



U.S. DEPARTMENT OF **ENERGY**

Office of Science

Berkeley Site Office (BSO)

Quality Assurance Program Plan

Revision 3.0

June 14, 2010

SUBMITTED:

A handwritten signature in black ink, appearing to read "Aundra Richards", written over a horizontal line.

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Berkeley Site Office

Date: 6/12/2010

APPROVED:

A handwritten signature in blue ink, appearing to read "George J. Malosh", written over a horizontal line. To the left of the signature is a small blue mark that looks like "fr".

George J. Malosh
Chief Operating Officer

Date: 7/20/2010

Revision Log

Revision No.	Description of Change	Effective Date
0.0	Initial Issue to comply with the requirements of DOE O 414.1C, <i>Quality Assurance</i> .	Upon Approval of this document.
1.0	Update to incorporate results of annual review.	1/7/07
2.0	Update to incorporate results of annual review.	11/07/08
3.0	Update to incorporate results of annual review, including Contractor Assurance System and BSO SharePoint Management tool.	6/14/10

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1.0 PURPOSE

This document describes the Berkeley Site Office (BSO) Quality Assurance Program Plan (QAPP) and identifies the framework established to meet the quality assurance requirements of:

- Department of Energy (DOE) Order (O) 414.1C, Quality Assurance;
- SC-Wide Quality Assurance Program Description; and
- SC Quality Assurance and Oversight Management System Description.

The criteria from ANSI/ISO/ASQ Q 9001-2000, Quality Management System: Requirements were also used to develop this QAPP. A crosswalk between ISO 9001-2000 and DOE O 414.1C with BSO implementing mechanisms is documented in Appendix B. This QAPP is designed to be consistent with the *BSO Functions, Responsibilities, and Authorities Manual* (FRAM).

1.1 Quality Objectives

The BSO QAPP establishes the following quality objectives:

- Quality is assured and maintained through a single, integrated, effective Quality Assurance (QA) program;
- Management support for planning, organization, resources, direction, and control is essential to QA;
- Performance and quality improvement require thorough, rigorous assessment and corrective action;
- Workers are responsible for achieving and maintaining quality, and;
- Risks and impacts associated with work processes can be minimized while maximizing reliability and performance of work products.

2.0 SCOPE

The BSO QAPP applies to all BSO personnel and outlines the framework for incorporating QA elements into BSO operations and procedures.

The BSO QAPP integrates with other quality or management system requirements in DOE directives, including DOE P 450.4, Safety Management System Policy and DOE O 226.1A, Implementation of Department of Energy Oversight Policy.

This QAPP is intended to be used in conjunction with the BSO's Integrated Safety Environmental Management System (ISEMS) and DOE Integrated Safeguards and Security Management System.

3.0 RESPONSIBILITIES

The responsibilities and authorities for implementing the BSO mission are described in the BSO FRAM. The responsibilities specific to implementing the BSO QAPP are:

3.1 Site Manager

- Ensure the BSO QAPP is developed, understood, implemented and maintained;
- Submit revisions to the BSO QAPP to the Office of Science, Deputy Director for Field Operations (SC-DDFO) for review and approval;
- Ensure the BSO QAPP implementing plans and procedures are developed and maintained;
- Ensure BSO staff comply with applicable QA standards and procedures;
- Implement provisions of the SC QA Program Description and associated components of the Office of Science Management System (SCMS); and
- Approve revisions to the Lawrence Berkeley National Laboratory (LBNL) QA Plan.

3.2 Deputy Site Manager/Senior Technical Advisor/Division Directors

- Support BSO Site Manager and assume duties, as needed;
- Ensure LBNL implements its Operating and Quality Management Plan (OQMP);

3.3 Quality Assurance Engineer

- Serve as the BSO QA Point of Contact;
- Revise and maintain BSO QAPP.
- Advise BSO management of BSO QAPP or LBNL OQMP implementation issues;
- Prepare/review QA implementing plans and procedures;
- Provide QA training to BSO staff;
- Review revisions to LBNL OQMP Plan;
- Review LBNL contract changes that could affect QA; and
- Conduct periodic QA assessments to verify BSO QAPP and LBNL OQMP are effectively implemented.

3.4 Contracting Officer

- Include applicable QA and technical requirements in BSO and LBNL contracts and purchase orders.

3.5 Business Management Analyst

- Manage BSO records management and document control system.

3.6 Integrated Service Center (ISC)/Oak Ridge Office

- Provide technical expertise support to BSO senior management and QA Manager.

3.7 Staff

- Adhere to BSO standard operating procedures and other implementing documents in accordance with the QAPP and management direction;
- Continually seek ways to improve the quality of work by suggesting on-going product and process improvements; and
- Ensure that the work performed meets expectations and standards, and that the expected outcomes are accomplished and justified.

4.0 QUALITY ASSURANCE PROGRAM REQUIREMENTS AND IMPLEMENTATION

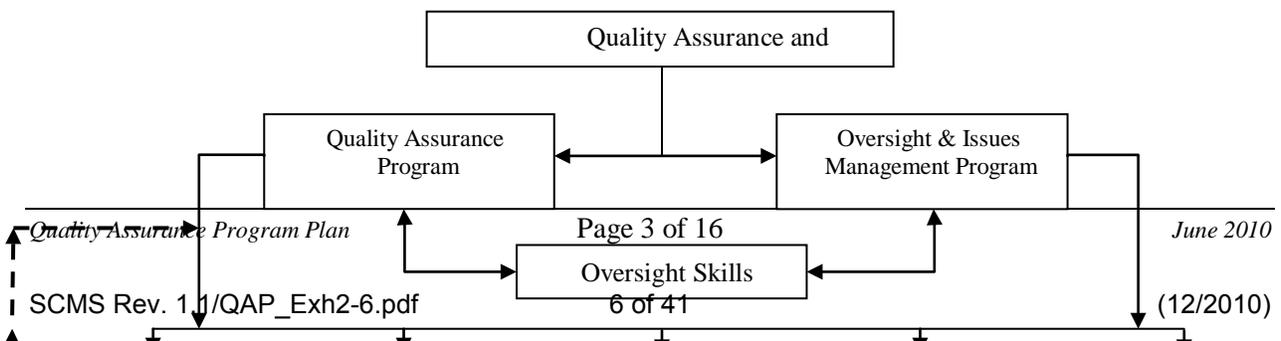
The BSO mission is to manage and administer DOE’s performance-based contract with the University of California for the management and operation of the Lawrence Berkeley National Laboratory. This includes: overseeing and evaluating the work and business systems of the M&O contractor, overseeing, managing, and executing assigned SC and non-SC programs; ensuring the safe, secure, and environmentally responsible operation of facilities under the purview of SC; and planning for the long-term viability of the site. To ensure accomplishment of the mission efficiently and effectively, this QAPP documents the BSO processes BSO implements to meet the ten criteria listed in DOE O 414.1C.

