Plan.

The EMS Project Manager will also establish a mechanism for the pilot facilities to have an opportunity to review and test new EMS protocols developed in WBS 2.0.

3.1.3 Prepare for Employee Training

The EMS Project Trainer will develop a prototype lesson plan for use by the pilot facilities for satisfying the facility specific training component of the EMS Training. Facility personnel will develop the content for the module that pertains to the actual work process/impact/controls/emergency response. The training will be piloted in accordance with BNL Training policy. Deliverable: Prototype lesson plan and guidance.

3.1.4 Guide Development of Facility EMS Procedures/Documents/Records

The EMS Project Manager will provide guidance and reference materials on EMS Procedures/Documents/Records to the Management Representatives. The EMS Project Manager will also establish a mechanism for the pilot facilities to have an opportunity to review and test new EMS protocols developed in WBS 2.0.

3.1.5 Prepare Assessment Activities

The EMS Project Manager will establish a EMS Project Assessment schedule covering the project progress, the Independent Oversight Office assessments, DOE Audits and BSA Corporate Assessments. [Coordination and hosting of audits is covered under WBS 6.0]

3.2 Deploy EMS at Pilot Facilities

Three facilities will participate in the pilot programs: RHIC, WMD, and RD. A uniform strategy for implementation was developed by the pilot facilities to facilitate deployment, maximize synergy in effort, and test applicability for eventual transferal to the balance of the laboratory. The following WBS reflects this uniform implementation strategy at each of the three facilities.

3.2.1 Relativistic Heavy Ion Collider Project (RHIC)

3.2.1.1 Project Planning

This WBS includes the activities associated with the planning stage of EMS Project implementation. It includes the following:

- Establish EMS Team/R2A2
- Establish Cost Accounting System
- Define Facilities/Projects (ie., organization) included within scope of project
- Develop Implementation Plan
- Conduct Gap Analysis
- Conduct Phase II Process Evaluations for high priority processes
- Develop Action Plan for WBS 3.2.1.2, Program Implementation
- Review/Test of Institutional Level Program Requirements, as appropriate

The Management Representative on EMS is responsible for coordinating the completion of the above tasks. The expected deliverables include the identification of the members of the facility EMS team, cost accounting system for tracking hours spent on EMS tasks, a gap analysis report, an implementation plan (with action plan for WBS 3.2.1.2 completed). [The Phase II process evaluations are being tracked as part of a deliverable for the Phase II PEP, and the description of the Facility organization will be developed and documented in the EMS Manual appendix for the facility.]

3.2.1.2 Program Implementation

This WBS represents the actions required by the facilities to develop facility protocols or revise existing facility protocols to conform to the BNL Institutional EMS Program Requirements and the implementation of these procedures. This WBS will require the Management Representative on EMS to Interface with facility personnel responsible for implementing related BSA Initiatives, such as IAP, PBMS, Phase II, etc. WBS sub-elements for each of the 17 ISO program elements will be developed by the

Management Representative on EMS as needed depending upon the results of the gap analyses.

A range of options exists for the facility to complete this WBS. They may choose to adopt the Institutional Program in its entirety and eliminate any facility specific procedures; they may choose to augment the Institutional Program with facility specific procedures; or they may pick and choose the elements that will be adopted or augmented. It is preferable that the facilities limit the number of additional procedures to those necessary to describe the unique operation and maintenance of the equipment and facility. The EMS Project Manager will also review and approve the facility documentation required by the EMS Management System Hierarchy of Documents (EMS Manual Appendix for facility, and facility index). The deliverable that is expected in this WBS is an EMS Manual and Index describing how the facility has deployed the Institutional EMS Program and indicating the procedures/documents/records which support the deployment.

3.2.1.3 Train Employees

The Management Representative on EMS and training coordinator, with assistance from the EMS Project Trainer, shall assign training requirements to all employees using the EMS Project Job Training Assessments. The Management Representative on EMS and Training Coordinator shall schedule and coordinate execution of the following training courses:

- EMS Implementation Team Training
- General Employee Environmental Protection Training
- Job Specific EMS Training
- EMS Management Overview
- Internal EMS Auditor

The deliverables from this WBS includes the following items:

- assignment of facility personnel to EMS JTA's
- job specific training modules
- training records entered into the Brookhaven Training Management System database

3.2.1.4 Communicate EMS Initiative

Several initiatives are included in this WBS to ensure frequent and widespread communication of the EMS Program and environmental performance throughout the facility. The Management Representative on EMS shall design communication initiatives that are conducive to their facility, including Division Kickoff Meeting and EMS presentations on the project, program elements, performance, and status. These communication efforts will augment the EMS Project Communications Initiatives. The expected deliverable is a summary listing of actual communiqués in the monthly status report.

The Pilot facilities shall also participate in two lessons learned sessions scheduled midway and at the end of the pilot phase, in order to discuss strengths and weaknesses of the implementation process, and improve the process before laboratory wide deployment.

3.2.1.5 Assess Readiness/Obtain Registration

3.2.1.5.1 Internal Audits

Several activities associated with assessment of the EMS Program will be coordinated by the Management Representative on EMS, including

- Self assessment
- Independent Oversight Audit of EMS Program
- Annual DOE Audit

The first two audits will be performed in accordance with the requirements of IAP. The DOE-BHG area office in accordance with the requirements in the MOA will coordinate the annual DOE Audit. The deliverable associated with this WBS is the final audit reports, and corrective actions if necessary.

3.2.1.6 Project Support

This WBS includes activities associated with managing and controlling costs and schedule associated with facility implementation of the EMS. The Management Representative on EMS will be responsible for tracking project performance measures related to costs and schedule, reporting progress on project implementation on a monthly basis to both their management and to the EMS Project Manger, and administer change control of facility implementation plan. The expected deliverables are monthly progress reports and baseline change control forms, as required.

3.2.2 Waste Management Division (WMD)

3.2.2.1 Project Planning

This WBS includes the activities associated with the planning stage of EMS Project implementation. It includes the following:

- Establish EMS Team/R2A2
- Establish Cost Accounting System
- Define Facilities/Projects (ie., organization) included within scope of project
- Develop Implementation Plan
- Conduct Gap Analysis
- Conduct Phase II Process Evaluations for high priority processes
- Develop Action Plan for WBS 3.2.1.2, Program Implementation
- Review/Test of Institutional Level Program Requirements, as appropriate

The Management Representative on EMS is responsible for coordinating the completion of the above tasks. The expected deliverables include the identification of the members of the facility EMS team, cost accounting system for tracking hours spent on EMS tasks, a gap analysis report, an implementation plan (with action plan for WBS 3.2.1.2 completed). [The Phase II process evaluations are being tracked as part of a deliverable for the Phase II PEP, and the description of the Facility organization will be developed and documented in the EMS Manual appendix for the facility.]

3.2.2.2 Program Implementation

This WBS represents the actions required by the facilities to develop facility protocols or revise existing facility protocols to conform to the BNL Institutional EMS Program Requirements and the implementation of these procedures. This WBS will require the Management Representative on EMS to Interface with facility personnel responsible for implementing related BSA Initiatives, such as IAP, PBMS, Phase II, etc. WBS sub-elements for each of the 17 ISO program elements will be developed by the Management Representative on EMS as needed depending upon the results of the gap analyses.

A range of options exists for the facility to complete this WBS. They may choose to adopt the Institutional Program in its entirety and eliminate any facility specific procedures; they may choose to augment the Institutional Program with facility specific procedures; or they may pick and choose the elements that will be adopted or augmented. It is preferable that the facilities limit the number of additional procedures to those necessary to describe the unique operation and maintenance of the equipment and facility. The EMS Project Manager will also review and approve the facility documentation required by the EMS Management System Hierarchy of Documents (EMS Manual Appendix for facility, and facility index). The deliverable that is expected in this WBS is an EMS Manual and Index describing how the facility has deployed the Institutional EMS Program and indicating the procedures/documents/records which support the deployment.

3.2.2.3 Train Employees

The Management Representative on EMS and training coordinator, with assistance from the EMS Project Trainer, shall assign training requirements to all employees using the EMS Project Job Training Assessments. The Management Representative on EMS and Training Coordinator shall schedule and coordinate execution of the following training courses:

- EMS Implementation Team Training
- General Employee Environmental Protection Training
- Job Specific EMS Training
- EMS Management Overview
- Internal EMS Auditor

The deliverables from this WBS includes the following items:

- assignment of facility personnel to EMS JTA's
- job specific training modules
- training records entered into the Brookhaven Training Management System database

3.2.2.4 Communicate EMS Initiative

Several initiatives are included in this WBS to ensure frequent and widespread communication of the EMS Program and environmental performance throughout the facility. The Management Representative on EMS shall design communication initiatives that are conducive to their facility, including Division Kickoff Meeting and EMS presentations on the project, program elements, performance, and status. These communication efforts will augment the EMS Project Communications Initiatives. The expected deliverable is a summary listing of actual communiqués in the monthly status report.

The Pilot facilities shall also participate in two lessons learned sessions scheduled midway and at the end of the pilot phase, in order to discuss strengths and weaknesses of the implementation process, and improve the process before laboratory wide deployment.

3.2.2.5 Assess Readiness/Obtain Registration

3.2.2.5.1 Internal Audits

Several activities associated with assessment of the EMS Program will be coordinated by the Management Representative on EMS, including

- Self assessment
- Independent Oversight Audit of EMS Program
- Annual DOE Audit

The first two audits will be performed in accordance with the requirements of IAP. The DOE-BHG area office in accordance with the requirements in the MOA will coordinate the annual DOE Audit. The deliverable associated with this WBS is the final audit reports, and corrective actions if necessary.

3.2.2.6 Project Support

This WBS includes activities associated with managing and controlling costs and schedule associated with facility implementation of the EMS. The Management Representative on EMS will be responsible for tracking project performance measures related to costs and schedule, reporting progress on project implementation on a monthly basis to both their management and to the EMS Project Manger, and administer change control of facility implementation plan. The expected deliverables are monthly progress reports and baseline change control forms, as required.

