

# Quality Assurance Plan

## sPHENIX Project

Brookhaven National Laboratory  
Upton, New York

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sPHENIX Project

### QUALITY ASSURANCE PLAN

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# Quality Assurance Plan

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## Quality Assurance Plan Version Control

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A	2/28/2018	Chuck Gortakowski	Initial release
B	5/10/2018	Chuck Gortakowski	Revised to add clarification thought out document and added information on Matrixed model

## LIST OF ACRONYMS AND ABBREVIATIONS

BNL	Brookhaven National Laboratory
C-A	Collider – Accelerator Department
CD	Critical Decision
CM	Configuration Management
DOE	Department of Energy
ES&H	Environment, Safety and Health
ESH&Q	Environment, Safety, Health and Quality
ISMS	Integrated Safety Management System
L2	Level 2
M&TE	Measuring and Test Equipment
PC	Project Coordinator
PEP	Project Execution Plan
PHENIX	Pioneering High-Energy Nuclear Interacting Experiment
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QAP	Quality Assurance Plan
QMS	Quality Management System
RHIC	Relativistic Heavy Ion Collider
SBMS	Standards-Based Management System
WBS	Work Breakdown Structure

# TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS .....	3
1 INTRODUCTION .....	5
1.1 PURPOSE.....	6
1.2 SCOPE.....	6
1.3 APPROACH .....	6
1.4 GRADED APPROACH .....	7
1.5 DEFINITIONS .....	7
2 QUALITY ASSURANCE PROGRAM.....	8
2.1 RESPONSIBILITY FOR MANAGING .....	9
2.2 ORGANIZATION AND LEVEL OF AUTHORITY AND INTERFACE.....	9
3 PERSONNEL TRAINING AND QUALIFICATION .....	10
4 QUALITY IMPROVEMENT .....	10
5 DOCUMENTS AND RECORDS.....	11
6 WORK PROCESSES .....	11
7 DESIGN.....	12
7.1 DESIGN PROCESS .....	12
7.2 DESIGN VERIFICATION AND VALIDATION.....	12
7.3 CONFIGURATION MANAGEMENT .....	13
8 PROCUREMENT .....	14
9 INSPECTION AND ACCEPTANCE TESTING .....	15
10 MANAGEMENT ASSESSMENT .....	15
ATTACHMENT 1 .....	16

# 1 INTRODUCTION

The sPHENIX Project is a project to design and upgrade the Pioneering High-Energy Nuclear Interacting Experiment (PHENIX) detector at the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory (BNL). This upgrade brings exciting new capability to the RHIC program by opening new and important channels for experimental investigation and utilizing fully the luminosity of the recently upgraded RHIC facility. It enables a compelling jet physics program that will address fundamental questions about the nature of the strongly coupled quark-gluon plasma discovered experimentally at RHIC to be a perfect fluid. The project is funded by the U.S. Department of Energy (DOE), RIKEN and other organizations.

As a result of the sPHENIX Project (hereafter, sPHENIX) being located at BNL, the Project will adopt, in its entirety, BNL's institutional Quality Assurance Program. This Program is documented and delivered through BNL's Standards-Based Management System (SBMS). The BNL SBMS contains the BNL Quality Assurance Program Description, Management System Descriptions (including a Quality Management System), and Subject Areas.

The BNL Quality Assurance Program uses an integrated management systems approach. It describes how the various BNL management system processes and functions provide a sound approach that conforms to the basic ten criteria defined in DOE Order 414.1 D, Quality Assurance. These criteria are broken into three distinct categories—Management, Performance and Assessment—as follows:

Management	Performance	Assessment
1. Program	5. Work processes	9. Management assessment
2. Personnel training and qualification	6. Design	10. Independent assessment
3. Quality improvement	7. Procurement	
4. Documents and records	8. Inspection and acceptance testing	

## 1.1 Purpose

The purpose of this Quality Assurance Plan (QAP) is to outline how the sPHENIX Project aligns with the institutional Quality Assurance (QA) requirements and any supplemental project-specific requirements. This plan seeks to unify the project's QA activities, which are spread across multiple laboratories and universities, and is implemented via documented processes that address specific quality requirements.