A risk-based graded approach was utilized in the development of this QAPP. This takes into account the potential adverse effects of activities and hazards based on risk and potential impact to safeguards and security, health and safety of the public, workers, the environment, mission success, and other factors as deemed significant by the Site Manager.

This QAPP shall be revised as necessary or on an annual basis to meet the latest requirements of 10 CFR 830 Subpart A and DOE O 414.1C.

The BSO QA Program process is depicted below:

BSO Quality Assurance and Oversight Flow Diagram



4.1 Management/Criterion 1-Program

(a) Establish an organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing work.

(b) Establish management processes, including planning, scheduling, and providing resources for work.

The BSO QAPP is a broad-based management system which ensures that the BSO missions, policies, and objectives are integrated into standard work processes. The QAPP applies to every BSO organization and employee.

BSO management system documents include the following:

- BSO Management System Description (MSD);
- BSO FRAM;
- BSO Annual Performance Plan;
- BSO Organization Chart with Assigned Roles;
- BSO Contract Management Plan; and
- BSO Oversight and Issues Management Program Manual.

The levels of authority and interfaces are prescribed in various approved documents (e.g., BSO implementing procedures).

BSO missions and objectives are accomplished and its policies are implemented in a reasonable, practical, and cost-effective manner. Technical standards that are developed or adopted from commercial practice are used, wherever applicable, to implement the QAPP. Employees are provided the necessary information, tools, training and support to perform their tasks in a quality manner. In addition,

employees are provided the authority to make decisions at the lowest effectual level where technical expertise is localized. Employees are thereby empowered to look for better, safer, and more efficient ways of accomplishing their work.

Not all items, services, and processes have the same effect on safety and reliability. The rigor with which the QAPP is applied is determined using a graded approach. The graded approach focuses on plans and schedules and considers cost impacts using the following criteria:

- the relative importance to safety, safeguards, and security;
- the magnitude of any hazard or risk involved;
- the life-cycle stage of a facility or activity;
- impact/consequences on the programmatic mission of a facility;
- the particular characteristics of a facility or activity;
- the nuclear safety classification or hazard category of the item or activity;
- adequacy of existing safety documentation;
- the relative importance of radiological and non-radiological hazards;
- complexity of products or services involved;
- performance history of a facility or activity; and
- any other relevant factors.

Environment, safety, health, and quality requirements are integrated at all levels of activities.

Organizational Structure – The BSO organization is described in the BSO Organization Chart.

Organizational Interfaces – The interface between BSO and the Defense Nuclear Facilities Safety Board is defined in DOE M 140.1-1B, *Interface with the Defense Facilities Safety Board*. Interfaces between BSO and its contractors are defined in the respective contracts and in the BSO *Contract Management Plan*. Interfaces with the Office of Science and other DOE organizations are formalized in Memoranda of Understanding and by other documents kept in BSO files. The Integrated Service Center Plan describes support from the SC Integrated Service Center (Chicago/Oak Ridge) to BSO.

Management Systems – The BSO QAPP integrates several management systems such as the *Integrated Safety Environmental Management System*). A crosswalk of the DOE O 414.1C criteria and the Integrated Safety Management (ISM) guiding principles and core functions are found in Appendix C, “*Crosswalk of Quality and Integrated Safety Management System Elements*.” In addition, a crosswalk of the DOE O 414.1C criteria and the EMS elements is found in

Appendix D, *Crosswalk of Quality and Environmental Management System Elements.*

Integrated Safety Management System – The DOE line management responsibilities for ISM as described in DOE M 411.1-1C, *Safety Management Functions, Responsibilities, and Authorities*, and BSO specific responsibilities are defined in the BSO FRAM and in the BSO ISEMS Description. Consistent with DOE P 411.1, *Safety Management Functions, Responsibilities, and Authorities Policy*, the BSO safety management functions, responsibilities, and authorities for ensuring adequate protection and safe operations cannot be delegated to contractors.

Quality Assurance – The BSO QAPP implements the requirements of DOE O 414.1C and ANSI ISO 9001 for Federal activities and Title 10, Code of Federal Regulations (CFR), Part 830, Subpart A, *Quality Assurance Requirements* for contractors with nuclear (including radiological) facilities. LBNL is required to comply with 10 CFR 830, Subpart A, but has no facilities coming under Subpart B. The BSO Manager has overall responsibility for development and implementation of the BSO QAPP. BSO Division Directors will review the status, adequacy, effectiveness, and compliance aspects of the QAPP on a continuing basis. The Deputy Director for Field Operations for the Office of Science is the approval authority for the BSO QAPP. The BSO QAPP will be reviewed on an annual basis and revised/updated as needed.

The Contractor's OQMP is internally reviewed and revised periodically to accommodate changes in requirements, activities, organizations, and continuous improvement recommendations. The Contractor's OQMP requires DOE approval. Reviews of the Contractor's OQMP implementation are accomplished through direct observation of contractor activities in the field during walk-through inspections and assessments. The contractor is responsible for ensuring that quality assurance requirements flow down to and are implemented by its subcontractors.

4.2 Management/Criterion 2-Personnel Training and Qualification

(a) *Train and qualify personnel to be capable of performing assigned work.*

(b) *Provide continuing training to personnel to maintain job proficiency.*

Training Process. BSO personnel are trained and qualified to perform their assignments. The Site Manager, with the assistance of the Division Directors, determines the need for training. Training is identified by each BSO employee or their Division Director at the beginning of each fiscal year. Individual Development Plans (IDPs) are developed by each employee to identify proposed training, the basis for the training, and related costs and schedule for the training course(s). The IDP is then submitted electronically for approval to the Site Manager through the Corporate Human Resource Information System (CHRIS). IDPs can be amended during the year to indicate changes to planned training,

when necessary. Objective evidence of completion of training requirements by each BSO employee is maintained on CHRIS.

