OFFICE OF SCIENCE
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Chicago Office

Brookhaven Site Office
Integrated Safety Management System
Review Plan For
Brookhaven National Laboratory

July 27, 2004

Brookhaven Site Office (BHSO)
Integrated Safety Management System (ISMS) Review Plan For
Brookhaven National Laboratory (BNL)

1.0 Introduction

This review plan outlines the scope and approach for conducting a review of elements of the BNL ISMS. The review is conducted at the request of Michael Holland, Manager Brookhaven Site Office (BHSO), to provide the management of BHSO with an independent assessment of the Laboratory's performance and as an input into BHSO's annual assessment of the overall status of the Laboratory's ISMS. The review will be lead by Safety and Technical Services (STS) technical staff from the Office of Science Chicago Office (CH). Team members will be from BHSO, CH, and other DOE and SC contractor personnel. This review will be conducted consistent with DOE P 450.4, *Safety Management System Policy*, DOE P 450.5, *Line Environment, Safety, and Health Oversight,* DOE G 450.4-1B, *Integrated Safety Management System Guide*, dated March, 2001, and the Office of Independent Oversight and Performance Assurance Environment, Safety, and Health Appraisal Process Guide (March 2003). The scope and approach for this review was developed from a review of recent occurrences and internal (BNL) and external (DOE) analysis of injuries.

2.0 Purpose

The purpose of this review is to assess specific work activities and organizations for their conformance to BNL's ISMS and it's compliance with DOE requirements: Worker Injuries, Hoisting and Rigging, Electrical Safety, and the Chemistry Department are the three activities and one organization selected for this review. Worker Injuries and Hoisting and Rigging are areas where BNL's recent safety performance has not indicated positive trends. Electrical Safety is an area where the Department has had a recent increase in occurrences and near misses. The Chemistry Department was selected to provide an opportunity to assess a BNL organization's implementation of BNL's ISMS. This information will serve as an input to the BHSO management for its overall annual assessment of the Laboratory's performance in safety and ISM.

3.0 Scope

The scope and approach for this review was developed from a review of recent occurrences and internal (BNL) and external (DOE) analysis of injuries, reportable and non-reportable incidents, and BHSO Management input. Based on reviews of occurrences reported in the DOE Occurrence Reporting and Processing System (ORPS), the *Analysis of Selected Brookhaven National Laboratory Integrated Safety System Performance Indicators, dated December 5, 2003, the BNL Occurrence Reporting & Processing System (ORPS) Quarterly Performance Analysis and Summary, 4th Quarter CY 2003*, the *Report of the Committee Investigation of the Category "R" Recurring Occurrence (CH-BH-BNL-2004-0005), dated May 20, 2004,* and BHSO Management input, this ISM review will concentrate on the following areas.

- **Worker Injuries:** The review is to assess BNL's program to investigate worker injuries, identify corrective actions, and ensure corrective actions are effective in reducing the probability of recurrence. Emphasis will include BNL's process of analysis of systematic factors and corrective actions to reduce the higher than the DOE average injury rates. The assessment shall also identify if there have been any specific recurring types of incidents.

- **Chemistry Division:** The review is to assess the Chemistry Division's implementation of institutional requirements for planning work, identifying and maintaining work controls, with a focus on institutional and division management accountability for continuous improvement. Areas to be addressed include experimental review, chemical hazards and electrical safety. The assessment shall include a review of the effectiveness of the corrective actions completed within the Chemistry Department as well as those site-wide which were the result of the September 2003 laser injury.

- **Electrical safety:** The review is to assess BNL's implementation of electrical safety institutional requirements through division and project activities. A focus area shall be the adequacy of BNL's planning and execution of work which has the potential of involving electrical hazards. The effectiveness of completed corrective actions from previous electrical safety incidents shall be reviewed.

- **Hoisting and Rigging:** The review is to assess the adequacy of implementation of the institutional requirements of the hoisting and rigging program. Emphasis shall be on the planning, training, and execution of work involving incidental hoisting and rigging use. The effectiveness of the corrective actions from the "R" (recurring) investigation of BNL's hoisting and rigging operations shall be included.

4.0 Prerequisites

BNL has agreed to provide access for review team members to visit and observe all relevant site facilities and activities, interview Laboratory personnel, and review pertinent documents and records. Documents and records include: ISMS and ES&H document hierarchy, internal (BNL) self-assessments, external (DOE) assessments, BNL's R2A2s (Roles, Responsibilities, Accountabilities, and Authorities), training records, occurrence reports, injury reports, and corrective actions plans including their status with closure documentation.

5.0 Approach

Criteria and Review Approach Document (CRAD)

This ISMS review CRAD was developed based on the guidance in DOE P 450.4, *Safety Management System Policy*, DOE P 450.5, *Line Environment, Safety, and Health Oversight,* DOE G 450.4-1B, *Integrated Safety Management System Guide*, dated 03/01/01 and the Office of Independent Oversight and Performance Assurance Environment, Safety, and Health Appraisal Process Guide. This CRAD and the topical ISMS Assessment Forms were written to facilitate evaluation of an existing ISMS

program and supporting documentation and processes against the continuing core expectations.

Each ISMS Assessment Form provides the stated objectives for the applicable systems and processes, the criteria for determining if the systems and processes satisfy the objectives, the applicable documents to be reviewed, personnel to be interviewed, and work activities to be observed. Each ISMS Assessment Form will document the results of the document reviews, interviews, and work observations, and cite any resulting issues and strengths.

The review team is divided into four 2-member sub-teams, each comprised of subject matter experts with technical backgrounds, relevant operations and policy experience, and knowledge of ISM. Appendix A contains the four ISMS Assessment Form Worker Injuries, Chemistry Division, Electrical Safety, and Hoisting & Rigging.

6.0 Process

The ISMS review will be conducted to ascertain adherence to, and application of, the core functions and guiding principles of ISM, using the criteria set forth in the BNL's ISMS Program Description https://sbms.bnl.gov/program/pd03/pd03d011.htm and this CRAD. The team will evaluate both the adequacy of the documented ISMS program, supporting documents, and the implementing and integrating mechanisms of their ISMS. Emphasis will be placed on demonstrating how the ISMS integrates ES&H into work planning, execution, and continuous improvement.

The ISMS will be reviewed through evaluation of information gathered from BNL and BHSO documents and records, interviews of personnel at the appropriate levels from management to staff (both scientific and operations support personnel, as appropriate), and observation of on-going work and/or management activities. Problems in the planning, execution of work and in ISM program elements for continuous improvement will be documented in the ISMS Assessment Form.

Factual accuracy as to the content and conclusions of the report will be done according to the schedule outlined in section 11. A schedule and associated dates for the development and finalization of the report, has been developed and agreed to by BHSO Management.

7.0 Evaluation Criteria

Execution of this CRAD and the associated review criteria is to evaluate the adequacy of the ISMS, its associated documents and processes, and to document BNL's current performance in effectively applying the ISMS guiding principles and core functions across the Laboratory. Each team member will assess their assigned areas of the Laboratory's ISMS and determine where issues and strengths exist.

In finalizing team members ISMS Assessment Forms, each sub-team will determine whether the issues and strengths observed are concerns, findings, observations, or noteworthy practices. For the purposes of this review, the following definitions will be used to decide when an issue or strength qualifies as a concern, finding, observation, or noteworthy practice.

Concern: A determination of a programmatic breakdown or widespread problem that is supported by objective evidence in the form of one or more Findings. Concerns can be based on several related Findings or a single Finding that reveals a significant breakdown in safety management. (i.e. The ISMS documentation and institutional processes are not effectively implemented or documented in applicable directives, policies, and requirements.)

Finding: (1) An individual item or group of similar items that do not meet a mandatory requirement. A Finding should be documented with two basic components: a statement of the mandatory requirement and citation, e.g., 29CFR1910.120(a)(1)(ii), and objective evidence demonstrating how the requirement was not met. (2) The ISMS documented processes or procedures do not adequately address the ISMS core safety functions and guiding principles, or integration of ES&H within its work planning needs strengthening to demonstrate effective integration of the ISMS mechanisms that address the core functions and guiding principles at the appropriate work or planning level.