3.2.3 Reactor Operations (RD)

3.2.3.1 Project Planning

This WBS includes the activities associated with the planning stage of EMS Project implementation. It includes the following:

- Establish EMS Team/R2A2
- Establish Cost Accounting System
- Define Facilities/Projects (ie., organization) included within scope of project
- Develop Implementation Plan
- Conduct Gap Analysis
- Conduct Phase II Process Evaluations for high priority processes
- Develop Action Plan for WBS 3.2.1.2, Program Implementation
- Review/Test of Institutional Level Program Requirements, as appropriate

The Management Representative on EMS is responsible for coordinating the completion of the above tasks. The expected deliverables include the identification of the members of the facility EMS team, cost accounting system for tracking hours spent on EMS tasks, a gap analysis report, an implementation plan (with action plan for WBS 3.2.1.2 completed). [The Phase II process evaluations are being tracked as part of a deliverable for the Phase II PEP, and the description of the Facility organization will be developed and documented in the EMS Manual appendix for the facility.]

3.2.3.2 Program Implementation

This WBS represents the actions required by the facilities to develop facility protocols or revise existing facility protocols to conform to the BNL Institutional EMS Program Requirements and the implementation of these procedures. This WBS will require the Management Representative on EMS to Interface with facility personnel responsible for implementing related BSA Initiatives, such as IAP, PBMS, Phase II, etc. WBS sub-elements for each of the 17 ISO program elements will be developed by the Management Representative on EMS as needed depending upon the results of the gap analyses.

A range of options exists for the facility to complete this WBS. They may choose to adopt the Institutional Program in its entirety and eliminate any facility specific procedures; they may choose to augment the Institutional Program with facility specific procedures; or they may pick and choose the elements that will be adopted or augmented. It is preferable that the facilities limit the number of additional procedures to those necessary to describe the unique operation and maintenance of the equipment and facility. The EMS Project Manager will also review and approve the facility documentation required by the EMS Management System Hierarchy of Documents (EMS Manual Appendix for facility, and facility index). The deliverable that is expected in this WBS is an EMS Manual and Index describing how the facility has deployed the

Institutional EMS Program and indicating the procedures/documents/records which support the deployment.

3.2.3.3 Train Employees

The Management Representative on EMS and training coordinator, with assistance from the EMS Project Trainer, shall assign training requirements to all employees using the EMS Project Job Training Assessments. The Management Representative on EMS and Training Coordinator shall schedule and coordinate execution of the following training courses:

- EMS Implementation Team Training
- General Employee Environmental Protection Training
- Job Specific EMS Training
- EMS Management Overview
- Internal EMS Auditor

The deliverables from this WBS includes the following items:

- assignment of facility personnel to EMS JTA's
- job specific training modules
- training records entered into the Brookhaven Training Management System database

3.2.3.4 Communicate EMS Initiative

Several initiatives are included in this WBS to ensure frequent and widespread communication of the EMS Program and environmental performance throughout the facility. The Management Representative on EMS shall design communication initiatives that are conducive to their facility, including Division Kickoff Meeting and EMS presentations on the project, program elements, performance, and status. These communication efforts will augment the EMS Project Communications Initiatives. The expected deliverable is a summary listing of actual communiqués in the monthly status report.

The Pilot facilities shall also participate in two lessons learned sessions scheduled midway and at the end of the pilot phase, in order to discuss strengths and weaknesses of the implementation process, and improve the process before laboratory wide deployment.

3.2.3.5 Assess Readiness/Obtain Registration

3.2.3.5.1 Internal Audits

Several activities associated with assessment of the EMS Program will be coordinated by the Management Representative on EMS, including

- Self assessment
- Independent Oversight Audit of EMS Program
- Annual DOE Audit

The first two audits will be performed in accordance with the requirements of IAP. The DOE-BHG area office in accordance with the requirements in the MOA will coordinate the annual DOE Audit. The deliverable associated with this WBS is the final audit reports, and corrective actions if necessary.

3.2.3.6 Project Support

This WBS includes activities associated with managing and controlling costs and schedule associated with facility implementation of the EMS. The Management Representative on EMS will be responsible for tracking project performance measures related to costs and schedule, reporting progress on project implementation on a monthly basis to both their management and to the EMS Project Manger, and administer change control of facility implementation plan. The expected deliverables are monthly progress reports and baseline change control forms, as required.

4.0 Deploy EMS Communications Program

An EMS communications campaign will be developed and implemented to ensure employee awareness of the BNL EMS initiative and to share EMS information with external stakeholders, including EMS professional organizations.

4.1 Develop EMS Communications Plan

This WBS describes the activities required to develop a communications plan for the EMS Project. The key element of this WBS is to identify the target audiences that need EMS information and the type of information that they need. The following are the internal/external stakeholders that are considered the target audience for the EMS Project:

- Brookhaven Executive Roundtable
- Community Advisory Committee
- Community Groups
- BNL Line Managers
- Employees

Integration with the Laboratory's overall Strategic Communication Plan is required, as well as clear definition of responsibilities between the Community Involvement, Government, Public Affairs Office (CIGPA) and the EMS project team. This integration addresses the need to coordinate the Laboratory's initiatives with the EMS Project Initiatives, avoid duplication of effort and avoid oversaturating the community groups with requests to make presentations.

The CIGPA personnel are responsible for providing technical assistance to the EMS Project manager in the development of the EMS Communications Plan. To the extent it is consistent with the mission of the CIGPA and their Strategic Communications Plan,

CIGPA will implement selected EMS Communication tasks using technical expertise provided by the EMS Project personnel. Examples include laboratory wide communications via Bulletin Articles, and coordination of presentations with external community groups. The EMS Project manager and EMS Specialist are responsible for developing and documenting the Communications Plan, providing technical information on the status, progress, and content of the EMS Project for any communications on the EMS Project, and implementing the actions identified within the plan. The deliverable of this WBS is the EMS Communications Plan. [Additional EMS communications not specifically addressed in this WBS are included within the WBS 5, Provide EMS Training, and the WBS 10, Project Support (status reports).]

4.2 Implement EMS Communications Plan

This WBS represents the activities that are performed to implement the Communications Plan. These activities include

- Developing and giving EMS presentations, both internal and external.
- Coordinating a presentation(s) by independent ISO experts to BER, CAC, and LI Business Community
- Developing and distributing EMS posters
- Developing and distributing EMS Program Brochures (Policy)
- Developing and airing BNL EMS video
- Providing Technical Expertise to CIGPA and others as required on a routine basis for related communiqués, both internal and external.
- Participating in community outreach activities.

The EMS Project Manager and EMS Specialist, with assistance from the Management Representatives on EMS, EMS Project Trainer, and CIGPA as needed, are responsible for performing these activities. The deliverables associated with this WBS are:

- List of presentations given, dates and copy of material presented
- A Workshop/Conference at BNL on ISO 14001, targeted to BER, CAC, and LI Business Community will be considered
- BNL EMS posters, brochures, and video
- Routine publishing of internal and external communiqués (frequency determined in Communications plan)

4.3 Participate in Professional EMS Organizations

Several professional organizations exist that provide support to organizations that are implementing EMS. These organizations share lessons learned on implementation experiences, promote ISO 14001 in the US, and stay abreast of current issues regarding ISO 14001 and EMS's. Organizations that are targeted for participation include:

- EFCOG ISO 14000 Working Group
- ANSI-RAB Council
- DOE Topical Committee on ISO 14000
- Multi-state Working Group

- ASQ Energy & Environmental Division

The EMS Project Manager and EMS Specialist are responsible for participating in these groups through participation on routine teleconferences, attendance at meetings, and volunteer efforts on special interest groups. Other Project Team members will be invited to participate to present and share their experiences as appropriate. The purpose of this involvement is to represent BNL, gain experience and expertise in these areas, and promote BNL's activities to implement an EMS and pursue ISO registration.

The deliverable from this WBS includes active membership in these organizations, presentations of BNL experiences implementing an EMS or lessons learned to these organizations, and presentations to the BNL EMS Project Team on highlights from these interactions.

5.0 EMS Project Training

Everyone at BNL will receive some form of training on his or her environmental responsibilities. The appropriate level of training will be determined based on an employee's potential to impact the environment when performing their job. EMS training will be provided in three general areas: EMS Awareness, job specific training, and specialized EMS training. This WBS speaks to tasks associated with defining training requirements for the Laboratory population as a whole, and developing/delivering the specialized EMS training. This specialized training is focused in two areas: management training and project personnel training on EMS implementation. WBS 5.5 references the training initiatives related to EMS Awareness and job specific training and provides the linkages to the other WBS sections in which they are fully described. The training described within this WBS, is augmented by (and does not duplicate) the training provided by the Phase II Process Evaluation Project that addresses Environmental Laws and Regulations, or the existing RCRA/RAD Waste training for waste generators.

NOTE: In addition to the training specific to the EMS project that is described above, this WBS shows the linkages to other training initiatives that are placed in other sections of this Project Management Plan because they were logically executed as part of other WBS elements. The responsibilities and deliverables associated with these tasks are described in the referenced WBS sections.

Job specific training will be developed to train operations personnel whose job has the potential to impact the environment. (refer to WBS 3.1.3 for preparations on developing facility training, 3.2.[1-3].3 for pilot facility training deployment, and 7.18. [2-11].3 for laboratory training deployment). Facility personnel will develop the training program with assistance on generic format and prototype provided by the EMS project trainer. The learning objective is to provide the target audience with knowledge of environmental impacts associated with their job, the consequences of these impacts (both positive and negative), and their responsibility to prevent, respond, and mitigate

the occurrence of these impacts. Opportunities to reduce or eliminate the potential impact through pollution prevention and waste minimization techniques will also be addressed.

5.1 Identify training needs for EMS Project Personnel

The EMS Project Trainer shall analyze the job training requirements for an EMS (ISO and EPA requirements) and develop generic Job Training Assessments (JTA) which identify the tasks and associated training for these generic positions. The deliverable is the JTA's.