Personnel Qualification. Qualification for specific job categories is based on requirements established by BSO management. Management reviews job categories to determine the following:

- Whether critical and unique job functions or tasks require highly technical, specialized skills;
- Whether competency must be demonstrated before performance; and
- Whether a specialized certification may be required.

Based on the review, qualification requirements ensure employee proficiency is established and documented within plans and procedures. CHRIS maintains the documentation (objective evidence) that attests to the qualification, re-qualification, or certification of proficiency of all assigned staff for which a formal qualification determination is made. A Technical Qualification Program for applicable BSO personnel has been documented in BSO's Technical Qualification Program Manual. Contracting personnel are qualified in accordance with the Acquisition Career Field requirements of DOE O 361.1A. Project management personnel are qualified in the Project Management Career Development Program, also in accordance with DOE O 361.1A.

General Quality Training. All BSO employees are required to read and be trained on this QAPP upon issuance and revision.

4.3 Management/Criterion 3-Quality Improvement

- (a) *Establish and implement processes to detect and prevent quality problems.*
- (b) *Identify, control, and correct items, services, and processes that do not meet established requirements.*
- (c) *Identify the causes of problems, and include prevention of recurrence as a part of corrective action planning.*
- (d) *Review item characteristics, process implementation, and other quality-related information to identify items, services, and processes needing improvement.*

Identification of Problems. BSO uses the *BSO Oversight and Issues Management Program Manual* to implement the process for identifying problems that arise from assessments, surveillances, inspections, audits, and other operational awareness activities/situations.

Corrective Action Management. The *BSO Oversight and Issues Management Program Manual* provides a formal process for identifying problems. It requires

problems to be analyzed, the causal factors identified, and effective corrective actions to be developed and implemented. Corrective actions will be directed towards preventing recurrence. In accordance with the importance of the problem and the work affected, efforts will be made to identify the root cause(s). Corrective actions should be effective alternatives and be within the capability of management to implement in a reasonable timeframe.

Tracking of Corrective Actions. The Oak Ridge Issues, Open Items, Nonconformances (ORION) tracking system is used by BSO to track corrective actions.

Quality Trending. To perform meaningful trend analysis, historical data needs to be accumulated and made available. Historical data from periods of acceptable performance or industry benchmarks may establish the reference or performance baseline for determining the acceptability of current trends. Results of key oversight activities (e.g., assessments, walkthroughs, etc.) are documented in ORION for trending purposes.

Operating Experience Program. The Lessons Learned Program is described in SCMS Management System: Quality Assurance and Oversight, Subject Area Corporate Operating Experience/Lessons Learned. The BSO Operating Experience (OE) Program objective is to share information from the Federal and contractor workplace that may be useful to others. The ultimate goal of the BSO OE Program is the continuous improvement of site office processes and procedures for meaningful improvements to the quality of work products. The distribution of lessons learned generated within the BSO workplace and outside BSO are necessary to satisfy the DOE requirements for feedback and improvement. Applicable Operating Experiences and Lessons Learned are uploaded into the BSO SharePoint desktop tracking tool and assigned to the pertinent BSO staff members for use and dissemination to their LBNL counterparts. BSO is currently evaluating an electronic system to house, disseminate, and trend Lessons Learned.

The requirements for feedback and continuous improvement are found in 48 CFR 970.5223-1, Integration of Environment, Safety, and Health into Work Planning and Execution, and DOE P 450.4. Additional guidance can be found in Chapters II and III of DOE G 450.4-1B, Integrated Safety Management System Guide. The BSO OE Program is based on the SCMS standard for [Quality Assurance and Oversight](#), *Corporate Operating Experience/Lessons Learned*.

4.4 Management/Criterion 4-Documents and Records

- (a) *Prepare, review, approve, issue, use, and revise documents to prescribe processes, specify requirements, or establish design.*
- (b) *Specify, prepare, review, approve, and maintain records.*

Documents

The current BSO document control program, described in the *BSO Document Management System Manual* establishes the overall roles, responsibilities and process for the development of the documents that provide direction and guidance for the conduct of key work activities. This document defines a five-tiered document management hierarchy. Policies set broad goals and objectives, expectations, and fundamental values of the organization. Standard Operating Procedures (SOPs) convey the requirements, responsibilities, and procedures necessary to accomplish a business process at BSO. Plans are forward looking documents that describe actions to be performed in order to accomplish a goal. Manuals and Guides provide specific instructions on “how” a task is to be accomplished.

The Business Management Analyst is responsible for maintenance and management of BSO’s document control system. All BSO Policies, SOPs, Plans, Manuals, and Guides are housed on the shared drive and the BSO SharePoint site serves as an electronic data storage interface.

The *Document Management System Manual* provides the following:

- Identification of documents to be controlled, their specified distribution, and the timeliness for distribution;
- Assignment of responsibility for preparing, reviewing, approving, revising, and issuing documents;
- Review of documents for adequacy, completeness, and correctness prior to approval and issuance (note: individuals who were not involved in originating the document and who are technically competent in the subject matter perform the reviews);
- Physical protection of documents from misuse, loss, or compromise of information; and
- A method of indicating the status of documents issued to ensure that only the correct documents are used.

BSO processes other documents (e.g., technical standards and notices) as required.

Records

The BSO records management system assures that records are specified, prepared, reviewed, approved, understood, used and maintained to accurately reflect completed work and includes the following features:

- Provisions for the retention and disposition of records to satisfy the requirements of DOE O 200.1, Information Management Program, and the National Archives and Records Administration’s methods to preclude unauthorized access to BSO records;

- Provisions for record storage areas that minimize the risk of damage from natural disasters and environmental conditions;
- Methods for maintaining record accountability;
- Provisions for the retrieval of BSO records; and
- Provisions that ensure records are legible, accurate, complete, and traceable to the activities to which they apply.

Requirements for retention and disposition of records are documented in DOE O 200.1, Information Management Program.