Observation: A condition or practice that does not provide or promote effective protection of the health and safety of the public or DOE's workers or the environment, but is not a violation of regulations, DOE Orders, or site-specific requirements.

Noteworthy Practice: A positive observation, based on objective assessment data, made to commend a particular practice, program, or management system. Mere compliance with mandatory requirements is generally not considered noteworthy.

8.0 Administration

Team Composition and Organization

Thomas M. McDermott, Industrial Hygienist, CH/STS, has been appointed to serve as the Team Leader for the by Michael Holland, the BHSO Manager. The Director of the Department's Safety Management Implementation Team (SMIT), certified Mr. McDermott as an ISMS Verification Team Leader back in 2000. Joe Drago, CH/STS, will serve as Deputy Team Leader. The Director of the Department's Safety Management Implementation Team (SMIT), certified Mr. Drago as an ISMS Verification Team Leader back in 2000.

Team members have been selected based upon the following criteria established in the DOE *ISMS Verification Team Leader's Handbook*:

- knowledge, understanding, and training on Integrated Safety Management,
- established expertise in one or more functional areas,
- appraisal experience, and
- familiarization with the site/facility mission and processes.

Brief team member Bios will be reviewed by the ISMS Review Team Leader and documented in the member Bio Summaries provided in Appendix B of this plan.

9.0 Preparation

Preparation is considered vital to producing a robust and credible review. Team members are required to prepare for this review through the following:

1. Read/study:
   - The structure of BNL SBMS Institutional Requirements
   - Pertinent BNL Division/Department implementing procedures and policies
   - DOE ORPS reports for BNL since 2003
   - DOE CAIRS reports for BNL since 2003
   - BNL Office of Quality Management, *Occurrence reporting and processing System (ORPS) Quarterly Performance Analysis and Summary, 4th Quarter CY 2003*
   - Relevant BHSO and BNL assessments
   - BNL *Report of the Committee Investigation of the Category "R" Recurring Occurrence (CH-BH-BNL-2004-0005), dated May 20, 2004*
   - *Review of the Brookhaven National Laboratory Laser Safety Program, September 29 - October 10, 2003.*

2. Preparation of team member's Bios. The ISMS Team Leader reviewed the qualifications of team members prior to selection.

3. Attend any site specific orientation and applicable safety training.

10.0 Site Coordination and Support

DOE BHSO and the BNL staff will be available to assist the team and provide support as needed during the review. Larry Hinchliffe of BHSO and Steven Hoey and Roy Lebel of BNL will be the principal points-of-contact for the ISMS review team. The Laboratory can assign additional points-of-contact to work with the review ISMS team members and facilitate the review. These points-of-contact will coordinate interviews, gather requested documentation and records, assist with access to facilities, and aid in the factual accuracy review of the final report.

The BHSO and/or BNL will provide workspace, meeting room, computers and printer, telephones, photocopy machine, and other office support for the review team. Access to, and needed copies of, the BNL's ISMS and ES&H documentation will be provided.

11.0 Schedule

The ISMS review team leader, in conjunction with the BHSO and BNL point of contact have established and committed to the following schedule.

ISMS Review Activity or Milestone	Lead	Date
(1) Develop preliminary scope to include activities and/or organizations to be reviewed and perspective team members and assignments	McDermott	June 18th
(2) Finalize scope and approach document and submitted to team members	Drago & Hinchliffe	July 2nd
(3) Develop and submit CRADs to team members for comment 1. ID Relevant Documents (imbed direct reference to pertinent BNL documents or processes in CRADS) • SBMS access – have CRADs reference institutional requirements • Division or Facility specific requirements • Corrective actions and management commitments from previous assessments and investigations where applicable 2. Team members expected to review SBMS and review documents provided prior to arriving on-site	McDermott & Hinchliffe	July 23rd
(4) Finalize CRADs	McDermott	July 28th
(5) On-Site Review	McDermott	August 9-12th
(6) CRADs completed by team members	All	August 12-13th
(7) BHSO Management out-brief	McDermott & Team	August 13th
(7) Off-site Video-conferencing Close out • Scope and approach • Concerns, Findings, Observations • Status of ISM Functions and Principles	McDermott	August 20th
(8) Draft report to BHSO	McDermott & Drago	September 10th
(9) Factual accuracy by BHSO and BNL	Hinchliffe	September 10th-17th
(10) Final report issued to BHSO	McDermott	September 24th

During the review, the daily schedule will include an end of the day open team meeting. At this meeting, the team members will present emerging issues, and concerns, discuss information to be passed on to other team members for follow-up; and request any assistance or advice they may need. Team members will briefly describe their planned next day activities, and confirm their scheduled interviews and work observations or facility tours. The assigned points-of-contact/counterparts from BHSO and BNL should attend this meeting. The purpose of the afternoon team meeting is to provide a forum for sharing information/observations amongst the team in order to better develop and understand any issues that result from the review and inform the team, BHSO and BNL off all emerging issues.

On August 13, 2004, the review team leader and team will present a briefing on the preliminary results to the BHSO Manager and staff and selected BNL management and staff. This briefing will identify issues and discuss any preliminary Concerns, Findings, or Observations and Noteworthy Practices. On August 20th, a video conference will be held to formally present to BHSO and BNL Management the identified Concerns, Findings, Observations, Noteworthy Practices and Conclusions. A draft report of the ISMS review will be submitted to the BHSO on September 10th for factual accuracy with the final report delivered to the BHSO Manager by September 24th.

Appendix A
ISMS Assessment Forms

ISMS ASSESSMENT FORM
WORKER INJURIES

Objective: Assess the laboratory's process for understanding the causes and development of effective corrective actions for incidents which have resulted in worker injuries or illnesses. Review the roles and responsibilities of line mangers, support personnel and workers who are involved in the incident as well as the adequacy of the investigation, development of corrective actions of such incidents, and the verification of their effectiveness. Review line management's understanding of the Laboratory's and division/department policies and procedures for working safely. Assess the Laboratory's process and implementation of identification and analysis of hazards, establishment of work controls including work planning, procedural adherence, and implementation of lessons learned both from previous work and current work activities.

1. Line Management Responsibility for Safety

Guiding Principle #1: *"Line Management Is Directly Responsible for the Protection of the Public, Workers, and the Environment."*

a. Criterion 1: Policy and Expectations

Safety policies and goals are documented, and initiatives are in progress to improve worker health and safety. Review Laboratory-wide and sample program/division initiatives. Assess the adequacy of documented BSA management expectations in policies specific to worker injury response, analysis, and prevention. Review BSA performance goals for managers, employees and divisions. Conduct interviews with department/division personnel about performance goals.

b. Criterion 2: Leadership

Line management demonstrates a commitment to protect the public and workers. Line management proactively demonstrates a leadership position in guiding their line organizations, subcontractors, and workers toward integrated safety management. Review Laboratory-wide and sample program/division performance metrics and conduct interviews of senior and middle managers. Determine what, if any, specific actions (and their drivers) were taken by line management related to worker injuries. Review Departmental "Safety Improvement Plans" for actions related to worker injury programs.

c. Criterion 3: Worker Empowerment

Contractor line managers recognize that active participation by workers is essential to maintain and improve protection of the public and workers. Conduct interviews of middle management and workers to ascertain level of participation to work planning and evaluation of events to improve performance. Review documents and interview personnel to ascertain the mechanism for workers to easily provide information to management; interview workers to determine their understanding of these mechanisms.