## 1.2 Scope

This QAP provides requirements applicable to sPHENIX, encompassing all activities, including but not limited to design, fabrication, testing, integration and installation at BNL. Specific QA procedures will be developed, as necessary, for particular component or system QA. Institutional collaborators will be responsible for design, development, and component fabrication via Memoranda of Understanding (MOUs) and Statements of Work (SOWs) with BNL/sPHENIX.

## 1.3 Approach

BNL manages all of its requirements through an integrated management system approach called the Standards-Based Management System (SBMS), whereby all functions of the Laboratory are defined within a finite set of fully integrated Management Systems. BNL.

The purpose of the QMS is to embed quality management methodology throughout the various Laboratory management systems and associated processes. In doing so, it also delivers and maintains a Quality Assurance Program Description, which describes how various management system processes and functions provide for a Laboratory management approach that conforms to the basic requirements defined in the DOE Order 414.ID, *Quality Assurance*.

The QMS includes a graded approach, as documented in the Graded Approach for Requirements Subject Area. BNL uses the graded approach for applying requirements in order to emphasize and allocate proper resources to those items and/or processes that may have the greatest effect upon personnel, environment, safety, health, security, cost, data, equipment, performance, and schedule. In some cases, the graded approach is embedded into topic-specific SBMS subject areas.

The sPHENIX Project will be the responsible organization within the Nuclear & Particle Physics (NPP) Directorate for implementing the QMS requirements for all project activities through completion of integration and installation.

A crosswalk between the ten criteria in DOE Order 414.ID and the implementing institutional SBMS documents and sPHENIX project-specific, supplemental documents is provided as Attachment 1. As the project matures, the crosswalk will be

updated to include additional supplemental documents.

As part of annual planning, an integrated assessment plan will be developed, including management assessments, independent assessments, and periodic project reviews, to ensure QA compliance. The BNL Directorate QA representative (Quality Rep) will review this QAP (Interface Document) yearly to evaluate impacts from revisions to the BNL laboratory-wide QAP. After the review, the Quality Rep will advise the need for any necessary revisions to the Interface Document.

#### **1.4 Graded Approach**

This QAP embodies the concept of graded approach; that is, selecting and applying an appropriate level of analysis and controls to work activities, equipment, and items commensurate with the potential for environmental, safety, health, radiological, or programmatic impact.

The graded approach does not allow the sPHENIX project's internal or external requirements to be ignored or waived, but does allow the degree of controls, verification, and documentation to vary in meeting requirements based on the risk level.

This methodology is described in the BNL SBMS *Graded Approach for Requirements* Subject Area and was developed to facilitate the application of the graded approach.

#### **1.5 Definitions**

The following is a list of definitions for terminology used in this plan:

**Configuration Management (CM)** - The technical and administrative direction and surveillance actions taken to identify and document the functional and physical characteristics of a configuration item; to control changes to a configuration item and its characteristics; and to record and report change processing and implementation status.

**Environment, Safety and Health (ES&H)** - An all-inclusive term that encompasses protection of the public, workers, and the environment.

**Independent Assessment** - An assessment conducted by individuals within the organization or company but independent from the work or process being evaluated, or by individuals from an external organization.

**Item** - An all-inclusive term used in place of appurtenance, assembly, component, equipment, material, module, part, structure, product, software, subassembly, subsystem, system, unit, or support systems.

**Management Assessment** - A periodic introspective self-analysis, conducted by management, to evaluate management systems, processes, and programs ensuring the project team's work is properly focused on achieving desired results.

**Measuring and Test Equipment (M&TE)** - Devices or systems used to calibrate, measure, gauge, test, inspect, or control in order to acquire research and development, test, or operational data to determine compliance with design, specifications, or other technical requirements

**Quality (Q)** - The condition achieved when an item, service, or process meets or exceeds the user's requirements and expectations.