The *BSO Records Management System Manual* establishes the overall roles, responsibilities and processes for carrying out the management of SC BSO records. Electronic records generated through incoming and outgoing correspondence, assessments, and actions are maintained in SMART and/or ORION and filed in CHIP and the BSO SharePoint site.

4.5 Performance/Criterion 5-Work Process

- Perform work consistent with technical standards, administrative controls, and hazard controls adopted to meet regulatory or contract requirements using approved instructions, procedures, etc.*
- Identify and control items to ensure their proper use.*
- Maintain items to prevent their damage, loss, or deterioration.*
- Calibrate and maintain equipment used for process monitoring or data collection.*

BSO work is planned, authorized, and performed by technically competent individuals who provide leadership, direction, and oversight. Work processes are performed using technical standards developed or adopted from commercial practice, policies, procedures, and other appropriate means and contain a level of detail commensurate with the complexity and importance of the work being performed (i.e., graded approach). Environment, safety, and health requirements are integrated into BSO work processes.

If the SCMS or underlying DOE Order does not provide sufficient direction, the Deputy Site Manager and Division Directors ensure that appropriate staff develop and implement organization-specific procedures, manuals, or desk instructions. The organization-specific procedures, manuals, or desk instructions should include sufficient detail to implement the DOE requirements. The content and format of organization-specific procedures or desk instructions are implemented according to requirements. In addition, procedures, manuals, or desk instructions are reviewed and revised as required.

Division Directors are responsible for implementing this aspect of the QA program in their areas of responsibility as defined in the BSO FRAM.

Oversight of contractor work processes is performed through participation in operational awareness activities and assessments, including the oversight and evaluation of the Contractor Assurance System. The level and/or mix of oversight is tailored based on the effective operation of the Contractor Assurance System. BSO comments and findings are provided to the contractor through official correspondence for formal oversight, and informally for informal activities. Using a tailored approach, if informal feedback is ineffective, BSO staff will elevate issues to the Division Directors for higher level attention, and ultimately to the Site Manager.

A graded approach is used to determine which items used by Federal personnel are identified and controlled using bar codes or other markings. BSO identifies and tracks BSO property including computers (including laptops) and other electronic equipment, official cell phones, and other items of value. Copiers, printers, and office equipment are maintained to ensure availability when needed.

4.6 Performance/Criterion 6-Design

- (a) *Design items and processes using sound engineering/scientific principles and appropriate standards.*
- (b) *Incorporate applicable requirements and design bases in design work and design changes.*
- (c) *Identify and control design interfaces.*
- (d) *Verify/Validate the adequacy of design products using individuals or groups other than those who performed the work.*
- (e) *Verify/Validate the work before approval and implementation of the design.*

BSO does not design items; however, BSO performs oversight of its contractors who design items. Oversight of contractors who design items is conducted using approved SCMS procedures and DOE O 413.3A. Independent Project Reviews are conducted as needed to review, verify, and validate the adequacy of designs.

4.7 Performance/Criterion 7-Procurement

- (a) *Procure items and services that meet established requirements and perform as specified.*
- (b) *Evaluate and select prospective suppliers on the basis of specified criteria.*
- (c) *Establish and implement processes to ensure that approved suppliers continue to provide acceptable items and services.*

BSO procures services in accordance with the Federal Acquisition Regulations (FARs) and DOE Acquisition Regulations (DEARs). The BSO procurement process is based on established technical and administrative criteria, and includes

the evaluation of quotations, bids, and proposals submitted by offerors. In addition, these processes provide methods for accepting procured services (e.g., review of technical data provided, review of objective evidence for conformance to procurement documents, and evaluation of the service provided).

BSO procurement documents identify the performance requirements that must be fulfilled by the supplier/contractor. These requirements are specified in each contract. BSO procurement documents are reviewed to ensure the following provisions are included, as applicable to the service or product being procured:

- Technical Requirements – Applicable technical requirements (e.g., specifications, codes, and standards) are specified in or referenced by specific DOE Directives, regulations, or procedures.
- QAPP Requirements – Applicable QAPP requirements are documented and depend on the type of procurement.
- Right of Access – For the Management and Operating contract the procurement documents specify allowances for access to the supplier/contractor facilities and records for the purpose of evaluation.
- Documentation Requirements – Applicable document requirements are identified.

Suppliers are monitored to ensure their performance meets procurement requirements and/or expectations and that they continue to provide acceptable services and products.

The BSO makes credit card purchases per FAR Subpart 3.104, FAR Part 8, FAR Part 12, and FAR Part 13.

The BSO provides oversight of the contractor's procurement system to ensure their performance meets procurement requirements and/or expectations, and that the contractor continues to provide acceptable services and products.

The BSO's Contracting Officers are a part of the Integrated Project Team for contracts subject to the requirements of DOE O 413.3A, *Program and Project Management for the Acquisition of Capital Assets*.

4.8 Performance/Criterion 8-Inspection and Acceptance Testing

(a) *Inspect and test specified items, services, and processes using established acceptance and performance criteria.*

(b) *Calibrate and maintain equipment used for inspections and tests.*

BSO performs inspection and acceptance testing of items, services, and processes as defined by DOE O 414.1C. Examples include using checklists for acceptance of services and reporting of inspections for suspect and counterfeit items.

BSO may perform limited calibration or maintenance of equipment used for inspections and tests as defined by DOE O 414.1C, but in general uses contractor-calibrated measuring and test equipment on an as-needed basis.

The BSO performs contractor oversight to ensure the contractor's processes are conducted using established acceptance and performance criteria.

4.9 Assessment/Criterion 9-Management Assessment

Ensure that managers assess their management processes and identify and correct problems that hinder the organization from achieving its objectives.

The BSO management assessment consists of an annual self-assessment of the Site Office Annual Performance Plan, ISMS and DOE O 226.1 implementation. The assessment identifies accomplishment of goals, and management problems that prevent effective implementation of quality, safety, and environmental requirements. This process not only assists BSO in achieving its objectives, but also allows BSO to evaluate customer and employee perceptions relative to the following key issues:

- The organization's mission and strategic objectives;
- The employees' role in the organization;
- The customers' expectations and the degree to which those expectations are being met;
- Opportunities for improving quality and cost-effectiveness; and
- Recognizing and enhancing human resource capabilities.