2. Clear Roles and Responsibilities

Guiding Principle #2: *"Clear Lines of Authority and Responsibility for Ensuring Safety Shall Be Established and Maintained at All Organizational Levels Within*

the Department and Its Contractors."

a. **Criterion 1: Clear Lines of Authority and Responsibilities**
Line management defined, documents and maintains clearly delineated roles and responsibilities for worker health and safety that provide a foundation for effectively integrating safety into site wide operations. Interview work managers/supervisors and workers to determine their understanding of their authorities and responsibilities for performing work safety. Review BSA documents for inclusion of specific staff and division requirements related to workplace injuries (evaluation, prevention, etc.). Interview personnel to determine the adequacy and understanding of their R2A2s regarding BSA safety goals and the communication to staff.

b. **Criterion 2: Defined Responsibilities and Accountability**
Line managers are responsible and accountable for ensuring that DOE facility operations and work practices are performed in a manner that adequately protects the public, workers, and the environment. Review roles, responsibilities and authorities and accountabilities (R2A2s) of senior managers, middle managers, foremen, and workers regarding safety and then select individuals of organizations that have had worker illnesses and injuries for interviews

c. **Criterion 3: Accountability for Performance**
Line managers are accountable for safety performance through performance objectives and appraisal systems. Performance is explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers execute actions to attain and continuously improve the safety of their operations. Conduct interviews with Human Resources, line managers and supervisors on accountability for performance. Review the process and conduct selected interviews on how the information is fed back to BSA management. Assess whether the information is being effectively used by management to improve overall performance.

3. **Competence Commensurate with Responsibilities**
Guiding Principle #3: *"Personnel Shall Possess the Experience, Knowledge, Skills, and Abilities That Are Necessary To Discharge Their Responsibilities."*

a. **Criterion 1: Staffing and Qualifications**
Line managers and staff demonstrate a high degree of technical competence and a good understanding of programs and facilities. Review SBMS and R2A2s as appropriate for select positions (ESH Managers, work supervisors, critique leaders & investigators). Conduct interviews with senior managers, facility managers, principal investigators, building managers, as appropriate. Perform a sampling of training records. Review incidents reports to determine whether staffing and/or qualification were causal factors in worker injuries.

b. **Criterion 2: Technical Competence**

Workers and managers are technically competent to perform jobs and are appropriately educated and knowledgeable of hazards, vulnerabilities, and risks. Review training records and JTAs for personnel performing hazardous work. Conduct interviews with senior managers, facility managers, principal investigators, building managers, as appropriate. Review incidents reports to determine whether technical competence was a causal factor in worker injuries. Review training records of personnel who have performed incident investigations. Assess the adequacy of the accident investigator training.

4. Define the Scope of Work and Balanced Priorities

Guiding Principle #4: *"Resources Shall be Effectively Allocated To Address Safety, Programmatic, and Operational Considerations. Protecting the Public, the Workers, and the Environment Shall Be a Priority Whenever Activities Are Planned and Performed."* Core Function #1: *"Missions are Translated Into Work, Expectations are Set, Tasks Identified and Prioritized, and Resources are Allocated."*

a. Criterion 1: Translate Mission into Work; Set Expectations

Contractors use defined mechanisms to define the scope, schedule and cost of work and to identify and communicate associated risks and hazards. Review the work processes and compare expectations in SBMS and division/department procedures for conformance as well as recent events.

b. Criterion 2: Provide for Integration

ES&H functions and activities are integrated into program, activity, and work planning at all levels of the line organization. Review SBMS and division/department procedures that demonstrate that ISM is integrated into activities. Conduct interviews of a cross-cut of personnel for their level of understanding. Assess whether job planners/supervisors/foremen are integrating the appropriate safety staff into the work planning process. Select current work activities and determine level of ESH involvement in job review and planning.

c. Criterion 3: Project Prioritization and Resource Management Systems

Contractor line managers at appropriate levels within the organization understand and synthesize program goals and risks in order to effectively deploy resources to adequately address both. Review Laboratory's process to achieve safety program targets. Evaluate the performance of the worker injury management program (recordkeeping, data analysis, feedback mechanisms, etc.) for lab-wide and departmental programs. Review incidents reports to determine whether staffing and support were causal factors in worker injuries.

5. Identification of Safety Standards and Requirements and Analyze the Hazards

Guiding Principle #5: *"Before Work Is Performed, the Associated Hazards Shall Be Evaluated and an Agreed Upon Set of Safety Standards Shall Be Established That, if Properly Implemented, Will Provide Adequate Assurance That the Public, the Workers, and the Environment Are Protected from Adverse Consequences."*

Core Function #2: *"Hazards associated with the work are identified, analyzed and categorized."*

a. **Criterion 1: Hazards Analysis and Work Planning**
Prior to the initiation of work, line management identifies, analyzes, and categorizes the hazards associated with the work activity so that the appropriate administrative and engineering controls can be put in place to prevent or mitigate those hazards. Review work processes from SBMS and division/department procedures and compare with recent events and observations.

b. **Criterion 2: Identification of Standards and Requirements**
Line management has identified, communicated, executed, and monitored all applicable DOE requirements, and Federal, state, and local regulations. Review SBMS and division/department for omissions that may have been factors in recent events. Assess the subject areas for clarity and technical adequacy.

6. Hazard Controls Tailored to Work Being Performed; Develop and Implement Hazard Controls
Guiding Principle #6: *"Administrative and Engineering Controls To Prevent and Mitigate Hazards Shall Be Tailored to the Work Performed and Associated Hazards."* Core Function #3: *"Applicable Standards and Requirements are Identified and Agreed Upon, Controls to Prevent/Mitigate Hazards are Identified, the Safety Envelope Established, and Controls are Implemented."*

a. **Criterion 1: Identify Controls to Prevent/Mitigate Hazards**
Line management has established processes for identifying and tailoring controls for hazards associated with all facilities, operations and activities. Review Laboratory's process for identifying and tailoring controls that may have been less than adequate in recent incidents and resulted in injuries.

b. **Criterion 2: Establish Safety Controls**
Hazard controls are established based on the understanding of the hazards, vulnerabilities, and risks in the work environment (e.g., nuclear, radiological, chemical, industrial, physical, and natural phenomena). Review Laboratory's process for establishing safety controls that may have been less than adequate in recent incidents and resulted in injuries.

c. **Criterion 3: Implement Controls**
Line management has established methods to implement controls at every level and which ensure that controls remain in effect as long as hazards are present. Review Laboratory's investigations and conduct observations to determine if implementation of controls has been less than adequate in recent incidents.

7. Operations Authorization; Perform Work Within Controls
Guiding Principle #7: *"The Conditions and Requirements to be Satisfied for Operations Initiated and Conducted Shall Be Clearly Established and Agreed-*

Upon." Core Function #4: *"Readiness is Confirmed and Work is Performed Safely."*

a. Criterion 1: Confirm Readiness
Line management has established and implemented processes to confirm that a facility or work process/activity, as well as the work force, are in an adequate state of readiness prior to authorizing the performance of work. Review the Laboratory's process for assuring that work preparation is adequate. Conduct work observation and review documentation at work site. Review recent events to determine whether readiness was a causal factor resulting in injuries.

b. Criterion 2: Operations Authorization
Line management has assumed the responsibility for ensuring that all operations are authorized at a level commensurate with the hazards and has established work authorization processes for both facility- and activity-level operations. All work activities, including maintenance modifications, are subject to authorization based on appropriate review of the preparation and readiness to perform work. Review work processes and sample documentation from activities observed in the field. Review events to determine whether proper authorization was a causal factor.

c. Criterion 3: Perform Work Safely
Line managers are responsible for implementing programs in compliance with defined requirements. Line managers ensure that contractors, and subcontractors execute defined requirements in such a manner that employees, the public, and the environment are protected from adverse consequences. Conduct interviews with senior managers, division directors, supervisors, foreman and workers on procedural compliance and their understanding of the effectiveness of the SBMS and division/department implementation procedures. Review reports to determine when procedural compliance was a factor in injuries.