5.2 Provide Internal Auditor Training Course

This course provides training on ISO 14001 auditing requirements and techniques for auditing an EMS in one's own facility. The target audience is the Management Representative for EMS and/or designated personnel who have responsibilities for performing self-assessments within the Directorate, and selected staff from the QM Office and Environmental Services Division who have responsibilities for providing assessment services to the Laboratory departments. The EMS Project Trainer, with assistance from the EMS Project Manager, shall identify the target audience for subject course, evaluate the availability and applicability of vendor provided courses, and procure a vendor to provide the course to the pilot facilities and initial target audience. Procurement of a train-the-trainer capability will be explored as an option for future delivery of the course. The Project Trainer will also coordinate and administer the delivery of the course, including notifications, logistical arrangements for vendor, attendance records, and student evaluations of the course. The evaluations will be analyzed and if adequate, the course will be used for laboratory deployment of EMS and the course will be given to the final target audience. If not adequate, the process will be repeated and a new vendor and course will be procured (and/or developed). The deliverable for this WBS is a procurement specification, course materials, attendance records entered in Brookhaven Training Management System (BTMS), and student evaluations.

5.3 Deliver EMS Implementation Training Course

This course provides an overview of the ISO requirements and guidance in how to apply the requirements to existing programs in order to bring them into conformance with the Standard. The EMS Implementation Training course will utilize existing training materials, such as those provided by EPA and the National Science Foundation or other EMS consultants, and are preferable if they provide a hands-on workshop format where participants can participate in a gap analysis of their own program. The target audience includes the EMS Project Personnel and the Facility EMS Implementation Teams. The EMS Project Trainer, with assistance from the EMS Project Manager, shall identify the target audience, evaluate the availability and applicability of vendor provided courses, and procure a vendor to provide the course to the pilot facilities and initial target audience. Procurement of a train-the-trainer capability will be explored as an option for

future delivery of the course. The Project Trainer will also coordinate and administer the delivery of the course, including notifications, logistical arrangements for vendor, attendance records, and student evaluations of the course. The evaluations will be analyzed and if adequate, the course will be used for laboratory deployment of EMS and the course will be given to the final target audience. If not adequate, the process will be repeated and a new vendor and course will be procured (and/or developed). The deliverable for this WBS is a procurement specification, course materials, attendance records entered in Brookhaven Training Management System (BTMS), and student evaluations.

5.4 ISO 14001 Lead Auditor Training

This course provides training to be a lead auditor on an EMS Audit Team. The course will be given at BNL if there is interest in advanced training in EMS Auditing and funding to support it. The target audience is select persons who either have interest in pursuing professional development in this area, or personnel from facilities who are pursuing ISO registration. This course provides an overview of the ISO requirements and guidance in how to apply the requirements to existing programs in order to bring them into conformance with the Standard.

5.5 Deliver EMS Management Overview Training Course

This course provides an overview of BNL's EMS including the drivers, key elements, deployment strategy and timetable, benefits, and management's role/responsibility in the BNL EMS. The target audience is Level 1 – 4 managers, ESH Coordinators, and the EMS Project Personnel and Facility EMS Working Groups. The EMS Project Trainer, with assistance from the EMS Project Manager, shall identify the target audience for subject course, evaluate the availability and applicability of vendor provided courses, and procure a vendor to provide the course to the pilot facilities and initial target audience. Procurement of a train-the-trainer capability will be explored as an option for future delivery of the course. The Project Trainer will also coordinate and administer the delivery of the course, including notifications, logistical arrangements for vendor, attendance records, and student evaluations of the course. The evaluations will be analyzed and if adequate, the course will be used for laboratory deployment of EMS and the course will be given to the final target audience. If not adequate, the process will be repeated and a new vendor and course will be procured (and/or developed). The deliverable for this WBS is a procurement specification, course materials, attendance records entered in Brookhaven Training Management System (BTMS), and student evaluations.

5.5 Milestone: Pilot Project Teams Training

5.7 Milestone: Balance of Project Team Training

5.8 Develop General Employee Environmental Protection Training

General Employee Environmental Training is designed to raise environmental awareness, gain commitment to the environmental policy, and instill a sense of individual responsibility. The EMS Project Trainer will be responsible for developing a General Employee Environmental Protection Training course. The course is intended to be Web based, address all the EMS training requirements, and documented and piloted in accordance with BNL training policy. The deliverable for this WBS is a procurement specification, course materials, attendance records entered in Brookhaven Training Management System (BTMS), and student evaluations.

5.9 General Environmental Protection Course

Once the General Environmental Protection course is finalized, the EMS Project Trainer will except material from this course to be used to revise the BNL General Employee Training and Contractor/Vendor Orientation courses (or others if deemed appropriate) and providing it to the OSH Training Group. The OSH Training Group is responsible for updating these courses (EMS Training is also referenced in WBS 5.0.) The deliverable for this WBS is a procurement specification, course materials, attendance records entered in Brookhaven Training Management System (BTMS), and student evaluations.

6.0 EMS Program Assessments

Several mechanisms will be employed to assess the BNL EMS program. First, this WBS describes an assessment of BNL facilities potential to impact the environment for the purpose of recommending those facilities to pursue full ISO registration. Second, BSA is deploying an Integrated Assessment Program at BNL that the EMS Project will be utilizing to assess the readiness of the EMS Program. Two mechanisms of assessment described in that program directly apply to the EMS Project: Self-Assessment and Independent Oversight. In addition, independent corporate audits and DOE audits (as required by the MOA) shall be performed annually. Lastly, the final assessment activity for the EMS project will be the ISO Registration Audit for facilities seeking registration. Other assessment activities included in other sections of the Project Management Plan are:

- Environmental Auditing (WBS 2.16)
- Gap Analyses (WBS 3.1.2, WBS 3.2.[1-3].1 and WBS 7.18. [2-11].1)
- Facility Self Assessments (WBS-3.1.5, WBS 3.1.6, 3.2.[1-3].5, 7.18.[2-11].5)

6.1 Develop Identification Method for ISO-registered Candidate Facilities

To satisfy the first of three BSA/DOE contract milestones, the EMS Project Manager in conjunction with the BNL NEPA coordinator will develop an identification process for nominating facilities that should pursue ISO registration. A NEPA-based criteria will be established to evaluate a facilities potential to impact the environment. Facility managers, with technical expertise provided by environmental specialists will perform the evaluation. These evaluations will be verified by independent evaluations by subject matter experts and performance data of actual impacts. Those facilities that have a

high potential to impact will be recommended to pursue full registration. A formal recommendation will be submitted to DOE for approval. The NEPA Coordinator will be responsible for coordinating the evaluation of the facilities. The EMS project manager will be responsible for writing the report, seeking technical review of methodology, obtaining management approval, and submitting the report to DOE-BHG. The deliverable is the approved report submitted to DOE.

6.2 Perform Project Self Assessment

The EMS Project manager shall perform project self-assessments as scheduled for FY 99 and FY 00. The deliverable is a self-assessment report for FY 99 and FY 00 respectively.

6.3 Perform Internal Independent Assessment of EMS Program

The EMS Project manager will coordinate and host an independent assessment of the EMS Program Documentation (Requirements Documents in SBMS) utilizing qualified personnel from Independent Oversight Office (or other qualified source). Each assessment will have the following required documentation:

- Assessment plan (or task order),
- Assessment report,
- Corrective actions for any finding or non-conformance identified.

The EMS project manager will be responsible for writing the audit plans; the auditors will be responsible for writing the audit report; and the EMS project manager will be responsible for performing the corrective action with input from the respective project managers and management representatives on EMS. The deliverables for this WBS are an audit plan, audit report, and corrective action if required.

The EMS Project manager will coordinate an independent assessment of the EMS Program Implementation within the facilities. Refer to WBS 3.2.[1-3].5.1, and WBS 7.18.[2-11].5.1 for a description of responsibilities and deliverables.

At the conclusion of EMS Project Implementation and successful completion of Independent Assessments by the Independent Oversight Office, the Laboratory will self declare conformance to ISO 14001.

6.4 Host BSA Corporate Oversight Assessment

BSA parent corporations, Battelle Memorial Institute and Stony Brook University, shall at their discretion conduct annual reviews of the BNL. It is assumed that the EMS Program will be represented in the scope of such audits, and for the purpose of the project plan is estimated that two audits per year will be conducted. BSA Corporate Oversight Assessments will be coordinated through the Director's Office. It is the responsibility of the EMS Project Manager, and project personnel as applicable, to host the audit, provide documentation as requested, and develop a corrective action if

required. To the extent possible, facility working groups that are in the implementation phase of the EMS Project will be shielded from auditors in order to minimize diverting resources from implementation activities to host/respond to auditors.

6.5 Host DOE Independent Audits

This WBS identifies the tasks required by the EMS Project manager to host three DOE Independent Audits as required by the EPA/DOE MOA, (referred to as Year 1 – 3 audits in the MOA). DOE Phase III Audits will be coordinated and paid for by the DOE-BHG EMS Point of Contact. The EMS Project Manger will provide the current project plan and schedule to BHG to assist them in developing the audit scope. The EMS Project Manager is responsible for hosting the audit, performing a factual accuracy of the audit report, and developing corrective action plans as required. No rework of any EMS tasks have been considered in the resource estimate for this WBS because it is expected that either internal assessments will self-identify any corrective actions needed.

To mitigate one of the program risks identified in the Project Management Plan, the third year audit will be used as an independent verification that the Laboratory EMS Program conforms to ISO 14001.

Depending on the DOE decision on BNL's recommendation regarding Milestone 1 of the contract, this third year audit may also be used as the registration audit for facilities that are pursuing registration to the ISO 14001 Standard. To that end, the EMS Project Manager will work with BHG POC to coordinate this activity and/or develop a position paper, if required, to justify the cost/benefit of DOE-BHG procuring a qualified registrar to perform the audit.

This WBS also covers any tasks related to yet unplanned DOE Audits. The deliverables expected by the BNL EMS Project personnel on this WBS are factual accuracy comments and corrective action plans for each of three annual audits.

Year 4 and 5 assessments will be the responsibility of the EMS Management System Owner.

6.6 Obtain ISO Registration

This WBS represents the activities associated with preparing and coordinating the on site registration audit. All ISO registration audits will be coordinated through the EMS Project Manager, however the pilot facilities will pay for the costs of these audits, unless DOE-BHG agrees to have the third year audit (required by the MOA) conducted by an ISO accredited registrar. In this case, the cost of the audit will be borne by DOE-BHG.