Problems that hinder BSO quality, safety, and environmental goals and objectives are identified and corrected. Decisions and recommendations are promptly documented, acted upon, followed up on, and evaluated for effectiveness.

The *BSO Oversight and Issues Management Program Manual* documents BSO's Management Assessment Program.

Results of Management Assessments are periodically reported to DOE HQ.

4.10 Assessment/Criterion 10-Independent Assessment

- (a) *Plan and conduct independent assessments to measure item and service quality and the adequacy of work performance and to promote improvement.*
- (b) *Establish sufficient authority and freedom from line management for independent assessment teams.*
- (c) *Ensure that persons conducting independent assessments are technically qualified and knowledgeable in the areas to be assessed.*

BSO functions and activities (including those of the contractors) are independently assessed. These assessments expand on traditional auditing

techniques and focus on implementation of the QAPP, and they are intended to improve the quality and effectiveness of all of BSO functions and activities.

Independent assessments ensure consistent application of the QAPP and are not intended to reinterpret or redefine the requirements of DOE O 414.1C. Through defined assessment methodologies and techniques, which include the review and evaluation of organization-specific management assessments, independent assessments ensure that the following goals are achieved:

- Problems preventing BSO from meeting its established goals, including potential or fundamental causes, are identified;
- Actions are taken to correct identified problems;
- Actions to prevent recurrence are identified and documented;
- Lessons learned are applied, where applicable; and
- Actions are taken to improve the condition(s) causing the problem.

Independent assessment personnel meet the following criteria:

- Are technically knowledgeable in the areas being assessed;
- Do not have direct responsibilities in the areas being assessed;
- Act in a management advisory function;
- Have sufficient freedom and authority to identify problems;
- Monitor work performance;
- Identify abnormal performance and precursors of potential problems;
- Focus on improving the quality of the processes that lead to the end product;
- Document assessment results;
- Verify satisfactory resolution of problems; and
- Perform follow-up reviews of deficient areas, as necessary.

The BSO Independent Assessment Program is documented in the *BSO Oversight and Issues Management Program Manual*.

At management's direction, BSO will plan and conduct a management assessment using the guidance from DOE Guide 414.1-1A, *Management Assessment and Independent Assessment*. BSO personnel who participate in these assessments must be knowledgeable of the activity being assessed. Furthermore, assessors will not be involved with or have responsibility for the operation, program, process, or system being assessed, and must have sufficient authority and freedom to carry out their assessment responsibilities. Both internal and external assessments are managed and conducted in accordance with the *BSO Oversight and Issues Management Program Manual*.

5.0 BSO CORRECTIVE MANAGEMENT PROGRAM

BSO implements DOE O 414.1C, Attachment 4, *Corrective Action Management Program*, describing the process for resolving issues arising from:

- Findings identified by the Office of Security and Safety Performance Assurance and the Office of Environment, Safety, and Health (EH) (DOE O 470.2B, Independent Oversight and Performance Assurance Program, dated October 31, 2002);
- Judgments of Need identified by Type A accident investigations (DOE O 225.1A, Accident Investigations, dated November 26, 1997); and
- Other sources as directed by the Secretary or Deputy Secretary, including crosscutting safety issues.

BSO findings are entered and tracked in ORION, the ORO ISC Assessment and Oversight Tracking System.

6.0 BSO SUSPECT/COUNTERFEIT ITEMS PREVENTION PROCESS

The objective of the BSO S/CI Program is to meet the requirements of DOE O 414.1C, Quality Assurance. This includes prevention of the introduction and use of S/CIs; training and informing of managers, supervisors, and workers on S/CI processes and controls; identification and disposal of S/CIs on site; restriction of the use of S/CIs, as necessary; and the collection, maintenance, dissemination, and use of information on S/CIs and suppliers. The assigned BSO S/CI Program Coordinator serves as a liaison for BSO and various BSO contractors, and with the DOE Headquarters S/CI Program leads.

7.0 BSO SOFTWARE QUALITY ASSURANCE

BSO has designated a Software Quality Assurance (SQA) Subject Matter Expert (SME) from the ISC to carry out the SQA responsibilities. The SQA SME provides oversight of the contractor's SQA program and acts as the liaison to DOE/SC HQ for all SQA functions.

BSO does not maintain a SQA process. Should BSO procure, develop, or operate software critical to quality assurance in the future, an appropriate SQA process will be developed and implemented.

8.0 REFERENCES

The following references were used in the development of this Manual:

1. 10 CFR 830, Subpart A, "Quality Assurance Requirements," dated January 10, 2001.
2. DOE M 140.1-1B, Interface with the Defense Nuclear Facilities Safety Board.
3. DOE O 200.1, Information Management Program.
4. DOE O 210.2, DOE Corporate Operating Experience Program.
5. DOE P 226.1A, Department of Energy Oversight Policy.

6. DOE O 226.1A, Implementation of Department of Energy Oversight Policy.
7. DOE O 361.1A, Acquisition Career Development Program.
8. DOE P 411.1, Safety Management Functions, Responsibilities, and Authorities.
9. DOE M 411.1-1C, Safety Management Functions, Responsibilities, and Authorities.
10. DOE M 413.3-1, Project Management for the Acquisition of Capital Assets.
11. DOE O 414.1C, Quality Assurance.
12. DOE G 414.1-1A, Management Assessment and Independent Assessment Guide.
13. DOE G 414.1-2A, Management Assessment and Independent Assessment Guide for Use with 10 CFR Part 830, Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance. DOE G 414.1-3, Suspect/Counterfeit Items Guide for Use with 10 CFR 830, Subpart A, Quality Assurance Requirements, and DOE O 414.1B, Quality Assurance.
14. DOE G 414.1-4, Safety Software Guide for Use with 10 CFR 830 Subpart A, Quality Assurance Requirements, and DOE O 414.1C, Quality Assurance.
15. DOE P 450.4, Safety Management System Policy.
16. DOE P 450.7, Environment, Safety and Health (ESH) Goals.
17. DOE O 541.1B, Appointment of Contracting Officers and Contracting Officer Representatives.
18. DOE-STD-7501-99, The DOE Corporate Lessons Learned Program.
19. DOE-HDBK-7502-95, Implementing U.S. Department of Energy Lessons Learned Programs, Volumes I and II.
20. ANSI/ISO/ASQ Q9001-2000, American National Standard, Quality Management Systems – Requirements, dated December 13, 2000.