**Quality Assurance (QA)** - All actions and controls necessary to provide confidence that quality is achieved.

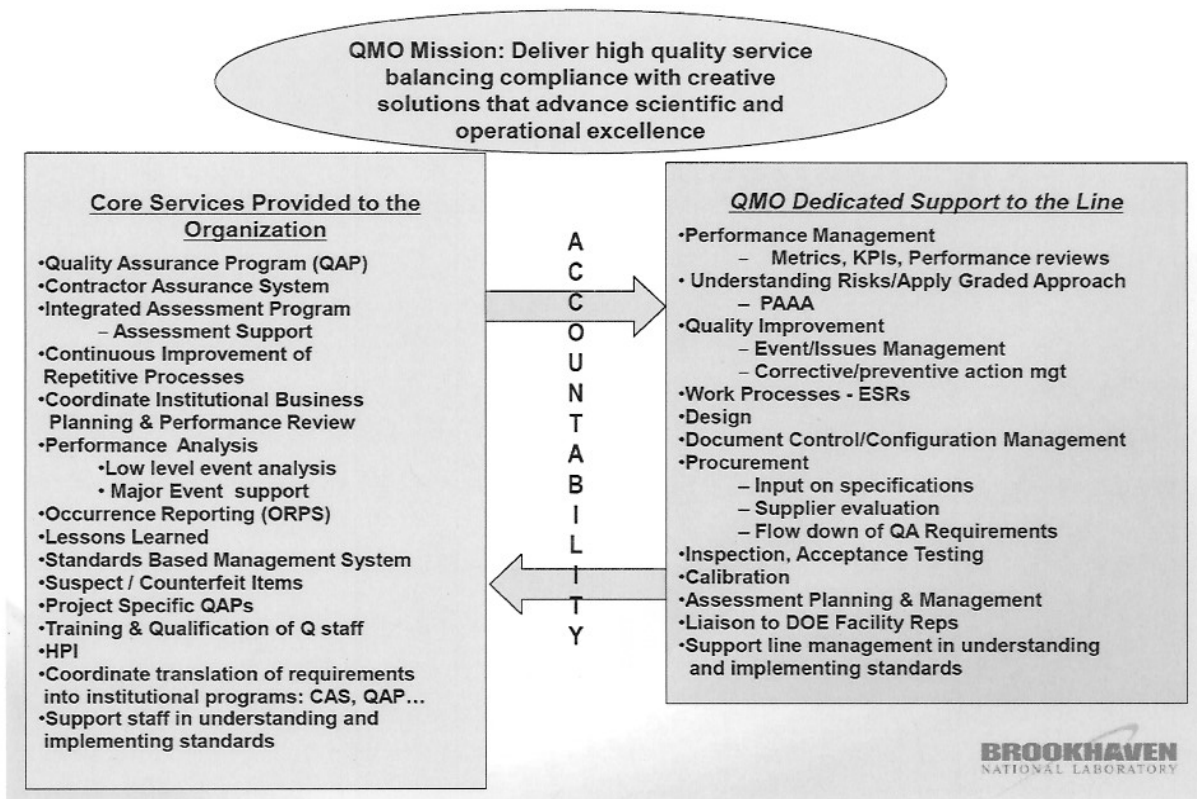
**QA Plan (QAP)** - The document describing the QA program requirements that the project will implement. The QAP typically includes a matrix of the QA requirements and the associated implementing procedures used by the project.

**QA Program** - The overall program or management system established to assign responsibilities and authorities, define policies and requirements, and provide for the performance and assessment of work.

## 2 QUALITY ASSURANCE PROGRAM

The sPHENIX project is carried out by BNL, as described in the sPHENIX Project Execution Plan (PEP), and managed by the sPHENIX Project Management. The project has a supporting structure organized according to the Work Breakdown Structure (WBS) assigned to the project and listed in the main body of the PEP. The Project Director maintains an organization chart, which includes a matrixed Quality Representative from BNL's central quality organization. In doing so, this allows for a tiered structure for the flow-down of institutional QA requirements, as well as the development of project-specific requirements. This also allows a level of quality engineering independence to ensure the project meets all quality-related requirements. This matrixed service is maintained with an annual Service Level Agreement (SLA) that allows for other quality engineering support from the central organization when necessary. The SLA structure is outlined in the figure below.