8. Provide Feedback and Continuous Improvement
Core Function #5: *"Feedback Information on the Adequacy of Controls is Gathered, Opportunities for Improving the Definition and Planning of Work are Identified and Implemented, Line and Independent Oversight is Conducted, and, If Necessary Regulatory Enforcement Actions Occur"*

a. Criterion 1: Assessment and Measurement of Performance for Continuous Improvement
Line management has established formalized mechanisms and processes (at the institutional, facility/project, and activity levels) for collecting both qualitative and quantitative information on worker illness and injury performance as the basis for informed management decisions to improve safety performance through assessments, performance measures, and other feedback mechanisms. Conduct interviews with senior and middle managers on the investigation and subsequent tasks associated with injury and illness cases. Review reports for technical adequacy. Evaluate the adequacy of the

BSA have injury performance measures that assess program performance and improvement. Determine if the injury performance measures are documented and clearly communicated. Evaluate the effectiveness of BNL requirements for routine analysis of worker injury data to identify areas for improvement. Review the requirements and mechanisms that BSA uses for information collection, analysis, communication to management and tracking.

b. **Criterion 2: Follow-up and Correction of Safety Management System Deficiencies**
Line management has established a formalized process to capture and track worker injury -related deficiencies and associated corrective actions. Line management has executed mechanisms, such as independent verification and performance-based evaluations, to ensure that corrective actions are timely, complete, and effective. Review Laboratory's process for determining whether the corrective action management system is effective in reducing the probability of repeat events. Sample accident investigation reports and follow-up on corrective action completion and effectiveness. Sample analysis and corrective actions from previous assessments for closure and effectiveness. (Sources of information include Task Force, OSHA findings, etc.)

c. **Criterion 3: Lessons Learned**
Line management has established a method to capture worker injury and illness-related deficiencies, to identify causes and generic applicability, and to disseminate lessons learned within and across organizations. Evaluate process and interview line managers and workers on the use and effectiveness of the lessons learned system.

Concerns:

Findings:

Observations:

Noteworthy Practices:

Records Reviewed:

Personnel Interviewed:

Work Observations:

Signatures:

Maria Dikeakos	Joseph Drago

ISMS ASSESSMENT FORM
CHEMISTRY DEPARTMENT

Objective: Assess the adequacy of institutional safety requirements and the effectiveness of their implementation in Brookhaven National Laboratory's (BNL) Chemistry Department. Assess line management's role in effectively translating institutional requirements into departmental activities, the adequacy of hazard analysis processes and the effectiveness of the department's implementation of these processes. Review and assess Management's efforts in assuring work are perform to within controls and its efforts at continuous improvement. Particular emphasis will be placed on examining the adequacy and sustainability of actions generated to correct identified deficiencies.

1. Line Management Responsibility for Safety

Guiding Principle #1: *"Line Management Is Directly Responsible for the Protection of the Public, Workers, and the Environment."*

a. Criterion 1: Policy and Expectations

Safety policies and goals, including ISM processes, are documented, and initiatives are in progress to improve ES&H programs and processes for ISM. Review departmental policies, goals, and initiatives with respect to accurate and adequate translation of institutional requirements.

b. Criterion 2: Leadership

Line management demonstrates a commitment to protect the public, workers, and the environment. Line management proactively demonstrates a leadership position in guiding the department toward integrated safety management. Review departmental performance metrics, if applicable, and conduct interviews of senior management and principal investigators to assess the effectiveness of their role in promoting safety in the workplace.

c. Criterion 3: Worker Empowerment

Line management recognizes that active participation by workers in work planning and control programs is essential to maintain and improve protection of the public and workers. Interview researchers, supervisors, and support staff to determine the level and effectiveness of employee participation in identifying hazards, working within controls and continuous improvement.

2. Clear Roles and Responsibilities

Guiding Principle #2: *"Clear Lines of Authority and Responsibility for Ensuring Safety Shall Be Established and Maintained at All Organizational Levels Within the Department and Its Contractors."*

a. Criterion 1: Clearly Defined Roles, Responsibilities, and Authorities

Line management defines, documents and maintains clearly delineated roles, responsibilities and authorities for ES&H that provide a foundation for effectively integrating safety into departmental operations. Functions, responsibilities, and authorities are defined, communicated, understood, and implemented for providing direction, analyzing hazards, developing and implementing hazard controls, performing work within controls, collecting feedback, and pursuing improvement. Interview management, principal investigators, support staff and employees to evaluate their comprehension of

the responsibilities they have for safety. Review the roles, responsibilities and authorities and accountabilities (R2A2s) of Department Chair, Group Leaders, Principal Investigators, support staff and employees regarding safety.

b. Criterion 2: Defined Responsibilities and Accountability
Line managers are responsible and accountable for ensuring that DOE facility operations and work practices are performed in a manner that adequately protects the public, workers, and the environment. Review roles, responsibilities and authorities and accountabilities (R2A2s) of senior managers, middle managers, foremen, and workers regarding safety and then select individuals of organizations which have had worker illnesses and injuries for interviews

c. Criterion 3: Accountability for Performance
Line managers are accountable for safety performance through performance objectives and appraisal systems. Performance is explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers execute actions to attain and continuously improve the safety of their operations. Within scheduled interviews, explore the consequences of good and poor safety related performance.

3. Competence Commensurate with Responsibilities
Guiding Principle #3: *"Personnel Shall Possess the Experience, Knowledge, Skills, and Abilities That Are Necessary To Discharge Their Responsibilities."*

a. Criterion 1: Staffing and Qualifications
Line managers and staff demonstrate a high degree of technical competence and a good understanding of programs and facilities. Review a sampling of departmental incident/occurrence reports to determine the extent to which training, experience, and other qualification issues were contributing or root causes.

b. Criterion 2: Technical Competence
Workers and managers are technically competent to perform jobs and are appropriately educated and knowledgeable of hazards, vulnerabilities, and risks. Review institutional and Department qualifications programs and standards as well as processes used to determine training needs and the Departments compliance with internal qualifications and training. Evaluate these technical qualifications, standards or training through scheduled interviews and a review of departmental incident/occurrence reports.

4. Define the Scope of Work; Balanced Priorities
Guiding Principle #4: *"Resources Shall be Effectively Allocated To Address Safety, Programmatic, and Operational Considerations. Protecting the Public, the Workers, and the Environment Shall Be a Priority Whenever Activities Are Planned and Performed."* Core Function #1: *"Missions are Translated Into Work, Expectations are Set, Tasks Identified and Prioritized, and Resources are Allocated."*

a. **Criterion 1: Translate Mission into Work; Set Expectations**
Contractors use defined mechanisms to define the scope, schedule and cost of work and to identify and communicate associated risks and hazards. Review departmental processes that assure work scope for research is adequate and that adequate resources and funding are identified prior to granting operational authority. Review and assess incidents/occurrence reports to assess factors relating to communication of hazards and lessons learned. Explore these factors in scheduled interviews.

b. **Criterion 2: Provide for Integration**
ES&H functions and activities are integrated into program, activity, and work planning at all levels of the line organization. Review departmental procedures for integrating ES&H into research and work activities. Evaluate personnel understanding of integration of safety into activities through scheduled interviews.

c. **Criterion 3: Project Prioritization and Resource Management Systems**
Contractor line managers at appropriate levels within the organization understand and synthesize program goals and risks in order to effectively deploy resources to adequately address both. Review the Chemistry Department's process for prioritization of activities and allocation of safety-related funding.

5. **Identification of Safety Standards and Requirements: Analyze the Hazards**
Guiding Principle #5: *"Before Work Is Performed, the Associated Hazards Shall Be Evaluated and an Agreed Upon Set of Safety Standards Shall Be Established That, if Properly Implemented, Will Provide Adequate Assurance That the Public, the Workers, and the Environment Are Protected from Adverse Consequences."*
Core Function #2: *"Hazards associated with the work are identified, analyzed and categorized."*

a. **Criterion 1: Hazards Analysis and Work Planning**
Prior to the initiation of work, line management identifies, analyzes, and categorizes the hazards associated with the work activity so that the appropriate administrative and engineering controls can be put in place to prevent or mitigate those hazards. Review selected departmental experimental safety reviews and work permits for adequate hazard identification and consideration of institutional safety requirements. Compare work planning documentation with observed departmental activities and evaluate incidents/occurrences for factors relating to hazard identification.

b. **Criterion 2: Identification of Standards and Requirements**
Line management has identified, communicated, executed, and monitored all applicable DOE requirements, and Federal, state, and local regulations in planning and executing work. Evaluate departmental incidents/occurrences for causal factors related to omission of an appropriate standard.