6.6.2 Execute Registrar Procurement

After successful completion of EMS implementation in their facility, the Management Representative and EMS Project Manager will coordinate the ISO Registration Audit process with a third party registrar. The EMS Project Manager and/or EMS Specialist shall develop the procurement specification for a Registrar, evaluate bids and choose a registrar the deliverable is an ISO 14001 registrar contract. The deliverable is an ISO Certificate for each of the following organizations:

- 6.6.2.1 RHIC
- 6.6.2.2 RO
- 6.6.2.3 EM Directorate
- 6.6.2.4 CAD
- 6.6.2.5 BLIP

7.0 Institutional EMS Program Deployment

Deployment of the Institutional EMS Program is comprised of two major efforts: first, institutional level programs must be deployed as designed and documented in the EMS Requirements Documents, and second, the balance of facilities must implement the EMS program requirements. This WBS provides an overview of each of the seventeen elements and how BNL will deploy that element. In some cases, simple links to other related activities within this project management plan will suffice in describing the deployment of the requirements, in other cases descriptions of additional activities to ensure implementation will be provided.

The majority of the activities in this WBS relate to EMS implementation in the non-pilot facilities at BNL. EMS deployment throughout the balance of the Laboratory will be phased in, Directorate by Directorate. By developing a uniform management system for each Directorate, augmented with facility specific procedures as required, implementation costs can be reduced. In addition, a uniform management system within each Directorate will increase the likelihood that systems conform, as determined by an independent assessor. Therefore, it was proposed and accepted that each ALD establish an EMS within their Directorate that is consistent with the Institutional EMS Program requirements and be uniformly implemented in the Departments/Divisions that they manage.

Facility implementation teams will be responsible for implementing the institutional EMS program, documenting facility/project specific EMS protocols, training employees, and implementing all related BSA management system initiatives. EMS project personnel are responsible for guiding the deployment of the institutional programs, providing technical assistance to the EMS working groups, and approving required facility EMS documentation.

7.1 Deploy Policy

In addition to the activities associated with establishing the BNL Environmental Policy (WBS 2.1), the Environmental Policy will be deployed through the Communications initiatives (WBS 4.2) and the Training initiatives (WBS 5.8).

7.2 Deploy Environmental Aspects/Impacts

In addition to the activities associated with establishing Environmental Aspects/Impacts (WBS 2.2), the Aspects/Impacts process will be reevaluated and improved as part of the planned improvements to the institutional program (WBS 8.1). In addition, EMS requirements pertaining to identifying aspects/impacts will be delivered to the ISM Project Manager Work Planning Experiments Safety Review procedures to ensure uniform implementation.

7.3 Deploy Legal & Other Requirements

Legal and other requirements, once established, are required to be maintained and kept up to date, triggering revisions to Institutional Program Requirements (ie., ESH standards/subject areas) depending on the revision to the regulations. Under the current staffing and capabilities of the Environmental Services Division responsible for legal and other requirements, the mechanism to keep apprised on changing regulations will be via a subcontract to a commercial (paralegal) firm. This WBS includes the activities with procuring this service. It includes developing a specification, requesting proposals, evaluating bids, and selecting a vendor. The Environmental specialists in the Environmental Services Division are responsible for the tasks in this WBS. If additional internal procedures are required to execute this service, ESD will develop them. The deliverables are a specification and a final contract for services and any internal procedure needed.

7.4 Deploy Objectives/Targets

This WBS describes the activities associated with participating in the Laboratory wide Critical Outcomes, Performance Objectives and Performance Measures process and representing the interests of the EMS project to ensure that ISO/EMS requirements are fulfilled.

7.4.1 Develop Guidance Document for EMS Performance Measures Process

7.4.2 Issue Performance Measures Guidance on SBMS Subject Area

7.4.3 Review FY 99 Performance Objectives/measures Process

Due to the timing of the PBMS and Critical Outcomes process, the FY 99 objectives/targets process does not benefit from following an established ISO conforming process (not scheduled for completion until 12/98). The PBMS Project

manager is responsible for coordinating and facilitating the process to establish the FY 99 objectives/targets and documenting the final Institutional level performance objectives/measures. The EMS project manager will review the proposed objectives & targets and flow-down process to ensure that the goals of the BNL EMS are represented (establishment of EMS, regulatory compliance, pollution prevention, and community outreach). The expected deliverable is FY 99 objectives/targets that are consistent with EMS goals.

7.4.4 Monitor FY 00 Performance Objectives/Measures Process

This cycle of deploying objectives/targets will adhere to ISO requirements. The EMS Project manager and/or EMS specialist and Environmental specialists are responsible for participating on a Laboratory working group that is coordinated and facilitated by the Performance Based Management Project Manager or designee. The environmental representatives are responsible for ensuring that the process to establish environment-related objectives and targets is consistent with the ISO requirements. The PBMS Project manager is responsible for documenting the annual objectives and targets. The EMS project manager is responsible for reviewing the objectives/targets and approving that they meet the EMS Program requirements. The expected deliverable is the annual institutional level environmental objectives and targets for FY 00.

7.4.5 Develop and Document Environmental Performance Objectives/Measures Development Process

The Environmental Subject matter Experts are responsible for developing and documenting a process for establishing annual performance objectives that: (1) meet ISO requirements, (2) includes line input, (3) includes stakeholder interest, and (4) supports the environmental policy commitments.

7.5 Deploy EM Program

The Environmental Management program will be deployed both at the facility level (refer to WBS 3.2.[1-3].2) and at the institutional level. This WBS describes the activities at the institutional level.

7.5.1 Establish Institutional FY 99 EM-Program

This WBS establishes the Institutional level EMS EM program by integrating and prioritizing related environmental initiatives at BNL in support of the critical outcomes, performance objectives and performance measures. Open MSIP compliance initiatives are considered as well as new programs and initiatives such as Phase II and Phase III projects, Facility Review, and others. An action plan with milestones and target dates is developed. The projects are incorporated into the Management Plan after obtaining approval and resource commitment. Responsibility is assigned for tasks and activities, and implementation is tracked and reports on its status are provided to management. Project Managers are responsible for establishing project plans and seeking

management approval. The Environmental Services Division is responsible for establishing the operational plans for compliance initiatives. The Management Plan project manager is responsible for integrating and tracking these project plans within the Laboratory Management Plan. The expected deliverables are project charters, project management plans, and commitment authorizations and/or ADS' for authorized environmental projects in FY 99.

7.5.2 Integrate MSIP Environmental Program Initiatives

Environmental compliance initiatives identified in the MSIP but not completed shall be integrated into the Laboratory Management Plan. The initiatives that are ongoing include:

- Historical Data Review (which is linked to the groundwater management plan)
- Facilities Review
- Environmental Radiation Protection
- NY State Title V
- Rad waste Liability Survey

The Management Planning Project Manager is responsible for transferring these projects from the MSIP into the Management Plan. The assigned project manager for each of these initiatives is responsible for re-authorizing the project (or terminating it) and tracking it to completion. The expected deliverable is a reassigned WBS and re-authorized project charter/plan.

7.5.3 Deploy CY 99 Pollution Prevention Program

After establishment of the Pollution Prevention subject area in SBMS and completion of the Phase II high priority process evaluations, a P2 working group will be convened to evaluate pollution prevention opportunities and establish CY 00 projects and actions to take. The Phase II Project Manager will be responsible for convening the working group (ECRs, Line Managers, EMS Specialist, P2 Coordinator), evaluating potential projects, prioritizing the initiatives, and seeking funding and authorization for the CY 00 P2 projects. The expected deliverable is an action plan identifying P2 initiatives for CY 00.

7.5.4 Deploy CY 00 Pollution Prevention Program

After establishment of the Pollution Prevention subject area in SBMS and completion of the Phase II high priority process evaluations, a P2 working group will be convened to evaluate pollution prevention opportunities and establish CY 00 projects and actions to take. The Phase II Project Manager will be responsible for convening the working group (ECRs, Line Managers, EMS Specialist, P2 Coordinator), evaluating potential projects, prioritizing the initiatives, and seeking funding and authorization for the CY 00 P2 projects. The expected deliverable is an action plan identifying P2 initiatives for CY 00.

7.5.5. Establish Institutional FY 00 EM Program

This WBS establishes the Institutional level EMS EM program by integrating and prioritizing related environmental initiatives at BNL in support of the critical outcomes, performance objectives and performance measures in accordance with protocols established under the Integrated Planning System. Open MSIP compliance initiatives are considered as well as new programs and initiatives such as Phase II and Phase III projects, Facility Review, and others. An action plan with milestones and target dates is developed. The projects are incorporated into the Management Plan after obtaining approval and resource commitment. Responsibility is assigned for tasks and activities, and implementation is tracked and reports on its status are provided to management. Project Managers are responsible for establishing project plans and seeking management approval. The Environmental Services Division is responsible for establishing the operational plans for compliance initiatives. The Management Plan project manager is responsible for integrating and tracking these project plans into the Laboratory Management Plan. The expected deliverables are project charters, project management plans, and commitment authorizations and/or ADS' for authorized environmental projects in FY 00.

7.5.1 Develop Laboratory Wide System to Track Environmental Projects and Activities via OMS-MP

This WBS links the compilation and tracking of Environmental Management Programs to other initiatives within the PBMS and Integrated Planning System that support environmental performance objectives and performance measures, such as Communications and Trust, Operational Excellence and Environment and Clean-up to enable alignment and balance in priorities and focused effort in key areas for improvement. The Management Plan Project Manager is responsible for integrating these initiatives in the BNL Management Plan. The respective project managers are responsible for obtaining management authorization, and tracking and reporting on their progress.

7.6 Deploy EMS Structure and Responsibility

In addition to the activities associated with establishing the BNL EMS Structure and Responsibility identified in WBS 2.6, these requirements will be deployed in the following related WBS:

- the EMS Documentation element (WBS 2.9),
- Facility Deployment (WBS 3.2.[1-3].1 and WBS 7.18.[2-11].1),
- EMS Training Initiatives (WBS 5.0), and
- the laboratory-wide PBMS R2A2 process.

7.7 Deploy Training, Awareness and Competency

In addition to the activities associated with establishing the EMS Program requirements for Training, Awareness and competency (WBS 2.7), training initiatives are described in detailed and/or linked to WBS 5.0.