## 2.1 Responsibility for Managing

The sPHENIX Project Director manages the project and is responsible for achieving performance goals.

The sPHENIX Quality Assurance Representative (QAR) is responsible for supporting that a quality system is established, implemented, and maintained in accordance with BNL's institutional quality and project-specific QA requirements. The QAR reports to the Deputy Quality Manager within the central organization, as well as the sPHENIX Project Director for the project. The QAR provides oversight and support to the project participants to ensure a consistent quality program.

The sPHENIX L2 Managers are responsible for implementing the QAP within their subsystem and reporting their QA issues to the sPHENIX Project Director.

## 2.2 Organization and Level of Authority and Interface

The PEP and this QAP together define the responsibility, authority, organization and interrelation of personnel who manage, perform, and verify work that affects quality. This QAP defines the QA roles and responsibilities of management and the working levels of the project.

All employees, collaborators, contractors, and subcontractors are responsible for the quality of the work that they perform and/or supervise. Each has the authority to stop work and report adverse conditions that affect the quality of the project deliverables to their respective managers. Personnel responsible for the project components or systems determine and document their acceptance criteria. Management at each level is responsible for evaluation of quality through management assessments; however, independent assessments may be requested by project management.

The QAR serves as a focal point to assist sPHENIX management in delivering and maintaining the QA program requirements. All sPHENIX personnel can consult with the QAR and seek guidance on quality-related matters. The QAR reports, as necessary, on the performance of the quality system to the Project Director for his/her review and as a basis for improvement of the quality system.

### **3 PERSONNEL TRAINING AND QUALIFICATION**

sPHENIX managers are responsible for ensuring that their staff members are trained and qualified to perform their assigned work effectively and safely.

The training process for employees, guests, and contractors is described in the BNL SBMS *Training and Qualification* Subject Area. Personnel will each have a Job Training Assessment (JTA) that identifies required training for their position. The Brookhaven Training Management System (BTMS) will be used to track the JTA status of each worker.

All project participants are responsible for ensuring that their training and qualification requirements are fulfilled, including continuing training to maintain proficiency and qualifications, where applicable.

### **4 QUALITY IMPROVEMENT**

Processes to detect and prevent quality problems will be established and implemented, including:

- Design reviews
- Baseline change reviews
- Inspection and testing
- Work planning
- Assessments

Item characteristics, process implementation, and other quality-related information will be reviewed and the data analyzed to identify items, services, and processes needing improvement.

Problems identified by assessment, analysis, test, inspection, and other means will be controlled and corrected using the graded approach described in the BNL SBMS *Graded Approach* Subject Area. Where appropriate, the cause(s) of the problem will be identified and corrected to prevent recurrence.

Occurrence reporting will be executed as required by DOE for certain defined events or conditions as described in the BNL SBMS *Events Issues Management* Subject Area

To promote continual improvement, sPHENIX will participate in the BNL Lessons Learned Program. This program provides a systematic approach to identify and analyze relevant information for both good and adverse work practices that can influence successful project execution. Sources of lessons learned include the DOE Lessons Learned List Server, the BNL Lessons Learned Database, and sPHENIX staff who participate in peer reviews of other DOE projects.

All project participants are encouraged to identify problems or potential quality improvements and may do so without fear of reprisal or recrimination.

## **5 DOCUMENTS AND RECORDS**

Documents will be prepared, reviewed, approved, issued, used, and revised described in the BNL SBMS *Document Control* Subject Area, and sPHENIX document control procedure.

BNL SBMS *Document Control* Subject Area states the requirements and offers guidance for developing, reviewing, approving, controlling, and maintaining documents. The project managers will use the graded approach described in this plan to determine work in their scope that requires the preparation of controlled documents.

Records are prepared and maintained to provide evidence that activities have been performed or results have been achieved. Guidelines will be followed for storing and maintaining records for the project in accordance with BNL SBMS *Records Management* Subject Area. Project management, team, and task leaders are responsible for identifying the records to be preserved. In addition to the technical, cost, and schedule baseline and all changes to it, records must be preserved that show evidence or proof that a decision was made or an action taken and the justification for the decision or action.

