



PHENIX CONFIGURATION MANAGEMENT

procedure name

PHENIX Procedure No. PP-2.5.6.1-03

Revision: A

Date: 9/28/2012

Hand Processed Changes

HPC No.

Date

Page Nos.

Initials

- *Typo: Under 4.2.2, the last bullet item has repeated words: "Impact on items already items already produced/procured..." should be written as "Impact on items already produced/procured..."*
- *Typo: Under References, "C-A OPM 02-42" should be written as "C-A OPM 2.42"*
- *Typo: Under Reference, PHENIX Document # PP-2.5.6.1-1, "Procedure Creation" should be written as "Procedure Preparation Guidelines"*

44. *PP-2.5.6.1-04 (Rev. A):*

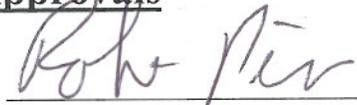
Approvals


PHENIX Engineering

Date 9/27/12

PHENIX Safety


Date 9-27-12


PHENIX Work Control

Date 9/27/12


PHENIX Management

Date 9/28/2012

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REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	AUTHOR	APPROVED BY	CURRENT OVERSIGHT
A	Original Issue.	9/28/2012	D. Lynch	D. Lynch, P Giannotti, R Pisani, E. O'Brien	D. Lynch

Introduction

The PHENIX experiment is a large multi faceted array of detector subsystems designed to study the properties of the products of nuclear sub-particles liberated by collisions between heavy ions with other heavy ions, heavy ions with protons and/or deuterons, and proto/deuteron collisions with other protons/deuterons. The experiment is run by a multi-national collaboration of scientists, engineers and technicians from numerous institutions including universities and national laboratories from many nations. In order to facilitate the constant evolution of the experimental apparatus as the experiment matures, while maintaining an accurate and current technical description of the apparatus, a structured but flexible configuration management plan is needed. (Note: this document applies to PHENIX equipment and facilities related to the PHENIX experiment complex. PHENIX equipment and facilities related to office spaces in the PHYSICS department building are not covered by this document, but are subject to PHYSICS department configuration management policy.

The necessity for this document comes from the nature of the PHENIX Experiment itself as a large collaborative effort of scientists, engineers and technicians from around the world working together on an extremely complex apparatus, which occupies a distinct and important space within the larger Relativistic Heavy Ion Collider (RHIC) which in turn resides in the still larger entity of Brookhaven National Laboratory (BNL). Operating at this intersection of entities there needs to be clearly defined scopes of influence at each of these levels. At the BNL level, PHENIX operations are governed by the SBMS which describes configuration management requirements on a somewhat generic level. The SBMS recognizes that “one size fits all” configuration management guidelines are impractical and overly burdensome and provides great latitude for implementation of configuration management at the organizational level, while still providing consistent general guidelines.

On the closer level of RHIC, configuration management is governed by the Collider Accelerator Department (C-A) Operating Procedures Manual (OPM). The C-A OPM is designed to meet the more generic requirements of the SBMS with C-A specific procedures. At this level C-A OPM provides for guidance for implementing configuration management for all C-A drawings and specifications with C-A OPM 13.6.2 *Configuration Management*. This OPM describes the process by which changes to the configuration of C-A equipment and facilities 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 facilities and equipment managed by C-A.

At the PHENIX level, all SBMS requirements flow down as do the requirements of the C-A OPM for equipment and facilities which comprise the PHENIX experiment. Such equipment is divided into 2 categories: (a) equipment and facilities managed by C-A engineering and (b) equipment and facilities managed by PHENIX engineering and/or PHENIX collaborators.

This document describes the demarcations between the 2 categories and the configuration management requirements for all such equipment and facilities.

This document defines a process for the review of technical changes to PHENIX drawings and specifications, including drawings and specifications generated by C-A engineering, by PHENIX engineering or PHENIX external collaborators' engineering. This process supplements the BNL's Standard Based Management System (SBMS) [Engineering Design](#) Subject Area.

The nature of experimental equipment and facilities is such that changes and modifications are necessarily frequent and often required to be quickly implemented to react to the current needs of the ongoing research. In order to allow the flexibility needed by the experiment, together with the safety and security required for personnel, facilities and equipment, the PHENIX experiment has adopted the configuration management approach described herein.

1. Responsibilities

PHENIX engineering and technical staff shall implement this configuration management program. PHENIX engineering shall coordinate with the C-A *experimental safety review committee (ESRC)* to implement the requirements of this program.

2. Prerequisites

None

3. Precaution

None

4. Procedure

4.1 Facilities and Equipment Subject to C-A Configuration Management

The following facilities and equipment categories shall be subject to C-A Configuration Management:

All buildings and permanent structural elements, including access of buildings, including PHENIX modular office building.

All permanent electrical line voltage wiring, distribution panels and other line power infrastructure

Permanent central cooling, ventilation and heating systems, including split AC systems serving PHENIX control and conference rooms.

All fixed cooling water lines to point of distribution for experimental equipment. (e.g. to magnet coils, including manifolds and hoses)

Permanent fixed access stairs, platforms and ladders in the PHENIX Interaction Region (IR) and Assembly Hall (AH)

PHENIX IR and AH Cranes and permanently installed lifting equipment (i.e. EC dumbwaiter and WC window washer)

PHENIX Beampipe, accelerator components and all related vacuum equipment.

Any PHENIX equipment or facilities which are categorized as A1 or A2, in accordance with C-A OPM 13.3.1 “**Graded Approach for Quality Requirements**” and which don’t otherwise already meet any of the criteria above.

All requirements of C-A OPM 13.6.2 Configuration Management shall apply to all equipment and facilities described above. Requests for changes are initiated with an **Engineering Change Notice (ECN)**, which are generated and implemented as described in C-A OPM 13.6.2.

