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RHIC-MAG-Q-1003-B

Page 1 of 13

1. Scope:

This procedure establishes specific instructions for the Magnet Division, in the processing of Engineering Change Requests (ECRs)/Engineering Change Notices (ECNs). It shall apply to all ECRs/ECNs originated in the Magnet Division that affect all in house baselined programs as well as major and minor contracts. This procedure will encompass ECR/ECNs generated in response to supplier Engineering Change Proposals (ECPs) and ECRs/ECNs affecting RFPs or RFQs. This procedure has been formatted to follow the Process Flow Diagrams as described in the Applicable Document Section and shown as Exhibit A and B.

2. Applicable Documents:

RHIC Project Configuration Management Plan

RHIC-QAI-4.1 Instructions: Completion of ECR/ECN Form, RHIC-QF-010

12010381 Magnet Division ECR/ECN Process Flow Diagram

12010382 Magnet Division/Contract Procurement ECR/ECP/ECN Process Flow Diagram

3. Definitions:

Major Contract - A signed contract valued in excess of \$500,000.

Minor Contract - A signed contract valued under \$500,000.

Baseline - A drawing or specification used in the manufacture of an item to be installed in the collider. A baseline drawing or specification cannot be changed unless it is through an approved ECN.

4. Requirements:

All ECRs generated within the Magnet Division shall be processed in accordance with the procedural steps of section 5 herein, as outlined in Process Flow Diagrams 12010381 and 12010382, shown as Exhibit A and B, respectively. This includes ECRs which affect suppliers and RFPs or RFQs. ECRs which affect RFPs or RFQs that have been issued and are in source selection shall either be held in abeyance until contract award or processed as an ECR not affecting a supplier. If the ECR is held in abeyance until contract award, it shall then be processed in accordance with the requirements of this procedure as an ECR affecting a supplier. If the ECR is processed as an ECR not affecting a supplier, it shall be issued as an amendment to the RFP or RFQ upon approval as an ECN.

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RHIC-MAG-Q-1003-B
Page 2 of 13

The requirements of this procedure are compliant with the requirements of RHIC-QAI-4.1. In case of conflict, the requirements of RHIC-QAI-4.1 shall take precedence.

4.1 Responsibility:

This procedure identifies the functional groups and individuals that contribute to the processing of ECRs/ECNs and establishes their responsibilities as follows:

Cognizant Engineer (CE)/Cognizant Scientist (CS): Shall be responsible for the technical content of the ECR/ECN and shall assure that all technical aspects of the change agree with the detailed requirements of the Design Manual or any document which describes performance requirements of the system.

Design Room: Shall be responsible for providing support and assistance to the CE/CS in completing the ECR package when requested; incorporating approved ECNs; checking ECRs and the incorporation of ECNs in accordance with the requirements of this procedure; maintaining and filing ECR originals; making and distributing copies as disclosed on the ECR/ECN form; maintaining the ECR/ECN data base and tracking system.

Approvers: Each of the approval authorities shall be responsible for reviewing the ECR for completeness; form, fit, function; impact on tooling, schedules, material, and costs; technical adequacy; interface impact; change affectivity; impact on Class I criteria.

Configuration Control Office (CCO): Shall be responsible for evaluating all configuration parameter change documents submitted and providing a systematic review of proposed Class I changes.

Cognizant Contracts Administrator: Shall be responsible for submitting all ECRs to the supplier and shall be the point of contact for all supplier generated comments and ECPs.

Quality Assurance: Shall be responsible for verifying that the proposed change, when implemented, can be properly inspected if required; and that all contractual conditions are met. In addition, Quality Assurance shall be responsible for auditing and verifying the activities of this procedure.

Environmental, Safety & Health: Shall be responsible for reviewing the ECR for impact on environment, safety and health.

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RHIC-MAG-Q-1003-B

Page 3 of 13

5. Procedure:

5.1 The CE/CS, or his designee, shall generate the ECR in accordance with RHIC-QAI-4.1

5.2 The CE/CS/designee shall take the initiated ECR to the Design Room Administrator and do the following:

- [1] Tell the Administrator whether the ECR is against a drawing that is presently out for contract, and whether the contract is a major contract or a minor contract.
- [2] Tell the Administrator the magnet program the ECR is written against (i.e., dipole, quadrupole, sextupole, etc.)

NOTE: When an ECR could affect other ECRs already at a contractor, a note should be added to the description section of the ECR as follows: "REF ECR XXXX", where "XXXX" represents the number of the affected ECR already at the contractor.