## **6 WORK PROCESSES**

sPHENIX workers are responsible for the quality of their work and L2 Managers are required to identify the resources and support systems to enable staff to do their work. All work will be performed using methods that promote successful completion of tasks,

conformance to project requirements, and compliance with Environment, Safety, Health and Quality (ESH&Q) rules and as described in the BNL SBMS *Work Planning and Control for Experiments and Operations* Subject Area. Work processes consist of a series of actions planned and carried out by qualified personnel using approved procedures, instructions, and equipment under administrative, technical, and environmental controls to achieve a result.

## **7 DESIGN**

The sPHENIX design process provides appropriate control of design inputs and design outputs. The primary design inputs are the sPHENIX programmatic and scientific/engineering requirements documentation. The primary design outputs are the programmatic (cost, schedule, management reports, etc.) and scientific/engineering documents (specifications, drawings, engineering reports, etc.). The basis of the design process requires sound engineering judgment and practices, adherence to scientific principles, and use of applicable orders, codes and standards, including ESH&Q concerns using the BNL SBMS *Engineering Design* Subject Area.

### **7.1 Design Process**

The scope of design work for any given scientific/engineering work group is defined by the sPHENIX requirements. From the requirements, preliminary design of the project will begin by breaking the work into sets of engineering drawings, specifications, and reports. This is the design output.

Throughout the design process, engineers, designers and other technical staff will determine QA inspection criteria of fabricated parts and installations. Close coordination is also made with the project scientists to assure that engineering satisfies the scientific requirements of the experiment. Configuration management, through use of engineering drawing management software, will be implemented to control designs. Final design work sets the final QA parameters for the parts, assemblies, and installations. Design during production is confined, making changes necessary to facilitate production, drawing error correction, material substitutions, and the like.

### **7.2 Design Verification and Validation**

The design will be verified and validated through the graded approach to an extent commensurate with its importance to safety, complexity of design, degree of standardization, state of the art, and similarity to proven design approaches. Acceptable verification methods include but are not limited to any one or combination of (1) design reviews, (2) alternate calculations, and (3) qualification testing and comparison of the new design with a similar proven design, if available. Verification work will be

completed before approval and implementation of the design.

Design reviews are conducted by the sPHENIX Technical Committee chartered by the Project Director prior to final design acceptance and implementation.

Design reviews shall verify/validate the following at the appropriate milestone:

- Technical adequacy of the design
- Specifications
- Adherence to requirements
- Interface compatibility
- Work instructions
- Review of test results and other applicable reports
- Design calculations and drawings
- Reliability and useful life considerations
- Calibration program for measurement and test data.

Where the design method involves the use of computer software to make design calculations or dynamic models of the structure, system, or component's functionality, the software must have been demonstrated to produce validated results following the BNL SBMS *Software Quality Assurance* (SQA) Subject Area

### **7.3 Configuration Management (CM)**

Configuration management is accomplished throughout the project life-cycle through use of fundamental engineering documentation principles such as design requirements change control, drawing and specification change control, and revision control.

Application of a sound CM process protects the integrity of sPHENIX's Structures, Systems, and Components (SSCs), as well as design information and documentation. The sPHENIX CM process is applied during the design phase of our SSC and maintained throughout the lifecycle of the sPHENIX SSCs.

The BNL SBMS *Engineering Design* Subject Area describes how to establish configuration control for equipment used for scientific purposes and facility construction. It provides for the verification and validation of design adequacy by Technical Authorities (i.e., competent individuals, approved by management, other than those who performed the work), before the approval and implementation of the design. It uses a process that fosters the use of sound engineering/scientific principles, risk management, and standards for design work.

The *sPHENIX Configuration Management* procedure describes the process by which changes to the configuration of sPHENIX SCCs are documented to assure that a reliable

and consistent system reflects the current configuration of the parts, assemblies and/or complete articles which comprise the SCCs.

Revised drawings and specifications are to be created, maintained and controlled as described in *sPHENIX Engineering Documentation Control* procedure.