6. **Hazard Controls Tailored to Work Being Performed; Develop and Implement Hazard Controls**

Guiding Principle #6: *"Administrative and Engineering Controls To Prevent and Mitigate Hazards Shall Be Tailored to the Work Performed and Associated Hazards."* Core Function #3: *"Applicable Standards and Requirements are Identified and Agreed Upon, Controls to Prevent/Mitigate Hazards are Identified, the Safety Envelope Established, and Controls are Implemented."*

a. **Criterion 1: Identify Controls to Prevent/Mitigate Hazards**
Line management has established processes for identifying and tailoring controls for hazards associated with all facilities, operations and activities. Review departmental implementation of institutional processes for identifying and tailoring controls. Review departmental incidents/occurrences for factors relating to the identification and tailoring of hazard controls.

b. **Criterion 2: Establish Safety Controls**
Hazard controls are established based on the understanding of the hazards, vulnerabilities, and risks in the work environment (e.g., nuclear, radiological, chemical, industrial, physical, and natural phenomena). Review selected departmental experimental safety reviews and work permits for the establishment of appropriate controls. Evaluate incidents/occurrences for factors relating to inadequate safety controls.

c. **Criterion 3: Implement Controls**
Line management has established methods to implement controls at every level and which ensure that controls remain in effect as long as hazards are present. Review the departmental processes for implementing safety controls. Examine incidents/occurrences for deficiencies relating to effective implementation of controls.

7. Operations Authorization; Perform Work Within Controls
Guiding Principle #7: *"The Conditions and Requirements to be satisfied for Operations initiated and Conducted Shall Be Clearly Established and Agreed-Upon.* Core Function #4: *"Readiness is Confirmed and Work is Performed Safely."*

a. **Criterion 1: Confirm Readiness**
Line management has established and implemented processes to confirm that a facility or work process/activity, as well as the work force, are in an adequate state of readiness prior to authorizing the performance of work. Review the adequacy of Chemistry Department work control processes that assure readiness. Observe research/work activities and review the associated documentation. Include readiness factors in an examination of departmental incidents/occurrences.

b. **Criterion 2: Operations Authorization**
Line management has assumed the responsibility for ensuring that all operations are authorized at a level commensurate with the hazards and has established work authorization processes for both facility- and activity-level operations. All work activities, including maintenance modifications, are subject to authorization based on appropriate review of the preparation and readiness to perform work. Examine a sampling of experimental safety

reviews and work permits for the proper level of authorization. Verify that observed activities have appropriate authorizations in place. Review incidents/occurrences for adequate levels of authorizations.

c. Criterion 3: Perform Work Safely
Line managers are responsible for implementing programs in compliance with defined requirements. Line managers ensure that contractors, and subcontractors execute defined requirements in such a manner that employees, the public, and the environment are protected from adverse consequences. Observe research/work activities and note the level of compliance with institutional safety requirements. Explore Chemistry Department oversight of compliance in scheduled interviews with the department chair, principal investigators, support staff and employees. Evaluate the contribution of any procedural non-compliance to departmental incidents/occurrences.

8. Provide Feedback and Continuous Improvement
Core Function #5: *"Feedback Information on the Adequacy of Controls is Gathered, Opportunities for Improving the Definition and Planning of Work are Identified and Implemented, Line and Independent Oversight is Conducted, and, If Necessary Regulatory Enforcement Actions Occur"*

a. Criterion 1: Assessment and Measurement of Performance for Continuous Improvement
Line management has established formal mechanisms and processes for collecting both qualitative and quantitative information on ES&H performance. This information is collected and used effectively as the basis for informed management decisions to improve safety performance through assessments, performance measures, and other feedback mechanisms. Review Chemistry Department processes for collecting and assessing safety-related performance (e.g., the Tier I Inspection Program). Interview departmental management and safety support personnel to determine the effectiveness and uses for gathered information.

b. Criterion 2: Follow-up and Correction of Safety Management System Deficiencies
Line management has established a formalized process to capture, evaluate, and track to resolution ES&H-related issues and deficiencies and associated corrective actions. Line management has executed graded mechanisms, such as independent verification and performance-based evaluations to ensure that corrective actions and recurrence controls are timely, complete, and effective. Review departmental incidents/occurrences and any previous assessments (e.g., Laser Accident Investigations) for the effectiveness and sustainability of corrective actions. Examine records for the occurrence of similar incidents, or the recurrence of issues. Explore the usefulness and effectiveness of identified corrective actions with departmental personnel.

c. Criterion 3: Lessons Learned
Line management has established formal methods to identify deficiencies and noteworthy practices with generic applicability, disseminate these

lessons learned within and across organizations, and incorporate them into procedures and work control documents for subsequent work activities. Evaluate departmental processes for implementing the lessons learned system through scheduled interviews and review of incidents/occurrences and corrective actions.

Concerns:

Findings:

Observations:

Noteworthy Practices:

Records Reviewed:

Personnel Interviewed:

Work Observations:

Signatures:

Larry Hinchliffe	Nancy Hammond

ISMS ASSESSMENT FORM
ELECTRICAL SAFETY

Objective: Assess the institutional and department/division electrical requirements, policies, procedures, and work practices for both professional and incidental activities by reviewing the roles and responsibilities of line mangers, support personnel and workers who are involved in these activities, as well as, the adequacy of compliance with institutional and/or Department/Division qualifications, training requirements, and inspection requirements. Assess the causal analysis process and development and implementation of corrective actions for incidents which have resulted in the ORPS "recurring" category. Review the roles and responsibilities of line mangers, support personnel and workers who are involved in the incidents, as well as, the adequacy of the investigation, development of corrective actions, and the verification process of corrective action effectiveness. Assess line management's understanding of the Laboratory and division/department policies and procedures for working safely. Focus in on the adequacy of electrical requirements and policies within SBMS and how it flows down into lower tiered procedures with concentration on; the planning of electrical work, the implementation of effective hazards controls, and performance of work within those controls.

1. **Line Management Responsibility for Safety**
   Guiding Principle #1: *"Line Management Is Directly Responsible for the Protection of the Public, Workers, and the Environment."*

   a. **Criterion 1: Policy and Expectations**
      Electrical policies and goals are documented, and initiatives are in progress to improve electrical safety. Review laboratory-wide and department/division initiatives.

   b. **Criterion 2: Leadership**
      Line management demonstrates a commitment to protect the public and workers from electrical incidents. Line management proactively demonstrates a leadership position in guiding their line organizations, subcontractors, and workers toward integrated safety management. Review Laboratory-wide and department/division performance metrics and conduct interviews of senior and middle managers.

   c. **Criterion 3: Worker Empowerment**
      Contractor line managers recognize that active participation by workers is essential to maintain and improve the electrical program. Conduct interviews of middle management and workers to ascertain level of participation to improve performance.

2. **Clear Roles and Responsibilities**
   Guiding Principle #2: *"Clear Lines of Authority and Responsibility for Ensuring Safety Shall Be Established and Maintained at All Organizational Levels Within the Department and Its Contractors."*

   a. **Criterion 1: Clear Lines of Authority and Responsibilities**
      Line management defined, documents and maintains clearly delineated roles and responsibilities for electrical that provide a foundation for effectively integrating safety into electrical operations. Conduct interviews with

managers/supervisors and workers to determine their understanding of their authorities and responsibilities for performing electrical work safely.

b. Criterion 2: Defined Responsibilities and Accountability
Line managers are responsible and accountable for ensuring that electrical work practices are performed in a manner that adequately protects the public, workers, and the environment. Review roles, responsibilities and authorities and accountabilities (R2A2s) of senior managers, middle managers, supervisors, and workers concerning hoisting and rigging.

c. Criterion 3: Accountability for Performance
Line managers are accountable for electrical safety performance through performance objectives and appraisal systems. Performance is explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers execute actions to attain and continuously improve the safety of electrical. Conduct interviews with line managers and supervisors on accountability for performance.