5.3 The Design Room Administrator shall:

- [1] Verify that the top bold box on sheet 1 is completely filled out in accordance with RHIC-QAI-4.1:

"ECR/DWG/SPEC TITLE", "DWG/SPEC NO.", "REVISION :FROM__", "WBS NO.", "DESCRIPTION OF CHANGE", "REASON FOR CHANGE", "AFFECTIVITY POINT", "NEXT ASSEMBLY (USED ON) NO.", and signatures of requester and CE/CS.

- [2] Assign an ECR number. The number shall be the next unassigned number from the sequential log book.
- [3] Enter the ECR data into the ECR/ECN data base and tracking system.
- [4] Stamp either "MAJOR CONTRACT" or "MINOR CONTRACT", as applicable, in the upper right-hand corner of the ECR.
- [5] Return the ECR to the CE/CS for further processing.

5.4 The CE/CS shall seek out Division Management (Gene Kelly, in his absence, H. Foelsche) for a conceptual review of the proposed ECRs which will effect Brookhaven in-house construction only.

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RHIC-MAG-Q-1003-B

Page 4 of 13

- 5.4.1 If the ECR effects an outside magnet contractor, Gene Kelly shall seek out the Project Program Manager for a conceptual review of the proposed ECR that will effect all major contracts.

NOTE: The Conceptual Review may take place at a formal or informal meeting.

Management will initial next to their designated approval signature area on the ECR form.

- 5.4.2 Once the Conceptual Review has been held, the CE/CS shall be responsible for completing the ECR package. This includes providing a copy of the latest issue of the drawing, document, or list (including all outstanding/unincorporated ECNs) which is to be revised by the ECR, and any other supporting documentation so that the persons who must review and approve the ECR can properly analyze and understand the proposed change. If the CE/CS requires assistance completing the ECR package, the Design Room Supervisor shall assign a cognizant designer who will be responsible for providing the necessary support. In addition, the correct class of change is assigned (if known) in accordance with RHIC-QAI-4.1.

NOTE: If the ECR is marked "MAJOR CONTRACT", it will be necessary to await an impact statement from the contractor before assigning a class.

When the CE/CS is satisfied that the package is complete, he/she shall forward it the Design Room Supervisor.

- 5.5 The Design Room Supervisor shall assign the package to a Checker. The Checker shall check the package for completeness by doing the following:

- [1] Check that the top bold box on sheet 1 is completely filled out including:
- a. Check that the ECR No. appears on all sheets and each sheet is numbered.
 - b. Check that the WBS No. has been entered.
 - c. Check that description of change is clearly defined for draftsman to incorporate, i.e.: "From/To" drawing, parts list (PL) or specification; cut and pasted, marked-up portions of a drawing showing From/To conditions; reduced, marked-up print; clearly written From/To narrative description.

- d. Check that reason for change is specific, clear, and concise; i.e., justification for change is provided; a definition of what caused the need for the design change; why it is necessary. Cursory statements or meaningless and obvious expressions such as "Engineering Change" or "Sponsor's Request" are not acceptable.
- e. Check that an effectivity point is designated.
- f. Check that the next assembly (used on) is shown.
- g. Check that the CE/CS has signed in the proper place.

[2] Check that all drawings and PLs affected appear on back of first sheet and on a "drawing affected" continuation sheet.

[3] Check that each drawing and PL affected by change has its own individual continuation sheet of ECR.

5.5.1 If the package is not complete, then the Checker shall return it to the CE/CS for completion.

5.5.2 If the package is complete, then the Checker shall forward the completed ECR package to the Design Room Administrator. The ECR is now ready for either the in-house approval cycle or Contracts/Procurement.

5.6 The Design Room Administrator is responsible for preparing the completed ECR package for signature routing.

5.6.1 If the ECR does not affect any contract, then the Design Room Administrator shall proceed as in 5.9.

5.6.2 If the ECR affects a minor contract, then the Design Room Administrator shall return the ECR to the CE/CS.

5.6.2.1 The CE/CS is responsible, as a minimum, for contacting the affected supplier directly or through the Cognizant Contracts Administrator and performing an impact assessment. The CE/CS shall document on the ECR, in the "Impact Assessment" section, that the supplier was contacted, including contact name and date; and the results of the assessment. The CE/CS shall then return the ECR to the Design Room Administrator.

5.6.2.2 The Design Room Administrator shall check that the "Impact Assessment" section

is complete and shall proceed as in 5.9.