7.8 Deploy EMS Communications

In addition to the activities associated with establishing the EMS Program Requirements for Communications (WBS 2.8), communications initiatives are described in detail in the following WBS:

- Communications Initiatives (WBS 4.0)
- Facility Deployment (WBS 3.2.[1-3].4 and WBS 7.18.[2-11].4),
- The laboratory wide Strategic Communications Plan

7.9 Deploy EMS Documentation

In addition to the activities associated with producing the EMS Documentation (WBS 2.9). This WBS includes activities associated with using the EMS Web site as a temporary storage while SBMS is created, and the approval steps for Laboratory EMS documentation. Additional initiatives are described in detail within the Standards Based Management System Project Plan regarding web page development, database queries, and other documentation services provided by SBMS. The deliverables are EMS subject areas, approved by the Laboratory Director and issued on SBMS.

7.9.1 Create EMS Index

This document identifies facility level environmental documents, procedures and records that are required by and used in the BNL EMS in an easy to reference index. The index will include the documents for the Institutional EMS program elements and be linked to the Program Description Document.

As the EMS project is implemented in each of the Laboratory directorates, the EMS Index will be amended to include the facility and/or project level documentation. The EMS Project Team is responsible for contributing the information to create this document; the EMS Specialist is responsible for compiling this into an index.

7.10 Deploy Document Control

In addition to the activities associated with establishing the EMS Document Control requirements (WBS 2.10), additional related activities are described in detail in Facility Deployment (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2). Request for QM system steward to conduct training will be deliverable.

7.11 Deploy Operational Controls

In addition to the activities associated with establishing the EMS Program Requirements for Operational Controls (WBS 2.11), additional related initiatives are described in detail in the following WBS:

- Facility Deployment (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2).
- Phase II Process Evaluation Project
- Integrated Safety Management Project (experimental safety review and work planning)

In addition, EMS requirements pertaining to operational controls will be delivered to the ISM Project Manager Work Planning Experiments Safety Review procedures to ensure uniform implementation.

7.12 Deploy Emergency Preparedness and Response

As Phase II high priority process evaluations are complete, the EMS Project Team member from the EP Team will coordinate the evaluation of aspects/impacts and operational controls information gathered during the Phase II process and revisions of the following as needed:

- F/R Run books
- Local Emergency Plans
- Local Emergency Plan ESH Standard

In addition, the EMS Project Team member from the EP Team shall coordinate the execution of a drill with an environmental impact as the scenario. The EP Team member is responsible for coordinating the drill with laboratory personnel and critiquing the performance and lessons learned. The expected deliverables are:

- Revision of Run Books and LEPs as needed to reflect environmental scenarios, and
- Documented emergency drill critique with lessons learned and corrective actions as applicable, including revised procedures.

Also included in this effort is the incorporation of facility level requirements for Local Emergency Plans, revision of the Fire/Rescue Run books to reflect any additional hazards identified during the Phase II process evaluations, and the review and testing (i.e., drills) of Department Local Emergency plans.

Related initiatives can be referenced in the Facility Deployment section of this WBS (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2).

7.13 Deploy Monitoring and Measurement

This WBS includes the following tasks to ensure that current data reporting protocols are executed as designed:

- update environmental monitoring plan with new monitoring requirements,
- deliver EMS requirements to QMO for training on calibration subject area,

- document the process for collecting and reporting performance measure data, and
- develop facility monitoring data report.

In addition to the activities associated with establishing the EMS Program Requirements for Monitoring and Measurement (WBS 2.13), additional related initiatives are described in detail in the following WBS:

- Facility Deployment (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2).
- Management Review (WBS 2.17 and 7.17)
- Integrated Monitoring Initiative
- Environmental Protection Office Environmental Monitoring Plan and the resultant Site Environmental Report

7.14 Deploy Nonconformance and Corrective/Preventive Action

To ensure consistent implementation, this task includes a request for the QMO to conduct training on this subject area. In addition to the activities associated with establishing the EMS Program Requirements for Nonconformance and Corrective/Preventive Action (WBS 2.14), additional related initiatives are described in detail in the following WBS:

- Facility Deployment (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2).

7.4 Deploy Records

To ensure consistent implementation, this task requests the management system steward to conduct training on this subject area. In addition to the activities associated with establishing the EMS Program Requirements for Records (WBS 2.15), additional related initiatives are described in detail in the following WBS:

- Facility Deployment (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2).
- Integrated Monitoring Initiative

7.16 Deploy Environmental Auditing

In addition to the activities associated with establishing the EMS Program Requirements for Environmental Auditing (WBS 2.16), additional related initiatives are described in detail in the following WBS:

- Facility Deployment (WBS 3.2.[1-3].5 and WBS 7.18.[2-11].5).
- Assessment Initiatives (WBS 6.0)
- Integrated Assessment Program

7.17 Deploy Management Review

In addition to the activities associated with establishing the EMS Program Requirements for Management Review (WBS 2.17), additional related initiatives are described in detail in the following WBS:

- Facility Deployment (WBS 3.2.[1-3].2 and WBS 7.18.[2-11].2).
- Performance Based Management System Initiative

Two cycles of management review will be performed during the project. The EMS Project manager will coordinate with the Performance Based Management System Project Manager and ALD for ES&H/Q annual reviews and reporting of the EMS performance to the Integration Council. The EMS Project Manager will be responsible for coordinating the reviews consistent with the EMS program requirements and compiling related information. The PBMS will coordinate the compilation of performance data related to the critical outcomes. The ALD ES&H/Q will be responsible for conducting the Management Review meeting in a method consistent with the EMS program requirements. The expected deliverables are two cycles of documented management review minutes.

7.18 Facility Deployment

7.18.1 Apply Lesson Learned From Pilot Projects

This WBS references the lessons learned sessions (WBS 3.2.[1-3]4) conducted as part of the Pilot facility Deployment and subsequent improvements made to the Facility Implementation Plans that will be used to guide the deployment of the EMS throughout the balance of the Laboratory.

7.18.2 Template for Facility Deployment in Laboratory Directorates

Based on the lessons learned from pilot facilities, a generic task list was developed identifying the tasks that were performed in order to develop and implement an ISO-conforming EMS. This list provides the task description associated with each of the Level IV WBS elements assigned to each of the Directorates to complete their EMS implementation. In addition, this list was formatted in a manner that, when completed and submitted in accordance with the reporting schedule, satisfies the progress reporting requirements identified in the Project Support WBS. Refer to Table A for a copy of the task list and a description of the required tasks.

Environmental Management Directorate

- Environmental Restoration Division Department (*Elements of the following implementation plan may vary due to the fact that this department will be merged into a pre-existing, ISO Registered EMS Program established within the EM Directorate*),
- BGRR Project (*Elements of the following implementation plan may vary due to the fact that this project will be merged into a pre-existing, ISO Registered EMS Program established within the EM Directorate*)

- 7.18.2.1 Project Planning
- 7.18.2.2 Program Implementation
- 7.18.2.3 Train Employees
- 7.18.2.4 Communicate EMS Initiative
- 7.18.2.5 Assess Readiness

Directorate: _____

TABLE A

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
			10/30/99				
1.1	Establish EMS Team/R2A2						
1.2	Establish Cost Accounting System						
1.3	Define facilities/projects included in pilot						
1.4	Conduct Gap Analysis						
1.5	Review Phase II Evaluation						
1.6	Augment Tasks (section 2.0) with facility specific Action Plan						
			5/30/00				
2.1	Policy			0%			
2.1.1	post policy plaque						
2.1.2	review and revise (or purge) Div/Dept level documents that refer to old ESH Policy						
2.2	Aspects/Impacts			0%			
2.2.1	Review Phase II Process Evaluations to determine aspects/impacts						
2.2.1.1	perform additional evaluations to ensure all processes addressed						
2.2.2	Review Facility Review Items						
2.2.2.1	disposition as either: phase II process; labwide program; facility review project; past activity; operational activity						
2.2.3	Execute BNL aspects/impacts procedure						
2.2.4	Establish Div/Dept protocol/methodolgy for maintaining up-to-date						
2.2.5	Review all applicable subject areas, identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.2.6	review/revise (or purge) Div/Dept documents(ie., Work planning & Ctrl's; Exp. Safety Review; ESH Committee procedures; etc) and incorporate Phase II process evaluations and Aspects/Impacts procedure as appropriate						

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.3	Legal and Other Requirements			0%			
2.3.1	Identify/link/document applicable subject areas for each Phase II process and provide information into Ph 2 database						
2.3.2	Coallate Div/dept specific permit or regulatory requirements/conditions documents						
2.3.3	Subscribe to SBMS subscription service for all EMS related documents/manuals						
2.3.4	Assign responsibility/establish Div/Dept procedure for managing updates/changes to requirements and communicating within organization						
2.3.5	communicate/distribute regulatory requirements(subject areas) to relevant organizational members						
2.3.6	Review all applicable subject areas, identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.3.7	review and revise (or purge) Div/Dept level documents that refer to legal/other requirements						
2.4	Objectives and Targets			0%			
2.4.1	Identify critical outcomes/objectives/measures applicable to Div/Dept						
2.4.2	Link CO/O/PM to significant aspects (phase II process)			0%			
2.4.2.1	address policy commitments (compliance, pollution prevention, cleanup, community outreach, and/or continual improvement) as appropriate						
2.4.2.2	address needed E improvements identified during Dept/Div self assessment						
2.4.3	determine reasonable targets (quantity/timeframe) for Div/Dept specific processes						
2.4.4	Coordinate and integrate deployment of EMS objectives/target with labwide process for CO/O/PM						