Appendix A – List of Acronyms

Appendix A
List of Acronyms

LIST OF ACRONYMS

BSO	Berkeley Site Office
CATS	Corrective Action Tracking System
CFR	Code of Federal Regulations
CHRIS	Corporate Human Resource Information System
DEAR	Department of Energy Acquisition Regulation
DOCs	Document Control System
DOE	Department of Energy
EH	Office of Environmental, Safety and Health
EPLS	Excluded Parties List System
ES&H	Environmental, Safety and Health
FAR	Federal Acquisition Regulation
FRAM	Functions, Responsibilities and Authorities Manual
HRD	Human Resources Division
HSS	Office of Health, Safety, and Security
HQ	Headquarters
IDP	Individual Development Plan
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
LBNL	Lawrence Berkeley National Laboratory
M	Manual
M&O	Management and Operating
O	Order
OQMP	Operating and Quality Management Plan
ORION	Oak Ridge Issues, Open Items, Nonconformances
P	Process
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
SMART	Science Management Action and Record Tracking
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SQA	Software Quality Assurance
S/CI	Suspect/Counterfeit Items
SSO	Safety System Oversight
STD	Standard
TQP	Technical Qualification Program

Appendix B– Crosswalk of DOE O 414.1C and ISO 9001-2000 with BSO Implementing Mechanisms

Appendix B
Crosswalk of DOE O 414.1C and ISO 9001-2000 with BSO Implementing Mechanisms

Attachment 1: Crosswalk of DOE O 414.1C and ISO 9001-2000 with BSO Implementing Mechanisms

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
<p>4.a Quality Assurance Program Requirements. Each DOE organization must develop and implement a QAP.</p>	<p>4.2 Documentation Requirements</p> <p>4.2.1 General The quality management system documentation shall include: documented statements of a quality policy and quality objectives; a quality manual; documented procedures required by this international standard; documents needed by the organization to ensure effective planning, operation, and control of its processes; records required by this international standard.</p> <p>4.2.2 Quality Manual The organization shall establish and maintain a quality manual that includes the scope and justification for any exclusion, references to procedures, and description of interaction between the processes of the quality management system.</p>	<ul style="list-style-type: none"> • BSO QAPP
<p>4.b(1) Management/Criterion 1—Program.</p> <p>(1) Establish an organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing work.</p> <p>(2) Establish management processes, including planning, scheduling, and providing resources for work.</p>	<p>4. Quality Management System</p> <p>4.1 General Requirements The organization shall establish, document, implement, and maintain a quality management system and continually improve its effectiveness.</p> <p>5.1 Management Commitment Top management shall provide evidence</p>	<ul style="list-style-type: none"> • BSO Organizational Chart • BSO FRAM • BSO QAPP • BSO Annual Performance Plan • BSO Contract Management Plan • BSO Oversight and Issues Management Program Manual

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>of its commitment to the development and implementation of the quality management system and continually improving its effectiveness.</p> <p>5.2 Customer Focus Top management shall ensure that customer requirements are determined and are met with the aim of enhancing customer satisfaction.</p> <p>5.3 Quality Policy Top management shall ensure that the quality policy is appropriate to the purpose of the organization and includes a commitment to comply with requirements and continually improve the effectiveness of the quality management system.</p> <p>5.4 Planning 5.4.1 Quality Objectives Top management shall ensure that quality objectives, including those needed to meet requirements for product, are established at relevant functions and levels within the organization.</p> <p>5.4.2 Quality Management System Planning Top management shall ensure that the planning of the quality management system is carried out in order to meet the requirements and quality objectives and is maintained.</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>5.5 Responsibility, Authority, and Communication</p> <p>5.5.1 Responsibility and Authority Top management shall ensure that responsibilities and authorities are defined and communicated within the organization.</p> <p>6. Resource Management</p> <p>6.1 Provision of Resources The organization shall determine and provide the resources needed to implement and maintain the quality management system and continually improve its effectiveness, and enhance customer satisfaction.</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
<p>4.b(2) Management/Criterion 2—Personnel Training and Qualification.</p> <p>(1) Train and qualify personnel to be capable of performing assigned work.</p> <p>(2) Provide continuing training to personnel to maintain job proficiency.</p>	<p>6.2 Human Resources</p> <p>6.2.1 General</p> <p>Personnel performing work affecting product quality shall be competent on the basis of appropriate education, training, skills, and experience.</p> <p>6.2.2 Competence, Awareness, and Training</p> <p>The organization shall determine the necessary competence for personnel performing work affecting product quality, provide training, evaluate the effectiveness, ensure that its personnel are aware of the relevance and importance of their activities, and maintain appropriate records of education, training, skills, and experience.</p>	<ul style="list-style-type: none"> • DOE O 361.1A • DOE O 413.3A • DOE M 413.3-1 • DOE O 541.1B • BSO Oversight and Issues Management Program Manual
<p>4.b(3) Management/Criterion 3—Quality Improvement.</p> <p>(1) Establish and implement processes to detect and prevent quality problems.</p> <p>(2) Identify, control, and correct items, services, and processes that do not meet established requirements.</p> <p>(3) Identify the causes of problems, and include prevention of recurrence as a part of corrective action planning.</p> <p>(4) Review item characteristics, process implementation, and other quality-related information to identify items, services, and processes needing improvement.</p>	<p>5.5.2 Management Representative</p> <p>Top management shall appoint a member of management who, irrespective of other responsibilities, shall have responsibility and authority.</p> <p>5.5.3 Internal Communication</p> <p>Top management shall ensure that appropriate communication processes are established within the organization and that communication takes place regarding the effectiveness of the</p>	<ul style="list-style-type: none"> • BSO QAPP • SMART database • EH CATS database and documentation • Lessons Learned Program • Quarterly ES&H Status Reports • BSO Site Office Annual Performance Plan • ORION database and documentation system • BSO Oversight and Issues Management Program Manual