4.2 Facilities and Equipment Not Subject to C-A Configuration Management

All PHENIX equipment and facilities not covered by section 4.1 above shall be subject to Configuration Management as described in this section and sub sections.

4.2.1 Any individual recognizing the need for a drawing change may prepare a written request for such a change. This request shall be referred to as an **Engineering Change Request (ECR)**. The ECR shall be submitted to the PHENIX cognizant engineer for the relevant equipment/facilities for which a change is requested.

4.2.2 The cognizant engineer (CE) shall confer with the C-A liaison engineer (LE) and liaison physicist (LP) and together they will evaluate the ECR for the following:

- Impact on form, fit, and function □
- Impact on tooling schedules, material, and costs
- Impact on cost, schedule, and/or technical performance (i.e. performance, reliability, maintainability, availability, durability,

interchangeability, systems interface, health, or safety)

- Technical adequacy
- Impact on drawing numbers and revisions
- Impact on design review criteria. The Design Process section of C-A OPM 13.6.1 “**Configuration Management – Design, drawing and Specifications Requirements**” outlines when to convene a formal design review
- Impact on OPM’s (for changes affecting A1 systems, items only).
- Impact on items already items already produced/procured, as well as items that are in the process of being produced or procured. The CE, LE and LP shall evaluate the ECR and affected documents, and determine whether such changes are subject to C-A configuration management requirements.

If C-A configuration management applies an ECN shall be generated in accordance with C-A OPM 13.6.2 and the procedures in that OPM shall be followed.

All other changes shall be communicated to The C-A ESRC via the LE and LP for determination of appropriate level of review by C-A engineering. Such changes may be communicated by one of the following methods

- informally in daily correspondence between PHENIX engineering, the LE and/or the LP
- at the weekly ESRC planning meeting
- at the weekly PHENIX planning meeting
- at the annual PHENIX safety review
- at a PHENIX/ ESRC Design review
- in an enhanced work permit

4.3 ECR Impact on Drawing/Specification Revisions

4.3.1 It is the responsibility of the CE, when reviewing an ECR, to evaluate the impact of a drawing modification on all subsequent higher and/or lower assemblies/parts. The CE shall communicate the required changes to C-A engineering, PHENIX design engineering or PHENIX external collaborator’s design engineering (as appropriate). Changes requested shall be incorporated into all affected drawings prior to any subsequent release of those drawings.

4.3.2 A new drawing/specification will be created when a part/item is changed

in such a manner that one or more of the following conditions occur.

- 4.3.2.1 Performance or durability is affected to such an extent that superseded items must be discarded or modified for reasons of safety or malfunction.
 - 4.3.2.2 Parts, subassemblies, or complete articles, are changed to such an extent that the superseded (old article), and superseding (new article) items, are not interchangeable.
 - 4.3.2.3 When superseded parts (old parts) are limited to use in specific articles or models, and the new parts are not so limited to use.
 - 4.3.2.4 When a replaceable part, or subassembly within an assembly, is changed so that it is no longer interchangeable with its previous version, a new drawing number shall be assigned to the assembly which contains the new art/subassembly, if the new assembly is not interchangeable with previous revisions. All subsequent higher order assembly part numbers will also be changed, up to and including the level at which interchangeability is re-established.
 - 4.3.2.5 An item has been altered, selected, or is a source control item.
- 4.3.3 Based on the information supplied by the CE, the Design Group shall increment the drawing(s) revision by one letter if an item is changed in such a manner that none of the conditions in paragraph 4.3.2 (1 through 5) occur.
- 4.3.4 The ECR shall specify when a drawing becomes obsolete. It is recommended that the design room annotate each superseded drawing with the statement "This Drawing has been superseded by Drawing No. ". The revision level of the superseded drawing shall not be incremented due to the addition of this statement in the field of the drawing.

4.4 Incorporation/Distribution of Approved Drawing/Specification Changes

- 4.4.1 For technical specifications, approval, incorporation, and distribution of changes, are the responsibility of the project engineer or physicists.
- 4.4.2 For drawings, the originating Design Group (internal PHENIX Design Group or external PHENIX Collaborator Design Group) will incorporate the change into the drawing, describe the change in the revision section of

the drawing and, as a minimum, have the person who verified that the plotted drawing incorporates the changes as stated in the original ECR, initial the revision history box.

4.4.3 To facilitate implementation of the ECN, the CE should consider the following:

- Contacting groups or individuals responsible for carrying out actions/dispositions required by the change.
- Submitting a "need to know" distribution list to the PHENIX Controlled Documents Manager. The PHENIX Controlled Documents Manager would then inform, via email, the individuals on the distribution list that a specific drawing/document has changed.

4.4.4 The recipient of the revised/new drawing shall ensure that all drawings, obsolete or superseded by the revision, are removed from current files and/or workplaces, or are marked "Superseded", and are not utilized in processing material beyond the date the revised drawing/specification was signed by the CE, or designee.

5. Documentation

Revised drawings and specifications are to be created, maintained and controlled as described in PHENIX procedure PP-2.5.6.1-04 "PHENIX Engineering Documentation Control"

6. References

C-A OPM 02-42 Liaison Engineer, Physicist; Project Engineer and Physicist; Liaison Scientist: Roles and Responsibilities for Modifications

C-A OPM 13.6.1 Configuration Management – Design, Drawing and Specification Requirements

C-A OPM 13.6.2 Configuration Management

C-A OPM 13.3.1 Graded Approach for Quality Requirements

PHENIX Document # PP-2.5.6.1-1 Procedure Creation

PHENIX Document # PP-2.5.6.1-2 Work Planning

PHENIX Document # PP-2.5.6.1-4 PHENIX Engineering Documentation and Control

7. **Attachments**

None