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.4.5	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.4.6	review and revise (or purge) Div/Dept level documents that refer to objectives/targets						
2.5	Environmental Management Program			0%			
2.5.1	develop action plans to achieve objectives/targets			0%			
2.5.1.1	address Facility Review operational issues and Phase II process evaluation issues						
2.5.1.2	verify that dept/div objectives are addressed						
2.5.1.3	obtain management and resource commitments						
2.5.1.4	document action plans on EMP form(s)						
2.5.2	Coordinate and integrate deployment of labwide Management Planning process with EMS EM Program action plans			0%			
2.5.2.1	incorporate business plans and ADS's						
2.5.2.2	develop EM Plan for activities related to achieving EMS Conformance						
2.5.3	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.5.4	review and revise (or purge) Div/Dept level documents that refer to management planning of Environmental activities						
2.6	Structure and Responsibility			0%			
2.6.1	assign responsibilities to staff as required by ISO 14001 (see cross matrix)						
2.6.2	for EMS						
2.6.3	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.6.4	review and revise (or purge) Div/Dept level documents that refer to structure/responsibility of Environmental activities						
2.6.4.1	dept/div organization charts and documents to reflect E and EMS structure/responsibility (ECR/EMS Rep, etc						
2.6.4.2	R2A2 for dept/div staff to include EMS related responsibilities and communicate appropriately						
2.7	Training			0%			
2.7.1	assign EMS JTAs to relevant personnel						
2.7.2	incorporate E and EMS training requirements into dept/div training program						
2.7.3	verify competence of personnel based on their satisfying education, training and/or experience requirements						
2.7.4	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.7.5	review and revise (or purge) Div/Dept level documents that refer to E training and qualification						
2.8	Communication			0%			
2.8.1	establish Dept/Div contact point and responsibilities for processing CCTS requests						
2.8.2	acquire training on CCTS						
2.8.3	establish internal communication channels (amongst people involved with significant aspects) for:			0%			
2.8.3.1	legal requirements						
2.8.3.2	structure and responsibilities						
2.8.4	add "EMS Implementation- status & issues" to managers meeting agenda						

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.8.5	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.8.6	review and revise (or purge) Div/Dept level documents that refer to communications						
2.9	EMS Documentation			0%			
2.9.1	write facility specific appendix to BNL EMS Manual						
2.9.2	write index of facility specific procedures						
2.9.3	write list of organizational contacts for EMS elements						
2.9.4	Review lab-level EMS Manual, identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.9.5	review/revise (or purge) existing E program description documents						
2.10	Document Control			0%			
2.10.1	identify key Dept/Div E documents (associated with significant aspects that need to be controlled)-procedures, program description documents, etc.						
2.10.2	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.10.3	execute Document Control subject area for key Dept/Div E documents						
2.10.4	review and revise (or purge) Div/Dept level documents that refer to document control						
2.11	Operational Control			0%			
2.11.1	complete analysis of existing operational controls (engineered and administrative) for each process that has significant aspect and document on operational control form			0%			

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.11.1.1	include references to existing procedures, training, documents, etc						
2.11.1.2	identify gaps and institute needed operational controls						
2.11.2	identify and formally communicate requirements to suppliers/contractors performing work on processes that have a significant aspect						
2.11.3	establish and maintain documented procedures as required to ensure:			0%			
2.11.3.1	compliance requirements are met						
2.11.3.2	pollution prevention techniques are considered and performed						
2.11.3.3	operating limits and criteria are stipulated						
2.11.3.4	requirements are communicated to suppliers and contractors						
2.11.4	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.11.5	review and revise (or purge) Div/Dept level documents that refer to operational controls						
2.11.6	execute procedures (training, communications, perform, etc)						
2.12	Emergency Preparedness and Response			0%			
2.12.1	Review Local Emergency Plan			0%			
2.12.1.1	verify conformance to ESH Standard And Spill Response Subject Area						
2.12.1.2	incorporate actions required to prevent significant environmental impact						
2.12.1.3	update postings as needed						
2.12.1.4	identify and replenish supplies required to perform mitigative actions						
2.12.2	Conduct drill with environmental consequence						

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.12.2.1	verify training status of LEC, 1st responders, awareness, Emg Response personnel and update as needed						
2.12.3	Update run books with facility specific environmental hazard information (from phase 2 evaluations)						
2.12.4	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.12.5	review and revise (or purge) Div/Dept level documents that refer to emergency preparedness and response						
2.13	Monitoring and Measurement			0%			
2.13.1	identify monitoring related to processes that can have significant impact on environment			0%			
2.13.1.1	consider effluent, emissions, usage, releases, control equip efficiency, and tracking performance on objectives/targets						
2.13.1.2	determine responsible party (ESD/WMD, facility support, OPMPs, dept/div)						
2.13.1.3	establish agreement (E FUA) for sample collection, analysis and data reporting						
2.13.1.4	support/implement agreement, review results, and make corrections when needed						
2.13.2	identify calibration requirements (instrument, process, frequency) for instrumentation used to monitor effluents/emissions			0%			
2.13.2.1	determine responsible party (ESD/WMD, facility support, Instrumentation Group, dept/div)						
2.13.2.2	establish agreement for calibration and recordkeeping						
2.13.2.3	support/implement agreement, review results, and make corrections when needed						

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.13.3	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.13.4	review and revise (or purge) Div/Dept level documents that refer to monitoring/measurement and/or calibration						
2.13.5	perform regulatory compliance assessment as described in Environmental Assessments Subject Area (refer to #16)						
2.14	Nonconformance and Corrective/Preventive Action			0%			
2.14.1	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.14.2	establish process and communicate responsibility for identifying and handling E NCR within Dept/Div						
2.14.3	use NCR system to document/track gaps in EMS implementation						
2.14.4	incorporate CA/PA in procedure revisions						
2.14.5	emphasize use of system to employees						
2.14.6	review and revise (or purge) Div/Dept level documents that refer to nonconformance & Corrective/preventive actions						
2.15	Records			0%			
2.15.1	identify key Dept/Div E records (associated with significant aspects that need to be controlled)--[see operational controls form]						
2.15.2	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.15.3	execute records management subject area for key Dept/Div E records						
2.15.4	review and revise (or purge) Div/Dept level documents that refer to records management						
2.16	EMS Audits			10%			
2.16.1	incorporate EMS/Regulatory Compliance audit into Dept/Div Self Assessment Plan						
2.16.2	conduct EMS audit			0%			
2.16.2.1	assign responsibility for Environmental Assessments and acquire training						
2.16.2.2	document findings, communicate to management, identify corrections, and track to closure						
2.16.3	conduct Regulatory Compliance audit (see item #13)			0%			
2.16.3.1	assign responsibility for Environmental Assessments and acquire training						
2.16.3.2	document findings, communicate to management, identify corrections, and track to closure						
2.16.4	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.16.5	review and revise (or purge) Div/Dept level documents that refer to environmental assessments/integrated						
2.17	Management Review			0%			
2.17.1	Review all applicable subject areas (or other lab-wide requirement document), identify gaps between current operations and requirements, and make corrections to dept/div operations						
2.17.2	compile information for management review meeting						
2.17.3	conduct meeting for senior dept/div management						
2.17.4	document decisions made and/or actions identified at meeting						

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
2.17.5	incorporate Environmental Management Review process with Integrated Assessment Program (evaluation of performance)						
2.17.6	review and revise (or purge) Div/Dept level documents that refer to environmental assessments/integrated assessment program						
2.18	Integrate Directorate EMS			0%			
2.18.1	objectives and targets						
2.18.2	EM program						
2.18.3	structure and responsibility						
2.18.4	training						
2.18.5	EMS Documentation						
2.18.6	Monitoring and Measurement						
2.18.7	Environmental Assessments						
2.18.8	Management Review						
			3/30/00				
3.1	EMS Team Training						
3.2	General Environmental Protection Training						
3.3	Job Specific EMS Training						
3.4	EMS Management Overview Training						
3.5	Internal EMS Assessor Training						
3.6	Update Records						
			4/30/00				
4.1	Conduct Division Kickoff Meeting						
4.2	Give EMS presentations						
4.3	Brief staff on audits						
			6/30/00				
5.1	Execute Self Assessment						
5.2	Participate in I/O Office Assessment						
5.3	Participate in DOE Annual Audit						
5.4	Obtain Registration, (if required)						

Directorate: _____

Reporting Date: _____
 Reporting Period: _____

TASK ID	TASK DESCRIPTION	LEAD	SCHEDULED COMPLETION DATE	% COMPLETE	REVISED COMPLETION DATE	ACTUAL COMPLETION DATE	Hours Expended*
			6/30/00				
6.1	Track Project Performance Measures (costs/schedule)						
6.2	Report Progress (monthly; EMS Project Mgr, Mgmt, Senior Mgmt)						
6.3	Administer change control of Facility Implementation Plan						
6.4	Attend EMS Project Meetings						
6.5	Provide status updates to Management						

*This column provides a method for tracking hours expended on EMS tasks if timecards are not used.

7.18.2.6 Project Support

7.18.3 Facility and Operations Directorate

- Plant Engineering Division
- Safeguards and Security Division
- Central Shops

7.18.3.1 Project Planning

7.18.3.2 Program Implementation

7.18.3.3 Train Employees

7.18.3.4 Communicate EMS Initiative

7.18.3.5 Assess Readiness

7.18.3.6 Project Support

7.18.4 Basic Energy Sciences Directorate

- Chemistry Department
- NSLS Department
- Center for Neutron Science

7.18.4.1 Project Planning

7.18.4.2 Program Implementation

7.18.4.3 Train Employees

7.18.4.4 Communicate EMS Initiative

7.18.4.5 Assess Readiness

7.18.4.6 Project Support

7.18.5 RHIC Directorate

- CAD Department (*Elements of the following implementation plan may vary due to the fact that this is a new department (AGS and RHIC Project) will be merged into a pre-existing, ISO Registered EMS Program established in RHIC Project*),
- Semiconducting Magnet Division

7.18.5.1 Project Planning

7.18.5.2 Program Implementation

7.18.5.3 Train Employees

7.18.5.4 Communicate EMS Initiative

7.18.5.5 Assess Readiness

7.18.5.6 Project Support

7.18.6 Life Sciences Directorate

- Biology Department
- Medical Department

7.18.6.1 Project Planning

7.18.6.2 Program Implementation

7.18.6.3 Train Employees

- 7.18.6.4 Communicate EMS Initiative
- 7.18.6.5 Assess Readiness
- 7.18.6.6 Project Support

7.18.7 Applied Science & Technology Directorate

- Department of Applied Science
- Department of Advanced Technology
- Economic Development and Technology Transfer