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>quality management system.</p> <p>6.3 Infrastructure The organization shall determine, provide, and maintain the infrastructure needed to achieve conformity to product requirements.</p> <p>6.4 Work Environment The organization shall determine and manage the work environment needed to achieve conformity to product requirements.</p> <p>8. Measurement, Analysis, and Improvement 8.1 General The organization shall plan and implement the monitoring, measurement, analysis, and improvement processes needed.</p> <p>8.2 Monitoring and Measurement 8.2.1 Customer satisfaction As one of the measurements of the performance of the quality management system, the organization shall monitor information relating to customer perception as to whether the organization has met customer requirements.</p> <p>8.2.4 Monitoring and measurement of product The organization shall monitor and measure the characteristics of the</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>product to verify that product requirements have been met.</p> <p>8.3 Control of nonconforming product</p> <p>The organization shall ensure that product which does not conform to product requirements is identified and controlled to prevent its unintended use or delivery.</p> <p>8.4 Analysis of data</p> <p>The organization shall determine, collect, and analyze appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the quality management system can be made.</p> <p>8.5 Improvement</p> <p>8.5.1 Continual improvement</p> <p>The organization shall continually improve the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions, and management review.</p> <p>8.5.2 Corrective Action</p> <p>The organization shall take action to eliminate the cause of nonconformities in order to prevent recurrence. Corrective actions</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>shall be appropriate to the effects of the nonconformities encountered.</p> <p>8.5.3 Preventive action The organization shall determine action to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions shall be appropriate to the effects of the potential problems.</p>	
<p>4.b(4)Management/Criterion 4—Documents and Records.</p> <p>(1) Prepare, review, approve, issue, use, and revise documents to prescribe processes, specify requirements, or establish design.</p> <p>(2) Specify, prepare, review, approve, and maintain records.</p>	<p>4.2.3 Control of documents Documents required by the quality management system shall be controlled.</p> <p>4.2.4 Control of Records Records shall be established and maintained to provide evidence of conformity to requirements and of the effective operation of the quality management system.</p> <p>5.6.1 General Records from management reviews shall be maintained.</p>	<ul style="list-style-type: none"> • BSO Document Management System Manual • BSO Records Management Manual
<p>4.b(5) Performance/Criterion 5—Work Processes.</p> <p>(1) Perform work consistent with technical standards, administrative controls, and hazard controls adopted to meet regulatory or contract requirements using approved instructions, procedures, etc.</p> <p>(2) Identify and control items to ensure proper use.</p> <p>(3) Maintain items to prevent damage, loss, or</p>	<p>7. Product realization</p> <p>7.1 Planning of product realization The organization shall plan and develop the processes needed for product realization.</p> <p>7.2 Customer-related processes</p> <p>7.2.1 Determination of requirements</p>	<ul style="list-style-type: none"> • BSO organizational procedures • BSO staff follow contractor procedures and controls when on sites managed by contractors

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
<p>deterioration.</p> <p>(4) Calibrate and maintain equipment used for process monitoring or data collection.</p>	<p>related to the product</p> <p>The organization shall determine requirements specified by the customer, requirements not stated by the customer but necessary for specified or intended use, where known, statutory and regulatory requirements related to the product, and any additional requirements determined by the organization.</p> <p>7.2.2 Review of requirements related to the product</p> <p>The organization shall review the requirements related to the product and the review shall be conducted prior to the organization's commitment to supply a product to the customer.</p> <p>7.2.3 Customer communication</p> <p>The organization shall determine and implement effective arrangements for communicating with customers.</p> <p>7.5 Production and service provision</p> <p>7.5.1 Control of production and service provision</p> <p>The organization shall plan and carry out production and service provision under controlled conditions.</p> <p>7.5.2 Validation of processes for production and service provision</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>The organization shall validate any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement.</p> <p>7.5.3 Identification and traceability</p> <p>Where appropriate, the organization shall identify the product by suitable means throughout product realization.</p> <p>7.5.4 Customer property</p> <p>The organization shall exercise care with customer property while it is under the organization's control or being used by the organization.</p> <p>7.5.5 Preservation of product</p> <p>The organization shall preserve the conformity of product during internal processing and delivery to the intended destination.</p>	
<p>4.b(6) Performance/Criterion 6—Design.</p> <ol style="list-style-type: none"> (1) Design items and processes using sound engineering/scientific principles and appropriate standards. (2) Incorporate applicable requirements and design bases in design work and design changes. (3) Identify and control design interfaces. (4) Verify/validate the adequacy of design products using individuals or groups other than those who 	<p>7.3 Design and Development</p> <p>7.3.1 Design and development planning</p> <p>The organization shall plan and control the design and development of product.</p> <p>7.3.2 Design and development inputs</p> <p>Inputs relating to product</p>	<ul style="list-style-type: none"> • Design calculations are performed by BSO contractors and are covered by BSO contractors' quality assurance programs and design control procedures. BSO exercises oversight and control through approval of the contractors' QA plan, contractual requirements, work authorization controls, assessments, and performance evaluations.

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
<p>performed the work.</p> <p>(5) Verify/validate work before approval and implementation of the design.</p>	<p>requirements shall be determined and records maintained.</p> <p>7.3.3 Design and development outputs</p> <p>The outputs of design and development shall be provided in a form that enables verification against the design and development input and shall be approved prior to release.</p> <p>7.3.4 Design and development review</p> <p>At suitable stages, systematic reviews of design and development shall be performed in accordance with planned arrangements.</p> <p>7.3.5 Design and development verification</p> <p>Verification shall be performed in accordance with planned arrangements to ensure that the design and development outputs have met the design and development input requirements.</p> <p>7.3.6 Design and development validation</p> <p>Design and development validation shall be performed in accordance with planned arrangements to ensure that the resulting product is capable of meeting the requirements for the specified application or intended use, where</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>known.</p> <p>7.3.7 Control of design and development changes Design and development changes shall be identified and records maintained.</p>	
<p>4.b(7) Performance/Criterion 7—Procurement.</p> <ol style="list-style-type: none"> (1) Procure items and services that meet established requirements and perform as specified. (2) Evaluate and select prospective suppliers on the basis of specified criteria. (3) Establish and implement processes to ensure that approved suppliers continue to provide acceptable items and services. 	<p>7.4 Purchasing</p> <p>7.4.1 Purchasing process The organization shall ensure that purchased product conforms to specified purchase requirements.</p> <p>7.4.2 Purchasing information Purchasing information shall describe the product to be purchased, including where appropriate requirements for approval of product, procedures, processes and equipment, requirements for qualification of personnel, and quality management system requirements.</p>	<ul style="list-style-type: none"> • BSO follows the FAR and DEAR
<p>4.b(8) Performance/Criterion 8—Inspection and Acceptance Testing.</p> <ol style="list-style-type: none"> (1) Inspect and test specified items, services, and processes using established acceptance and performance criteria. (2) Calibrate and maintain equipment used for inspections and tests. 	<p>7.4.3 Verification of purchased product The organization shall establish and implement the inspection or other activities necessary for ensuring that purchased product meets specified purchase requirements.</p> <p>7.6 Control of Monitoring and Measuring Devices The organization shall determine the</p>	<ul style="list-style-type: none"> • BSO does not keep or maintain equipment used for inspections. BSO contractors calibrate and maintain inspection and testing equipment.