L2 Managers may use site-specific formalized processes for generating, maintaining, and reviewing engineering changes, providing that they meet established quality and configuration management requirements, are in accordance with contractual requirements, and meet the design requirements.

## 8 PROCUREMENT

Procurement controls will be implemented to ensure that purchased items and services meet project needs and comply with applicable quality requirements.

sPHENIX personnel requesting procurement of items and services are responsible for providing technical, ESH&Q, and other specifications that adequately describe the item or service being procured so that the supplier can understand what is desired and what will be accepted. Development of these specifications may be achieved through the involvement of QAR and through established review and approval systems.

The BNL SBMS *Purchase Requisition Review for Quality-related Requirements* Subject Area provides a methodology for selecting and applying quality-related requirements to be imposed upon a supplier. Quality requirements that become part of the procurement/contract document are selected based upon the graded approach. The graded approach is used to ensure that only those requirements necessary are selected, i.e., requirements that may incur a cost are selected based on the mitigation of programmatic and ES&H concerns.

L2 Managers will use established BNL processes to ensure that procured items and services meet the established requirements, perform as specified, and meet the expectations of the end user. The need for inspection and acceptance testing is determined during project or activity planning, based on the graded approach. In addition, the processes will ensure that suppliers are evaluated and selected on the basis of specified criteria. The stringency of the procurement requirements is commensurate with the ESH&Q risk of the purchased items or services to the project or activity. For critical items, these requirements may include but are not limited to establishing supplier milestones, inspections of vendor progress during the manufacturing phase, production of prototypes, and delivery of pre-production units for inspection and testing.

Counterfeit and/or suspect parts are prohibited. Inspections will be used to detect violations. The BNL SBMS *Suspect/Counterfeit Items* Subject Area provides a process for conducting inspections of acquired items, items in storage/inventories, and installed components/assemblies to look for suspect/counterfeit items.

## 9 INSPECTION AND ACCEPTANCE TESTING

Inspection and testing of specified items, services, and processes will be conducted using established acceptance and performance criteria, and equipment used for inspection and tests will be calibrated and maintained.

The need for inspection and acceptance testing is determined during project or activity planning based on the graded approach. Nonconforming items will be identified and controlled to prevent their unintended use.

The BNL SBMS *Inspection and Acceptance* Subject Area provide steps for inspection, including testing, and acceptance of internal and external purchased items/services; conducting in-process, final, and source inspections; and determining criteria for inspection and acceptance.

Designated inspection/tests will be performed using equipment that is calibrated and maintained. The calibration status will be readily discernible and associated calibration procedures, documentation, and records shall be prepared and maintained. Calibrated equipment will be properly protected, handled, and maintained to preclude damage that could invalidate its accuracy. Measuring and test equipment (MT&E) that is found out of calibration will be identified and its impact evaluated as applicable.

When required, acceptance and performance criteria are developed and documented for key, complex, or critical inspection/test activities. If an item is nonconforming, it is identified as such to avoid its inadvertent use.

All inspection and acceptance testing results will be maintained as project records in accordance with this QAP, Section 5, *Documents and Records*.

## 10 MANAGEMENT and INDEPENDENT ASSESSMENT

sPHENIX management, at all levels, will regularly assess their management processes, and identify and correct problems that hinder the project from achieving its objectives. The management assessment process shall meet the requirements as stated in the Management System Description for the Integrated Assessment Program.

When performance does not meet established standards, management shall, with the assistance of others with appropriate expertise, determine the cause and initiate corrective action. QAR may assist, lead, or facilitate cause investigations in accordance with BNL *Event/Issues Management* Subject Area.