- 7.18.7.1 Project Planning
- 7.18.7.2 Program Implementation
- 7.18.7.3 Train Employees
- 7.18.7.4 Communicate EMS Initiative
- 7.18.7.5 Assess Readiness
- 7.18.7.6 Project Support

7.18.8 Environment, Safety & Health/Quality Directorate

- Emergency Services Division
- Environmental Services Division –
- Occupational Medicine Division
- Radiological Control Division
- Safety and Health Services Division
- Independent Oversight Office
- Performance Based Management and Integrated Assessment Program
- Quality Management Office
- Standard Based Management System and Integrated Safety Management Program
- Training and Qualifications Office

- 7.18.8.1 Project Planning
- 7.18.8.2 Program Implementation
- 7.18.8.3 Train Employees
- 7.18.8.4 Communicate EMS Initiative
- 7.18.8.5 Assess Readiness
- 7.18.8.6 Project Support

7.18.9 Directors Office

- Community Involvement & Public Affairs Directorate
- Directors Office

- 7.18.9.1 Project Planning
- 7.18.9.2 Program Implementation
- 7.18.9.3 Train Employees
- 7.18.9.4 Communicate EMS Initiative
- 7.18.9.5 Assess Readiness
- 7.18.9.6 Project Support

7.18.10 Finance & Administration Directorate-

- Contracts & Procurement Division
- Information Services Division
- Budget Office
- Administrative Support Division
- Financial Services Division

- 7.18.10.1 Project Planning
- 7.18.10.2 Program Implementation
- 7.18.10.3 Train Employees
- 7.18.10.4 Communicate EMS Initiative
- 7.18.10.5 Assess Readiness /
- 7.18.10.6 Project Support

7.18.11 High Energy and Nuclear Physics Directorate

- Physics Department,
- Center for Accelerator Physics
- Instrumentation Division

- 7.18.11.1 Project Planning
- 7.18.11.2 Program Implementation
- 7.18.11.3 Train Employees
- 7.18.11.4 Communicate EMS Initiative
- 7.18.11.5 Assess Readiness /
- 7.18.11.6 Project Support

8.0 EMS Program Improvement

8.1 Improve Institutional EMS Program

This WBS describes the activities related to the following:

- Evaluating need for policy changes, based on management review decisions and expanded inventory of aspects/impacts
- Review/revision of Aspects/Impacts protocol to incorporate balance of Phase II processes and assessment of natural resource usage (including land use) in impact analysis
- Review/revision of Legal and Other Requirements to incorporate changes in regulations in Environmental Standards/subject area documents
- Review/Revision of Objectives and Targets with respect to expanded inventory of aspects and impacts
- Review/revision of management review process by seeking input from participants and incorporating suggesting for improvement.

The EMS Project Manager is responsible for coordinating the evaluation of each of the above improvements and respective EMS Project Team member is responsible for

revising the affected EMS documents appropriately. The expected deliverable is revised EMS Documentation, as applicable.

8.2 Improve EMS Program

This WBS references the lessons learned sessions that will be conducted after facility deployment to improve the EMS Program. Institutional related EMS documents will be revised as applicable to incorporate lessons learned. The respective EMS Project Team member is responsible for revising the affected EMS documents appropriately. The expected deliverable is revised EMS Documentation, as applicable.

8.3 Improved Environmental Training Program

The EMS Project Trainer will be responsible for developing a General Employee Environmental Continuing Training course. The course is intended to be provided in an effective and efficient medium, address revisions to regulatory and EMS requirements, and documented and piloted in accordance with BNL training policy. Once the course is finalized, the EMS Project Trainer will excerpt material from this course to be used to revise the BNL General Employee Training and Contractor/Vendor Orientation courses (or others if deemed appropriate) and providing it to the OSH Training Group. The OSH Training Group is responsible for updating these courses. [Other EMS Training is also referenced in WBS 5.0]

The EMS Project Trainer will evaluate the transferability of the facility specific training modules, developed during laboratory deployment of the EMS, to the laboratory training programs such as GERT/Radiation Worker I Course, or other related courses such as HazCom, Lab Standard, etc. If applicable, the appropriate sections of the facility specific lesson plans will be provided to the OSH Training Group who will be responsible for updating these courses.

Future improvements of the EMS Program will be the responsibility of the EMS Management System Owner.

9.0 EMS Project Transition/ Closeout

The activities associated with this element include transition of responsibility from EMS project personnel to management system owners and line management, and development of final project report. EMS project personnel will be responsible for revising R2A2 as required and writing the final project report.

A transition plan leading to project closeout will be developed to effectively transfer responsibility from the EMS project manager to the responsible management system owner. Including will be steps necessary to achieve site-wide ISO registration by the end of FY 01. The EMS Project manager, with assistance from EMS Project personnel, is responsible for submitting a final project report and transition plan.

Staff who are involved with this project will be released and reassigned to their respective line managers when the deliverables they are responsible for are received, reviewed and approved.

10. Project Support

Project support activities include the overall management and control of the project including schedule, resources (personnel), and funding. This element also includes reporting progress to the Laboratory Director through the ALD for ESH&Q, and to DOE-BHG Point of Contact.

10.1 Track and Report Progress

Actual work progress will be routinely monitored and compared to established cost, schedule and technical baselines to determine if significant deviations are occurring from planned work and if these deviations will impact project deliverables or milestones. To accomplish this, the following activities will be conducted by Project Controls Support personnel:

- Track project progress and compare against baseline data on a routine (bimonthly for first six months, then monthly) basis.
- Collect level of effort and cost data as available in accordance with routine reporting schedule and provide periodic variance analysis based on Budgeted Cost of Work Scheduled for each EMS program element.
- Monitor trends in cost and schedule variance to determine need for corrective action or revised estimate rates.
- Report exceedances of variance threshold and changes in estimate at complete to ALD ESH&Q.

During scheduled project status, update meetings, the project manager and support personnel will present and review project status and review scheduled project activities for the upcoming two months. Refer to WBS 10.2 and 10.4 for other project performance reporting mechanisms.

The expected deliverable is routine (as scheduled) project controls reports. The EMS Project Team members will be responsible for submitting timely reports on project status and updating project management databases as appropriate. The EMS Project Controls support personnel will be responsible for generating these reports. The EMS Project Manager will be responsible for interpreting the data, acting on any variances, and reporting status to management

10.2 Status Reports to Management

Successful achievement and monitoring of project goals and objectives will be through regular communication of project performance, variance to baseline assumptions, along with a projection or forecast of actual project data applied to balance of project activity.

This communication is important for the project and stakeholders to accurately understand and affect the status and performance of the project.

Project team personnel will provide routine written summaries of their milestone progress and a description of any issues that the Project Manager should be made aware that may impact cost or schedule. This internal summary should consist of:

- Bullet list of project progress highlights,
- Notification to EMS Project Manager and/or project controls personnel of variance to scheduled milestones. Also as determined by project controls staff,
- Baseline Change Proposal if necessitated, including updated schedule, estimate, milestone schedule, and revised WBS dictionary if affected.
- The milestone deliverables for the assigned EMS program element
- A summary of hours spent in the assigned WBS element, in accordance with the project baseline.
- An explanation of variances.
- Discussion of problems and corrective actions planned or taken.

These reports will be submitted by the Project Team personnel to the EMS Project Manager in accordance with reporting schedule. The Project Manager will deliver the EMS project report to the ESD Manager on a bimonthly schedule.

10.3 Administer Change Control of Project Management Plan

This project plan including all attachments represents the project baseline for conducting the EMS project. As is the case for most projects, during the course of the project the potential exists for the project scope, resources, and schedule to change considerably as assumptions, parameters, or performance change. This project plan has been established to insert the appropriate management control points into the project process in order to identify the scope changes or project trends as soon as possible, and rectify them (if possible) by taking action to successfully address the change.

A Baseline Change Proposal (BCP) will be implemented according to the management authorization matrix in the PMP. The baseline change process identifies what magnitude of scope, resource, and schedule change necessitates approval by project participants or stakeholders.

The Management Planning Project manager is responsible for developing a baseline change procedure. The EMS project personnel are responsible for implementing that procedure on tasks they are assigned when a baseline change is in order. The EMS Project manager is responsible for approving and processing all baseline changes. The expected deliverable is the required documentation as defined in the baseline change procedure.

10.4 Bimonthly Meetings/Quarterly Progress Reports to Management

Bimonthly meetings with the DOE-BHG EMS Point of Contact will be held to facilitate communication of project progress. Quarterly status updates will be held for DOE-BHG and BNL Senior Managers (Level 0 – 2). These progress reports will include:

- Progress highlights
- Milestone progress
- Cost summary
- Major problems or concerns
- Corrective Actions.
- Variances for cost and schedule.

The EMS Project manager is responsible for coordinating and delivering the reports on the schedule established. The Management Representative on EMS is responsible for contributing material for the meeting and delivering status updates on their directorates progress as scheduled. The expected deliverable is the report.

10.5 Provide Periodic Reports to EPA/stakeholders

As requested, the EMS Project Manager, with assistance from EMS project personnel as appropriate, will provide updates and/or overviews of the BNL EMS Project to the extent that it does not impact project schedule and milestones. EPA updates will be scheduled on a semi-annual basis. The expected deliverable is a record of the presentation and a description of the audience members. All presentations with EPA/stakeholders will be coordinated through DOE-BHG. The EMS Project Manager will also notify the CIGPA.