3. Competence Commensurate with Responsibilities
Guiding Principle #3: *"Personnel Shall Possess the Experience, Knowledge, Skills, and Abilities That Are Necessary To Discharge Their Responsibilities."*

a. Criterion 1: Staffing and Qualifications
Line managers and staff demonstrate a high degree of technical competence and a good understanding of the electrical programs. Review SBMS and R2A2s as appropriate for select positions. Conduct interviews with senior managers, facility managers, principal investigators, building managers, supervisors, as appropriate. Review training and qualification programs. Sample the safety training records. Review incidents reports to determine whether staffing and/or qualification were causal factors in electrical incidents.

b. Criterion 2: Technical Competence
Workers and managers are technically competent to perform electrical jobs and are appropriately educated and knowledgeable of hazards, vulnerabilities, and risks. Conduct interviews with senior managers, facility managers, principal investigators, as appropriate. Review electrical incidents reports to determine whether technical competence was a causal factor in incidents.

4. Define the Scope of Work and Balanced Priorities
Guiding Principle #4: *"Resources Shall be Effectively Allocated To Address Safety, Programmatic, and Operational Considerations. Protecting the Public, the Workers, and the Environment Shall Be a Priority Whenever Activities Are Planned and Performed."* Core Function #1: *"Missions are Translated Into Work, Expectations are Set, Tasks Identified and Prioritized, and Resources are Allocated."*

a. **Criterion 1: Translate Mission into Work; Set Expectations**
Contractors use defined mechanisms to define the scope, schedule and cost of electrical work and to identify and communicate associated risks and hazards. Review the electrical work processes and compare expectations in SBMS and division/department procedures for conformance as well as recent electrical events.

b. **Criterion 2: Provide for Integration**
ES&H functions and activities are integrated into program, activity, and work planning at all levels of the line organization. Review SBMS and division/department procedures that demonstrate that ISM is integrated into electrical activities. Conduct interviews of a cross-cut of personnel for their level of understanding.

5. Identification of Safety Standards and Requirements and Analyze the Hazards

Guiding Principle #5: *"Before Work Is Performed, the Associated Hazards Shall Be Evaluated and an Agreed Upon Set of Safety Standards Shall Be Established That, if Properly Implemented, Will Provide Adequate Assurance That the Public, the Workers, and the Environment Are Protected from Adverse Consequences."* Core Function #2: *"Hazards associated with the work are identified, analyzed and categorized."*

a. **Criterion 1: Hazards Analysis and Work Planning (JHA)**
Prior to the initiation of work, line management identifies, analyzes, and categorizes the hazards associated with the work activity so that the appropriate electrical administrative and engineering controls can be put in place to prevent or mitigate those hazards. Review existing project JHAs for lockout/tag-out (LOTO) requirements, arc-flash calculations in compliance with NFPA-70E and requirements for personal protective equipment (PPE) requirements. Review work processes from SBMS and division/department procedures and compare with recent electrical events and observations, especially skill-of-the-craft determinations.

b. **Criterion 2: Identification of Standards and Requirements**
Line management has identified, communicated, executed, and monitored all applicable DOE requirements, and Federal, state, and local regulations. Review SBMS and division/department for omissions which may have been factors in recent electrical events.

6. Hazard Controls Tailored to Work Being Performed; Develop and Implement Hazard Controls

Guiding Principle #6: *"Administrative and Engineering Controls To Prevent and Mitigate Hazards Shall Be Tailored to the Work Performed and Associated Hazards."* Core Function #3: *"Applicable Standards and Requirements are Identified and Agreed Upon, Controls to Prevent/Mitigate Hazards are Identified, the Safety Envelope Established, and Controls are Implemented."*

a. **Criterion 1: Identify Controls to Prevent/Mitigate Hazards**
Line management has established processes for identifying and tailoring controls for hazards associated with all electrical activities. Review the Laboratory's process for identifying and tailoring controls which may have been less than adequate in recent electrical incidents.

b. **Criterion 2: Establish Safety Controls**
Hazard controls are established based on the understanding of the hazards, vulnerabilities, and risks in the work environment (e.g., nuclear, radiological, chemical, industrial, physical, and natural phenomena). Review Laboratory's process for establishing safety controls which may have been less than adequate in recent electrical incidents.

c. **Criterion 3: Implement Controls**
Line management has established methods to implement controls at every level and ensures that controls remain in effect as long as hazards are present. Review Laboratory's investigations and conduct observations to determine if implementation of controls has been less than adequate in recent electrical incidents.

7. **Operations Authorization; Perform Work Within Controls**
Guiding Principle #7: *"The Conditions and Requirements to be Satisfied for Operations Initiated and Conducted Shall Be Clearly Established and Agreed-Upon."* Core Function #4: *"Readiness is Confirmed and Work is Performed Safely."*

a. **Criterion 1: Confirm Readiness**
Line management has established and implemented processes to confirm that a facility or work process/activity that involves electrical, as well as the work force, are in an adequate state of readiness prior to authorizing the performance of work. Review the Laboratory's process for assuring that work preparation is adequate. Conduct work observation and review documentation at work site. Review recent electrical events to determine whether lack of readiness was a causal factor.

b. **Criterion 2: Operations Authorization**
Line management has assumed the responsibility for ensuring that all electrical operations are authorized at a level commensurate with the hazards and has established work authorization processes for both facility- and activity-level operations. All electrical work activities are subject to authorization based on appropriate review of the preparation and readiness to perform work. Review work processes and sample documentation from activities observed in the field. Review electrical events to determine whether improper authorization was a causal factor.

c. **Criterion 3: Perform Work Safely**
Line managers are responsible for implementing electrical programs in compliance with defined requirements. Line managers ensure that contractors, and subcontractors, execute defined requirements in such a manner that employees, the public, and the environment are protected from adverse consequences. Conduct interviews with senior managers, division

directors, supervisors, and workers on procedural compliance and their understanding of the effectiveness of the SBMS and division/department implementation procedures. Review reports to determine when procedural compliance was a factor in electrical incidents.

8. Provide Feedback and Continuous Improvement

Core Function #5: *"Feedback Information on the Adequacy of Controls is Gathered, Opportunities for Improving the Definition and Planning of Work are Identified and Implemented, Line and Independent Oversight is Conducted, and, If Necessary Regulatory Enforcement Actions Occur"*

a. Criterion 1: Assessment and Measurement of Performance for Continuous Improvement

Line management has established formalized mechanisms and processes (at the institutional, facility/project, and activity levels) for collecting both qualitative and quantitative information on electrical performance as the basis for informed management decisions to improve performance through assessments, performance measures, and other feedback mechanisms. Conduct interviews with senior and middle managers on the investigation and subsequent tasks associated with electrical incidents. Review reports for technical adequacy.

b. Criterion 2: Follow-up and Correction of Safety Management System Deficiencies

Line management has established a formalized process to capture and track electrical -related deficiencies and associated corrective actions. Line management has executed mechanisms, such as independent verification and performance-based evaluations, to ensure that corrective actions are timely, complete, and effective. Review Laboratory's process for determining whether the corrective action management system is effective in reducing the probability of repeat events.

c. Criterion 3: Lessons Learned

Line management has established a method to capture electrical related deficiencies, to identify causes and generic applicability, and to disseminate lessons learned within and across organizations. Evaluate process and interview line managers and workers on the use and effectiveness of the lessons learned system.

Concerns:

Findings:

Observations:

Noteworthy Practices:

Records Reviewed:

Personnel Interviewed:

ISMS ASSESSMENT FORM
ELECTRICAL SAFETY

Work Observations:

Signatures:

John C. Lacenere	Geoffrey L. Beausoleil

ISMS ASSESSMENT FORM
HOISTING AND RIGGING

Objective: Assess the institutional and department/division hoisting and rigging (including forklift, overhead cranes small hoists, and mobile cranes) requirements, policies, procedures, and work practices for both professional and incidental activities. Review the roles and responsibilities of line managers, support personnel and workers who are involved in these activities as well as the adequacy of compliance with institutional and/or Department/Division qualifications, training requirements, and inspection requirements. Assess the laboratory's process for understanding the causes and development of effective corrective actions for incidents which have resulted in the ORPS "recurring" category. Review the roles and responsibilities of line managers, support personnel and workers who are involved in the incident as well as the adequacy of the investigation, development of corrective actions of such incidents, and the verification of their effectiveness. Review line management's understanding of the Laboratory's and division/department policies and procedures for working safely. Focus will be on the adequacy of hoisting and rigging requirements and policies within SBMS and its flow down into lower tiered procedures, concentrating on: planning hoisting and rigging work, implementing effective hazards controls, and performing work within controls. Assess the identification and analysis of forklift operations and hoisting and rigging hazards, establishment of work controls, procedural adherence, and implementation of lessons learned both from previous work and current work activities.