# ATTACHMENT 1

## Crosswalk between DOE Order 414.1D, BNL Standards-Based Management System Documents and sPHENIX Documents

DOE O 414.1D Criterion	BNL Standards-Based Management System Documents	sPHENIX Supporting Documents
<p><b>Criterion 1 – Management/Program</b></p> <p>(a) Establish an organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing work.</p> <p>(b) Establish management processes, including planning, scheduling, and providing resources for work.</p>	<ul style="list-style-type: none"> <li>• <u>Quality Assurance Program Description</u></li> <li>• <u>Quality Management Management System Description</u></li> <li>• <u>BNL Organization Chart</u></li> <li>• <u>Graded Approach for Requirements Subject Area</u></li> <li>• <u>Roles, Responsibilities, Accountabilities, and Authorities (R2A2) Subject Area</u></li> <li>• <u>Integrated Assessment Program Management System Description</u></li> <li>• Policies</li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Project Execution Plan (PEP)</li> <li>• sPHENIX Organization Chart in the PEP</li> </ul>
<p><b>Criterion 2 – Management/Personnel Training and Qualification.</b></p> <p>(a) Train and qualify personnel to be capable of performing their assigned work.</p> <p>(b) Provide continuing training to personnel to maintain their job proficiency.</p>	<ul style="list-style-type: none"> <li>• <u>Training and Qualifications Management System Description</u></li> <li>• <u>Training and Qualifications Subject Area</u></li> <li>• <u>Guests and Visitors Subject Area</u></li> <li>• <u>Work Planning and Control for Experiments and Operations Subject Area</u></li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Awareness Training (sP-SE.QAM.005)</li> </ul>
<p><b>Criterion 3 – Management/Quality Improvement</b></p> <p>(a) Establish and implement processes to detect and prevent quality problems.</p> <p>(b) Identify, control, and correct items, services, and processes that do not meet established requirements.</p> <p>(c) Identify the causes of problems, and include prevention of recurrence as a part of corrective action planning.</p> <p>(d) Review item characteristics, process implementation, and other quality-related information to identify items, services, and processes needing improvement.</p>	<ul style="list-style-type: none"> <li>• <u>Integrated Assessment Program Management System Description</u></li> <li>• <u>Integrated Assessment Subject Area</u></li> <li>• <u>Health, Safety and Security Regulatory Compliance Validation and Noncompliance Reporting Program Description</u></li> <li>• <u>Lessons Learned Subject Area</u></li> <li>• <u>Event/Issues Management Subject Area</u></li> </ul>	



DOE O 414.1D Criterion	BNL Standards-Based Management System Documents	sPHENIX Supporting Documents
<p><b>Criterion 4 – Management/Documents and Records.</b></p> <p>(a) Prepare, review, approve, issue, use, and revise documents to prescribe processes, specify requirements, or establish design.</p> <p>(b) Specify, prepare, review, approve, and maintain records.</p>	<ul style="list-style-type: none"> <li>• <u>Document Control</u> Subject Area</li> <li>• <u>Records Management</u> Management System Description</li> <li>• <u>Records Management</u> Subject Area</li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Engineering Documentation Control (sP-SE.QAM.002)</li> <li>• sPHENIX Procedure Preparation Guidelines (sP-SE.QAM.001)</li> </ul>
<p><b>Criterion 5 – Performance/Work Processes.</b></p> <p>(a) 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>(b) Identify and control items to ensure their proper use. (c) Maintain items to prevent their damage, loss, or deterioration.</p> <p>(d) Calibrate and maintain equipment used for process monitoring or data collection.</p>	<ul style="list-style-type: none"> <li>• <u>Worker Safety and Health</u> Management System Description</li> <li>• <u>Acquisition Management System</u> Management System Description</li> <li>• <u>Graded Approach for Requirements</u> Subject Area</li> <li>• <u>Calibration</u> Subject Area</li> <li>• <u>Inspections and Acceptance</u> Subject Area</li> <li>• <u>Work Planning and Control for Experiments and Operations</u> Subject Area</li> <li>• <u>Materials Requiring Special Handling</u> (Including Age Sensitive Material) Subject Area</li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Work Planning (sP-SE.QAM.004)</li> <li>• sPHENIX Environmental, Safety and Health Plan</li> </ul>
<p><b>Performance/Criterion 6 – Design</b></p> <p>(a) Design items and processes using sound engineering/ scientific principles and appropriate standards.</p> <p>(b) Incorporate applicable requirements and design bases in design work and design changes.</p> <p>(c) Identify and control design interfaces.</p> <p>(d) Verify/validate the adequacy of design products using individuals or groups other than those who performed the work.</p> <p>(e) Verify/validate work before approval and implementation of the design.</p>	<ul style="list-style-type: none"> <li>• <u>Engineering Design</u> Subject Area</li> <li>• <u>Accelerator Safety</u> Subject Area</li> <li>• <u>Nuclear/Criticality Safety</u> Subject Area</li> <li>• <u>Software Quality Assurance</u> Subject Area</li> <li>• <u>Configuration Management</u> Program Description</li> <li>• <u>Graded Approach for Requirements</u> Subject Area</li> <li>• <u>Hazard Analysis</u> Subject Area</li> <li>• <u>Software Quality Assurance</u> (SQA) Subject Area</li> <li>• <u>Electrical Safety</u> Subject Area</li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Configuration Management (sP-SE.QAM.003)</li> <li>• sPHENIX Engineering Documentation Control (sP-SE.QAM.002)</li> <li>• sPHENIX Guidelines for the Conduct of Design Reviews (sP-SE.QAM.006)</li> </ul>