APPENDIX 4

EMS Implementation and Resource
Model

BNL EMS PROJECT
DIRECTORATE IMPLEMENTATION PLAN AND RESOURCE ESTIMATES

WBS	Description	Resources (hrs)				WBS Tasks, Assumptions, Comments, and Level of Effort	Estimated Subtotal*	
		Adm Div Base	Base	Facility Specific	Pilot Only		Adm Div Base	Base
1	Project Planning							
1.1	Establish EMS Team/R2A2	24	24			mgmt meeting; id team members; two intro meetings		
1.2	Establish Cost Accounting System	8	8			integrate with facility accounting; explain record keeping reqmts		
1.3	Define facilities/projects included in pilot	8	8			define scope, applicability of EMS to facility operations/projects		
1.4	Develop Implementation Plan	32	32			customize prototype implementation plan		
1.5	Conduct Gap Analysis	33	33			2 people/2days		
1.6	Conduct Phase II Evaluation		8			evaluate Phase II recommendations for incorporation into EMS implementation plan		
1.7	Develop Action Plan for WBS 2.0, Program Implementation	32	32			refine & focus implementation plan based on gap analysis & Phase II recommendations		
1.8	Review/Test Institutional Level Program Requirements				100	assume 5 tests at 20 hrs per test	\$ 6,850	\$ 7,250
2	Program Implementation (facility & project level)							
2.1	Environmental Policy	4	4			emails/training/div mtg	\$200	\$200
2.2	EMS Planning							
2.2.1	Aspects and Impacts	24	32	2 * # proc		integrate w/ ISM (8 hrs); eval Phase II reports (2 hrs per process), inventory of all aspects (16 hrs), internal SOP (8hrs)		
2.2.2	Legal & Other Requirements	24				integrate w/ ISM (8 hrs), inventory of env reqmts (16 hrs), internal SOP		

BNL EMS PROJECT
DIRECTORATE IMPLEMENTATION PLAN AND RESOURCE ESTIMATES

WBS	Description	Resources (hrs)				WBS Tasks, Assumptions, Comments, and Level of Effort	Estimated Subtotal*	
		Adm Div Base	Base	Facility Specific	Pilot Only		Adm Div Base	Base
2.2.3	Objectives and Targets	16	16	4* # proc		integrate w/PBMS (8hrs), team with ops/wkr/P2 to get buyin (4hrs per process); EMS Team documents env obj/targ & presents to mgmt (8hrs)		
2.2.4	EM Program	16	36	6* # proc		integrate w/ PBMS & ISM (16 hrs), internal SOP (8hrs); workshop to develop EM pgm plan (2 people from each high priority process for 3 hrs, including a SME); 4hrs prep for workshop & 8 hrs for doct/approv plan	\$ 4,000	\$ 9,400
2.3	EMS Implement and Operation							
2.3.1	EMS Structure & Responsibility	8	16	1.5* # proc		integrate w/ PBMS (8 hr), SOP (8 hr), review R2A2 of proc personnel (assume 3 positions per process@ .5 each)		
2.3.2	Training and competency	12	12	1.5* # proc		update training plan (12 hr) and JTAs for high priority process personnel (0.5 hrs per position, assuming 3 positions per process)		
2.3.3	Communications	0	8			internal SOP (8 hr)		
2.3.4	EMS Documentation	40	74			description of facility specific EMS elements (40hrs) and directory of EMS related documents (2 hrs per EMS element * 17 elements= 34 hrs)		
2.3.5	Document Control	4	12			internal SOP (8 hr) and id env records (4hr)		

BNL EMS PROJECT
DIRECTORATE IMPLEMENTATION PLAN AND RESOURCE ESTIMATES

WBS	Description	Resources (hrs)				WBS Tasks, Assumptions, Comments, and Level of Effort	Estimated Subtotal*	
		Adm Div Base	Base	Facility Specific	Pilot Only		Adm Div Base	Base
2.3.6	Operational Control	16	24	8* # proc		integrate w/ ISM (8hrs); internal SOP for each process (8 hrs each); evaluate supplier/contractor reqmts (8 hrs) & internal SOP for supplier/contractor reqmts (8hrs)		
2.3.7	Emergency Preparedness and Response	21	21	.5*# empl		conduct drill (0.5 hr per empl plus 5 hrs of ESS personnel); prepare for drill & post drill review (8 hrs); local emerg plan review & revision (8 hrs)	\$ 8,225	\$ 14,825
2.4	Checking and Corrective Action							
2.4.1	Monitoring and Measurement	16	16	12 * # proc		integrate w/ISM & PBMS (16hrs); 1 SOP for each high priority process (8 hr) incorporating calib needs (2 hr) and data tracking method (2 hr)		
2.4.2	NCR and Corrective/Preventive Action	0	8			internal SOP		
2.4.3	Records	0	8			internal SOP		
2.4.4	Environmental Audits	20	20			integrate w/ IAMS (8hrs); develop schedule & protocol for env. Audits(12 hrs)		
2.5	Management Review	40	60			integrate w/PBMS (8hrs), 40 hrs to prepare (20 hrs for administrative div to prepare); 2 hr mgmt rev meeting with 6 mgrs	\$ 3,800	\$ 9,200
3	Train Employees							
3.1	EMS Team Training	80	128			assumes 4 in team (8hr implem training; 24 auditor training (assume only 2 people in administrative div to be trained as auditor)		

BNL EMS PROJECT
DIRECTORATE IMPLEMENTATION PLAN AND RESOURCE ESTIMATES

WBS	Description	Resources (hrs)				WBS Tasks, Assumptions, Comments, and Level of Effort	Estimated Subtotal*	
		Adm Div Base	Base	Facility Specific	Pilot Only		Adm Div Base	Base
3.2	General Employee Environmental Training	8	8	1 * # empl		1 hr training course for all employees, 8 hours to make notifications & track employee attendance		
3.3	Facility Specific EMS Training	0	16	2*(3*# proc) + 4*(3*# proc)		assumes 3 positions per process; 2 hr facility specific training course; and 4 hrs per position to document competency; 16 hours to prepare facility specific training module		
3.4	Update Records	2	4			enter env training records into BTMS	\$ 10,850	\$ 19,550
4 Communicate EMS Initiative								
4.1	Conduct Division Kickoff Meeting	8	8	1*#empl		prepare for Division mtg (8 hr); one hr meeting		
4.2	Give EMS presentations	8	8			Mgmt Rep on EMS prepares communique for Div employees (4 communique; 2 hrs preparation each)		
4.3	Participate in Lessons Learned Workshop (2)	8	8		8	2 workshops at 4 hrs each		
4.4	Provide Lessons Learned to Laboratory personnel				8	pilot facilities give presentations to Lab depts/div on lessons learned	\$ 7,550	\$ 7,550
5 Assess Readiness								
5.1	Execute Self Assessment	168	280			2 auditors, 5 days for both compliance and EMS audit, 10 days of ops personnel involvement; 10 days to prep and write report; 5 days to respond (assume administrative div conducts audit in 3 days)		

BNL EMS PROJECT
DIRECTORATE IMPLEMENTATION PLAN AND RESOURCE ESTIMATES

WBS	Description	Resources (hrs)				WBS Tasks, Assumptions, Comments, and Level of Effort	Estimated Subtotal*	
		Adm Div Base	Base	Facility Specific	Pilot Only		Adm Div Base	Base
5.2	Participate in I/O Office Assessment	168	168			2 auditors, 3 days for both compliance and EMS audit, 6 days of ops personnel involvement; 6 days to prep and write report; 3 days to respond		
5.3	Participate in DOE Annual Audit	32	32			2 days of being audited; 1 day to respond; 1 day for debriefings.		
5.4	Obtain Registration				320	\$30K registration costs; plus preparations, previsit review, onsite audit, audit response.	\$ 18,400	\$ 24,000
6 Project Support								
6.1	Track Project Performance Measures (costs/schedule)	120	120			3 days per quarter to prepare 4 reports plus 3 days to prepare final report		
6.2	Report Progress (monthly; EMS Project Mgr & Mgmt)	120	120			1 day per month to prepare 12 monthly reports; plus 3 days to prepare final report		
6.3	Administer change control of Facility Implementation Plan	40	40			assume 10 changes at 4 hrs each	\$ 14,000	\$ 14,000
TOTALS		1160	1484	52 hrs/proc; 3.5 hrs/emp	436		\$ 73,875	\$ 105,975
*Resource estimates assume a generic Directorate with 127 employees & 6 high priority processes (the labwide mean)								

BNL EMS PROJECT
DIRECTORATE/DEPARTMENT PROGRAM IMPLEMENTATION COSTS

DEPT	# empl	# proces ses	Facility Specific (hrs)	Base (hrs)*	Pilot Only (hrs)	TOTAL (hrs)	Registr	\$\$ For Dept EMS	\$\$ for ALD EMS	Assumptions
RHIC	369	10	1811.5	1484	436	3731.5	30,000	\$216,575	\$ 216,575	
REACTOR	103	8	776.5	1484	436	2696.5	30,000	\$164,825	\$ 164,825	
WMD	22	4	285	1484	436	2205	30,000	\$140,250	\$ 153,300	
ERD/MIO	30	3	261	1484		1745		\$87,250		assume 3 processes
PE	387	14	2082.5	1484		3566.5		\$178,325	\$ 226,450	
SS	75	2	366.5	1484		1850.5		\$92,525		
CS	96	5	596	1484		2080		\$104,000		
CHEM	81	7	647.5	1484		2131.5		\$106,575	\$ 149,850	
NSLS	173	5	865.5	1484		2349.5		\$117,475		
AGS	326	8	1557	1484		3041		\$152,050	\$ 77,850	assume merge w/RHIC
PHYSICS/CAP	236	4	1034	1484		2518		\$125,900	\$ 152,850	
INSTR	50	7	539	1484		2023		\$101,150		
BIO	99	2	450.5	1484		1934.5		\$96,725	\$ 126,125	
MED	64	7	588	1484		Figure 5		#VALUE!		
DAS	153	10	1055.5	1484				\$0	\$ 198,675	
DAT	191	9	1136.5	1484				\$0		
CCD/EDTT	85		297.5	1160				\$0		
ESHSD	147	1	566.5	1484				\$0	\$ 107,425	
QMO/IO	5		17.5	1160				\$0		
OCC MED	23		80.5	1160		1240.5		\$62,025		
CIPA	32		112	1160		1272		\$63,600	\$ 92,125	assume part of DO
DCP/BUDGET/FIN SVCE	105		367.5	1160		1527.5		\$76,375	\$ 122,925	
TID	46	3	317	1484		1801		\$90,050		
ADMIN SUPP	116	4	614	1484		2098		\$104,900		
DO/HR/LEGAL/INT AUDIT	163		570.5	1160		1730.5		\$86,525		
avg	127.1	5.9				2186.4		#VALUE!	\$ 71,559	
TOTAL HOURS						41542			35779.5	
TOTAL FTE						20.8			17.9	
TOTAL DOLLARS								#VALUE!	\$1,788,975	

*Operational facilities require 1484 hrs; administrative div requires 1160 hrs.