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide evidence of conformity of product to determined requirements.</p> <p>Where necessary to ensure valid results, measuring equipment shall be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards.</p>	
<p>4.b(9) Assessment/Criterion 9—Management Assessment.</p> <p>Ensure that managers assess their management processes and identify and correct problems that hinder the organization from achieving its objectives.</p>	<p>5.6 Management Review</p> <p>5.6.1 General</p> <p>Top Management shall review the organization’s quality management system, at planned intervals, to ensure its continuing suitability, adequacy, and effectiveness.</p> <p>5.6.2 Review input</p> <p>The input to management review shall include information on results of audits, customer feedback, process performance and product conformity, status of preventive and corrective actions, follow-up actions from previous management reviews, changes that could affect the quality management system, and recommendations for improvement.</p> <p>5.6.3 Review output</p> <p>The output from the management</p>	<ul style="list-style-type: none"> • BSO QAPP • BSO organizational procedures • BSO assessments, including management assessments, are scheduled and tracked in ORION • DOE P 226.1 • DOE O 226.1 • BSO Oversight and Issues Management Program Manual

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
	<p>review shall include any decisions and actions related to improvement of the effectiveness of the quality management system and its processes, improvement of product related to customer requirements, and resource needs.</p> <p>8.2.3 Monitoring and measurement of processes The organization shall apply suitable methods for monitoring and, where applicable, measurement of the quality management system processes.</p>	

Quality Assurance Criteria (DOE O 414.1C)	American National Standard for Quality Management Systems (ISO 9001-2000)	Implementing Mechanisms (Note: Current versions of BSO directives are not posted on a directives website)
<p>4.b(10) Assessment/Criterion 10—Independent Assessment.</p> <ol style="list-style-type: none"> (1) Plan and conduct independent assessments to measure item and service quality, to measure the adequacy of work performance, and to promote improvement. (2) Establish sufficient authority and freedom from line management for independent assessment teams. (3) Ensure that persons conducting independent assessments are technically qualified and knowledgeable in the areas to be assessed. 	<p>8.2.2 Internal audit</p> <p>The organization shall conduct internal audits at planned intervals to determine whether the quality management system conforms to the planned arrangements, to the requirements of this international standard, and to the quality management system requirements established by the organization, and is effectively implemented and maintained.</p>	<ul style="list-style-type: none"> • BSO organizational procedures. • Independent assessments are identified and tracked in ORION. • The Office of Security and Safety Performance Assurance also conducts independent assessments, which are tracked in EH CATS. • Management selection of the review team leader and team leader selection of the team members ensures that persons conducting independent assessments are technically qualified and knowledgeable. • DOE P 226.1 • DOE O 226.1A • BSO Oversight and Issues Management Program Manual

Appendix C – Crosswalk of Quality and Integrated Safety Management System Elements

Appendix C
Crosswalk of Quality and Integrated Safety Management System Elements

Crosswalk of Quality and Integrated Safety Management System Elements

Quality Assurance Criteria	Program	Training and Qualification	Quality Improvement	Documents and Records	Work Processes	Design	Procurement	Inspection/Acceptance Testing	Management Assessment	Independent Assessment
ISM Principles and Functions										
ISM Guiding Principles										
Line Management Responsibility for Safety										
Clear Roles and Responsibilities										
Competence Commensurate with Responsibilities										
Balanced Priorities										
Identification of ES&H Standards and Requirements										
Hazard Controls Tailored to Work Being Performed										
Operations Authorization										
ISM Core Functions										
Define the Scope of Work										
Analyze the Hazards										
Develop and Implement Hazard Controls										
Perform Work within Controls										
Provide Feedback and Continuous Improvement										

Note: Adapted from DOE G 414.1-2A

Appendix D – Crosswalk of Quality and Environmental Management System Elements

Appendix D
Crosswalk of Quality and Environmental Management System Elements

Quality Assurance Criteria Environmental Management System (ISO 14001 Standard Requirements)	Program	Training & Qualification	Quality Improvement	Documents & Records	Work Processes	Design	Procurement	Inspection/ Acceptance Testing	Management Assessment	Independent Assessment
	General Requirements									
Environmental Policy										
Planning										
Environmental aspects										
Legal and other requirements										
Objectives, targets, and program(s)										
Implementation and Operation										
Resources, roles, responsibility, and authority										
Competence, training, and awareness										
Communication										
Documentation										
Control of documents										
Operational control										
Emergency preparedness and response										
Checking										
Monitoring and measurement										
Evaluation of compliance										
Nonconformity, corrective action, and preventive action										
Control of records										
Internal audit										
Management Review										
Environmental Protection Program (DOE O 450.1)										
Environmentally and economically beneficial landscape practices										
Centralized procurement and distribution program for toxic and hazardous contents										
Pollution Prevention Program implementation and monitoring										
Pollution Prevention Opportunity Assessments										
Emergency Planning and Community Right-to-Know Act										
Planning and management requirements for historic property and environmental management										

Note: Adapted from DOE O 450.1 and Executive Order 13148, Greening the Government Through Leadership in

Quality Assurance Criteria Environmental Management System (ISO 14001 Standard Requirements)	Program
	Training & Qualification
	Quality Improvement
	Documents & Records
	Work Processes
	Design
	Procurement
	Inspection/ Acceptance Testing
	Management Assessment
	Independent Assessment

Environmental Management