1. **Line Management Responsibility for Safety**
   Guiding Principle #1: *"Line Management Is Directly Responsible for the Protection of the Public, Workers, and the Environment."*

   c. **Criterion 1: Policy and Expectations**
      Hoisting and rigging policies and goals are documented, and initiatives are in progress to improve hoisting and rigging safety. Review laboratory-wide and department/division initiatives.

   d. **Criterion 2: Leadership**
      Line management demonstrates a commitment to protect the public and workers from hoisting and rigging incidents. Line management proactively demonstrates a leadership position in guiding their line organizations, subcontractors, and workers toward integrated safety management. Review Laboratory-wide and department/division performance metrics and conduct interviews of senior and middle managers.

   e. **Criterion 3: Worker Empowerment**
      Contractor line managers recognize that active participation by workers is essential to maintain and improve the hoisting and rigging program. Conduct interviews of middle management and workers to ascertain level of participation to improve performance.

2. **Clear Roles and Responsibilities**
   Guiding Principle #2: *"Clear Lines of Authority and Responsibility for Ensuring Safety Shall Be Established and Maintained at All Organizational Levels Within the Department and Its Contractors."*

   a. **Criterion 1: Clear Lines of Authority and Responsibilities**

Line management defined, documents and maintains clearly delineated roles and responsibilities for hoisting and rigging that provide a foundation for effectively integrating safety into hoisting and rigging operations. Conduct interviews with managers/supervisors and workers to determine their understanding of their authorities and responsibilities for performing hoisting and rigging work safely.

b. Criterion 2: Defined Responsibilities and Accountability
Line managers are responsible and accountable for ensuring that hoisting and rigging work practices are performed in a manner that adequately protects the public, workers, and the environment. Review roles, responsibilities and authorities and accountabilities (R2A2s) of senior managers, middle managers, supervisors, and workers concerning hoisting and rigging.

c. Criterion 3: Accountability for Performance
Line managers are accountable for hoisting and rigging safety performance through performance objectives and appraisal systems. Performance is explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers execute actions to attain and continuously improve the safety of hoisting and rigging. Conduct interviews with line managers and supervisors on accountability for performance.

3. Competence Commensurate with Responsibilities
Guiding Principle #3: *"Personnel Shall Possess the Experience, Knowledge, Skills, and Abilities That Are Necessary To Discharge Their Responsibilities."*

a. Criterion 1: Staffing and Qualifications
Line managers and staff demonstrate a high degree of technical competence and a good understanding of the hoisting and rigging program. Review SBMS and R2A2s as appropriate for select positions. Conduct interviews with senior managers, facility managers, principal investigators, building managers, supervisors, as appropriate. Review training and qualification programs. Review experience requirements needed to operate hoisting equipment. Sample training records. Review incidents reports to determine whether staffing and/or qualification were causal factors in hoisting and rigging incidents.

b. Criterion 2: Technical Competence
Workers and managers are technically competent to perform hoisting and rigging jobs and are appropriately educated and knowledgeable of hazards, vulnerabilities, and risks. Conduct interviews with senior managers, facility managers, principal investigators, as appropriate. Review hoisting and rigging incidents reports to determine whether technical competence was a causal factor in incidents.

4. Define the Scope of Work and Balanced Priorities
Guiding Principle #4: *"Resources Shall be Effectively Allocated To Address Safety, Programmatic, and Operational Considerations. Protecting the Public, the*

Workers, and the Environment Shall Be a Priority Whenever Activities Are Planned and Performed." Core Function #1: *"Missions are Translated Into Work, Expectations are Set, Tasks Identified and Prioritized, and Resources are Allocated."*

a. **Criterion 1: Translate Mission into Work; Set Expectations**
Contractors use defined mechanisms to define the scope, schedule and cost of hoisting and rigging work and to identify and communicate associated risks and hazards. Review the hoisting and rigging work processes and compare expectations in SBMS and division/department procedures for conformance as well as recent hoisting and rigging events.

b. **Criterion 2: Provide for Integration**
ES&H functions and activities are integrated into program, activity, and work planning at all levels of the line organization. Review SBMS and division/department procedures that demonstrate that ISM is integrated into hoisting and rigging activities. Conduct interviews of a cross-cut of personnel for their level of understanding.

5. **Identification of Safety Standards and Requirements and Analyze the Hazards**
Guiding Principle #5: *"Before Work Is Performed, the Associated Hazards Shall Be Evaluated and an Agreed Upon Set of Safety Standards Shall Be Established That, if Properly Implemented, Will Provide Adequate Assurance That the Public, the Workers, and the Environment Are Protected from Adverse Consequences."* Core Function #2: *"Hazards associated with the work are identified, analyzed and categorized."*

a. **Criterion 1: Hazards Analysis and Work Planning**
Prior to the initiation of work, line management identifies, analyzes, and categorizes the hazards associated with the work activity so that the appropriate hoisting and rigging administrative and engineering controls can be put in place to prevent or mitigate those hazards. Review work processes from SBMS and division/department procedures and compare with recent hoisting and rigging events and observations, especially skill-of-the-craft determinations. Review the activities associated with the Laboratory's Lifting Safety Committee.

b. **Criterion 2: Identification of Standards and Requirements**
Line management has identified, communicated, executed, and monitored all applicable DOE requirements, and Federal, state, and local regulations. Review SBMS and division/department for omissions which may have been factors in recent hoisting and rigging events.

6. **Hazard Controls Tailored to Work Being Performed; Develop and Implement Hazard Controls**
Guiding Principle #6: *"Administrative and Engineering Controls To Prevent and Mitigate Hazards Shall Be Tailored to the Work Performed and Associated Hazards."* Core Function #3: *"Applicable Standards and Requirements are*

Identified and Agreed Upon, Controls to Prevent/Mitigate Hazards are Identified, the Safety Envelope Established, and Controls are Implemented."

a. **Criterion 1: Identify Controls to Prevent/Mitigate Hazards**
Line management has established processes for identifying and tailoring controls for hazards associated with all hoisting and rigging activities. Review Laboratory's process for identifying and tailoring controls in recent hoisting and rigging incidents. Review the Laboratory's process for identifying lifts as critical lifts or pre-production lifts.

b. **Criterion 2: Establish Safety Controls**
Hazard controls are established based on the understanding of the hazards, vulnerabilities, and risks in the work environment (e.g., nuclear, radiological, chemical, industrial, physical, and natural phenomena). Review Laboratory's process for establishing safety controls in recent hoisting and rigging incidents.

c. **Criterion 3: Implement Controls**
Line management has established methods to implement controls at every level and ensures that controls remain in effect as long as hazards are present. Review Laboratory's investigations and conduct observations to determine if implementation of controls in recent hoisting and rigging incidents.