DOE O 414.1D Criterion	BNL Standards-Based Management System Documents	sPHENIX Supporting Documents
<p><b>Criterion 7 – Performance/Procurement.</b></p> <p>(a) Procure items and services that meet established requirements and perform as specified.</p> <p>(b) Evaluate and select prospective suppliers on the basis of specified criteria.</p> <p>(c) Establish and implement processes to ensure that approved suppliers continue to provide acceptable items and services.</p>	<ul style="list-style-type: none"> <li>• <u>Acquisition Management Management System Description</u></li> <li>• <u>Purchase Requisition Review for Quality-related Requirements</u> Subject Area</li> <li>• <u>Supplier Pre-Award Evaluation</u> Subject Area</li> <li>• <u>Procurement Operations Manual</u></li> <li>• <u>Graded Approach for Requirements</u> Subject Area</li> <li>• <u>Inspections and Acceptance</u> Subject Area</li> <li>• <u>Suspect/Counterfeit Items</u> Subject Area</li> </ul>	<p>sPHENIX Procurement Guidelines (sP-SE.PM.001) Advance Procurement Plan</p>
<p><b>Criterion 8 – Performance/Inspection and Acceptance Testing</b></p> <p>(a) Inspect and test specified items, services, and processes using established acceptance and performance criteria.</p> <p>(b) Calibrate and maintain equipment used for inspections and tests.</p>	<ul style="list-style-type: none"> <li>• <u>Inspections and Acceptance</u> Subject Area</li> <li>• <u>Calibration</u> Subject Area</li> <li>• <u>Suspect/Counterfeit Items</u> Subject Area</li> <li>• <u>Event/Issues Management</u> Subject Area</li> </ul>	
<p><b>Criterion 9 – Assessment/Management Assessment.</b></p> <p>(a) Ensure that managers assess their management processes and identify and correct problems that hinder the organization from achieving its objectives.</p>	<ul style="list-style-type: none"> <li>• <u>Integrated Assessment Program Management System Description</u></li> <li>• <u>Environmental Assessments and ESH Management Review</u> Subject Area</li> <li>• <u>Environment, Safety, Health and Quality (Tier I) Inspections</u> Subject Area</li> <li>• <u>Organizational Self-assessment</u> Subject Area</li> <li>• <u>Management System Self-assessment</u> Subject Area</li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Project Execution Plan (PEP)</li> <li>• sPHENIX Quality Plan</li> </ul>
<p><b>Criterion 10 – Assessment/Independent Assessment.</b></p> <p>(a) Plan and conduct independent assessments to measure item and service quality and the adequacy of work performance and to promote improvement.</p> <p>(b) Establish sufficient authority and freedom from line management for independent assessment teams.</p>	<ul style="list-style-type: none"> <li>• <u>Integrated Assessment Program Management System Description</u></li> </ul>	<ul style="list-style-type: none"> <li>• sPHENIX Project Execution Plan (PEP)</li> <li>• sPHENIX Quality Plan</li> </ul>