7. **Operations Authorization; Perform Work Within Controls**
Guiding Principle #7: *"The Conditions and Requirements to be Satisfied for Operations Initiated and Conducted Shall Be Clearly Established and Agreed-Upon."* Core Function #4: *"Readiness is Confirmed and Work is Performed Safely."*

a. **Criterion 1: Confirm Readiness**
Line management has established and implemented processes to confirm that a facility or work process/activity that involves hoisting and rigging, as well as the work force, are in an adequate state of readiness prior to authorizing the performance of work. Review the Laboratory's process for assuring that work preparation is adequate. Review the Laboratory's process for performing pre-job briefs. Review the Laboratory's hoisting and rigging preventive maintenance program. Review the Laboratory's hoisting and rigging periodic, daily, and monthly inspection program. Conduct work observation and review documentation at work site. Review recent hoisting and rigging events to determine whether lack of readiness was a causal factor.

b. **Criterion 2: Operations Authorization**
Line management has assumed the responsibility for ensuring that all hoisting and rigging operations are authorized at a level commensurate with the hazards and has established work authorization processes for both facility- and activity-level operations. All hoisting and rigging work activities are subject to authorization based on appropriate review of the preparation and readiness to perform work. Review work processes and sample

documentation from activities observed in the field. Review hoisting and rigging events to determine whether improper authorization was a causal factor.

c. Criterion 3: Perform Work Safely
Line managers are responsible for implementing hoisting and rigging programs in compliance with defined requirements. Line managers ensure that contractors, and subcontractors, execute defined requirements in such a manner that employees, the public, and the environment are protected from adverse consequences. Conduct interviews with senior managers, division directors, supervisors, and workers on procedural compliance and their understanding of the effectiveness of the SBMS and division/department implementation procedures. Review reports to determine when procedural compliance was a factor in hoisting and rigging incidents.

8. Provide Feedback and Continuous Improvement
Core Function #5: *"Feedback Information on the Adequacy of Controls is Gathered, Opportunities for Improving the Definition and Planning of Work are Identified and Implemented, Line and Independent Oversight is Conducted, and, If Necessary Regulatory Enforcement Actions Occur"*

a. Criterion 1: Assessment and Measurement of Performance for Continuous Improvement
Line management has established formalized mechanisms and processes (at the institutional, facility/project, and activity levels) for collecting both qualitative and quantitative information on hoisting and rigging performance as the basis for informed management decisions to improve performance through assessments, performance measures, and other feedback mechanisms. Conduct interviews with senior and middle managers on the investigation and subsequent tasks associated with hoisting and rigging incidents. Review reports for technical adequacy. Review the Laboratory's process for performing post-job briefs

b. Criterion 2: Follow-up and Correction of Safety Management System Deficiencies
Line management has established a formalized process to capture and track hoisting and rigging -related deficiencies and associated corrective actions. Line management has executed mechanisms, such as independent verification and performance-based evaluations, to ensure that corrective actions are timely, complete, and effective. Review Laboratory's process for determining whether the corrective action management system is effective in reducing the probability of repeat events. Review the corrective actions associated with the recent recurring ORPS on hoisting and rigging.

c. Criterion 3: Lessons Learned
Line management has established a method to capture hoisting and rigging related deficiencies, to identify causes and generic applicability, and to disseminate lessons learned within and across organizations. Evaluate process and interview line managers and workers on the use and effectiveness of the lessons learned system.

ISMS ASSESSMENT FORM
HOISTING AND RIGGING

Concerns:

Findings:

Observations:

Noteworthy Practices:

Records Reviewed:

Personnel Interviewed:

Work Observations:

Signatures:

Michael Viola	Peter Kelley

Appendix B
Team Member Bios

Tom McDermott has over eighteen years of occupational safety and health work experience and is currently responsible for providing technical advice, support and assistance on occupational health and industrial hygiene issues to the DOE Chicago Operations Office (DOE-CH) Manager. Mr. McDermott worked as an OSHA compliance officer before coming to work with the Department. He is an Industrial Hygienist and currently serves as the CH Issue Management Coordinator. He was an original working group member, chartered by Admiral Watkins with the development of a risk-based prioritization process for identifying, documenting, and allocating resources to ES&H needs and issues. In addition, he advises senior management from DOE-CH and other Department elements on the technical merits of risk-based prioritization methodologies and application of risk management systems in an operating environment. He has served on ISM verification teams for INEEL, Ames Laboratory, Brookhaven National Laboratory, and Argonne National Laboratory. He was the team leader for the Office of Civilian Radioactive Waste Management's (OCRWM) Yucca Mountain ISM Phase I & II Verifications. He was asked by Bechtel/SAIC (BSC), the Yucca Mountain contractor, to participate in their annual ISMS assessments in 2001 and 2002. He was an active member of the Department's Response Team to DNFSB recommendation 98-1, and is currently a member of the Department's Corrective Action Management Team (CAM).

Joseph P. Drago, P.E., is a General Engineer with the Chicago Operations Office (CH). Mr. Drago has a Bachelor of Science in Chemical Engineering and a Master of Science in Nuclear Engineering from the University of Illinois. He has nuclear power plant experience as a Root Cause Analyst, a Reactor Engineer, a Nuclear Steam Supply Engineer, and has conducted fuel recycle research. Mr. Drago was also a Safety Compliance Officer at Argonne National Laboratory. He has extensive experience in conducting nuclear safety reviews, facility reviews and inspections, nuclear safety appraisals and environmental management system (EMS) audits. In addition, Mr. Drago has served as Chairman of a Type B Accident Investigation, and he is a Price-Anderson Amendments Act Coordinator for CH. Mr. Drago has participated in four Integrated Safety Management System (ISMS) verifications (Princeton Plasma Physics Laboratory, Fermi National Accelerator Laboratory, Argonne National Laboratory-West, and Yucca Mountain) and two ISMS annual update assessments (Rocky Flats and Yucca Mountain). He has participated on two criticality safety program reviews of Fluor Hanford operations at the Plutonium Finishing Plant and Bechtel-Jacobs operations at the East Tennessee Technology Park.

Geoffrey L. "Geoff" Beausoleil works in the Office of Nuclear Energy, Science and Technology Idaho Operations Office (ID). Mr. Beausoleil has over 23 years of experience in operations and applying quality, safety and health programs on a day-to-day basis. Mr. Beausoleil's current position is the Director of the Quality and Safety Division. Mr. Beausoleil is responsible for all of the Idaho National Engineering and Environmental Laboratory (INEEL) quality, safety, health and worker protection programs. Prior to this assignment, Mr. Beausoleil was the ID Facility Director for the Radioactive Waste Management Complex and the Waste Reduction Operations Complex. At these facilities, Mr. Beausoleil was responsible for all transuranic, low level, hazardous, and mixed waste operations. Prior to working for the DOE, Mr. Beausoleil was employed at Newport News Shipbuilding, where he was a Test Engineer, Reactor Refueling Engineer, and a Hull Structure Field Engineer. Mr. Beausoleil has served on the Integrated Safety Management System Verifications at the INEEL. He is an active member of the EFCOG QA Subgroup (formerly the DOE's Quality and Safety

Management Special Interest Group – QSM SIG). He is on the DOE QA Steering Committee.

Mike Viola, P.E., works at Princeton Plasma Physics Laboratory (PPPL) located in Princeton, NJ. He is a senior Mechanical Engineer serving in the Engineering Department, Fabrication, Operations and Maintenance Division, Construction Branch. He is PPPL's lift manager responsible for their Hoisting and Rigging program and also a long standing member of the DOE Hoisting and Rigging Committee and technical advisory board and the Construction Safety Committee. He has contributed a significant portion of the language in the DOE Hoisting and Rigging Standard (DOE-STD-1090-2004). Prior to his current assignment as the technical representative for the National Compact Stellarator Experiment (NCSX) Vacuum Vessel; Mr. Viola was the construction manager for the D&D of the Tokamak Fusion Test Reactor (TFTR), responsible for the $45M 3 year D&D project of the removal of the activated and contaminated TFTR.

John Lacenere, **P.E.,** works at Princeton Plasma Physics Laboratory (PPPL) and is the Section Head of the PPPL AC Power Engineering Division responsible for serving the Lab's experimental, operations and maintenance of electrical power equipment to 480VAC and the lab's electrical safety training course called Electrical Utilization Training (EUT). Prior to working for PPPL, Mr. Lacenere worked as an Electrical Engineering Consultant for 15 years. Mr. Lacenere is a Professional Engineer with over 25 years of experience in electrical engineering with particular emphasis on design and analysis of industrial and commercial power systems. Mr. Lacenere is familiar with building and facility construction, machine and process control design, OSHA approved "zero-access" equipment guarding requirements, electrical acceptance & maintenance testing, and training NFPA-70(NEC), NFPA-70E and OSHA safety compliance.

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