- 5.6.3 If the ECR affects a Major contract, then the Design Room Administrator shall send a copy of the ECR package to the CE/CS who shall forward it to the Cognizant Contract Administrator.
- 5.7 The Cognizant Contracts Administrator shall be responsible for forwarding the ECR package to the supplier for comments, impact assessment, and/or generation of an ECP. Once the supplier has responded to the ECR package, the Cognizant Contracts Administrator shall forward the supplier comments and/or ECP to the CE/CS.
- 5.8 The CE/CS shall evaluate the supplier comments and/or ECP and perform an impact assessment, taking into account the impact to the design manual, cost, schedule, other systems and safety/environmental issues.
- 5.8.1 If the CE/CS decides to continue processing of the ECR, then he/she shall forward the package to the Design Room Administrator.
- 5.8.2 If the CE/CS decides not to continue processing of the ECR, then he/she shall notify the Cognizant Contracts Administrator and return the ECR package to the Design Room Administrator.
- 5.8.2.1 The Design Room Administrator shall void the ECR in accordance with section 5.11.1.1.
- 5.9 Upon receiving a completed, checked ECR package for processing, the Design Room Administrator shall do the following:
- [1] Verify assigned sheet numbers are correct.
 - [2] Put a copy of the ECR, stamped "File Copy" in red ink, on file.
 - [3] Enter the ECR data into the ECR/ECN data base and tracking system. The ECR is now considered "outstanding" to the drawing and/or PL.
 - [4] Generate a routing sheet and route the ECR package to the following groups for concurrence as indicated:
 - a. Division/Section QA
 - b. Project QA (Class I only)

- c. Environmental, Safety & Health
- d. Production Management (Class I only)
- e. Other Systems - This requires CAREFUL consideration and should include individuals or groups outside the Magnet Division who may be affected by the proposed change, e.g., when an interface control drawing/ specification/document is changed.

5.10 It is the responsibility of each reviewer to review the ECR in a timely manner for concurrence/nonconcurrence.

5.10.1 When the reviewer concurs with the proposed change, he/she shall initial in the proper space and return the package to the Design Room Administrator for further processing or forward it to the next review group. When all the necessary concurrence initials are obtained, the ECR package shall be submitted for approval signatures as in 5.12.

NOTE: If a change is made to an ECR that already contains concurrence initials or approval signatures, the ECR must be rerouted to those persons who shall re-initial next to their names, indicating concurrence with the change to the ECR.

5.10.2 If the person reviewing the ECR does not concur with the proposed change, then he/she shall generate a written explanation for the non-concurrence and send it with the ECR package to the CE/CS for consideration.

5.11 The CE/CS shall review the reviewer's explanation for non-concurrence and has the option to void the ECN and discontinue the process or disregard the non-concurrence and submit the ECR for approval.

5.11.1 If the CE/CS agrees with the reason for non-concurrence and wishes to discontinue the processing of the ECR, then he/she shall return it to the Design Room Administrator.

5.11.1.1 The Design Room Administrator shall void the ECR by writing "VOID" across all pages of the original ECR and entering a "W" in the appropriate field of the ECR/ECN database and tracking system. The voided, original copy shall be kept on file. All other file copies shall be discarded.

5.11.2 If the CE/CS disagrees with the reason for non-concurrence, or, agrees with the reason but wishes to process the ECR anyway, then he/she shall forward the package for signature approval.

- 5.12 The ECR package shall be routed to the following individuals/groups for signature approval:
- a. Division/Section Engineering Review
 - b. Section Head or Designee
 - c. Division Head or Designee
 - d. Assoc. Head (Class I only)
 - e. Project Head (Class I only)
 - f. DOE (as determined by Project Head)

The approval authorities shall review the ECR in accordance with the requirements of RHIC-QAI-4.1.

- 5.12.1 If any of the reviewing authorities reject the ECR, then he/she shall print their name; enter signature, date of rejection; state the reason for rejection; and return the ECR to the CE/CS.
- 5.12.1.1 The CE/CS is responsible for distributing copies of the rejected ECR to the originator and all parties on the ECR Review Distribution. The CE/CS shall also return the original copy of the ECR to the Design Room Administrator.
- 5.12.1.2 The Design Room Administrator shall void the ECR by writing "VOID" across all pages of the original ECR and entering a "W" in the appropriate field of the ECR/ECN data base and tracking system. Copies of the voided ECR shall be sent to the CE/CS and to the Cognizant Contract Administrator if the ECR was marked "Major Contract".
- 5.12.2 If all review authorities concur with the ECR as written, and the necessary signatures are obtained, then the CE/CS shall forward the ECR as follows, depending on class of change.
- 5.12.2.1 If the ECR is a Class I change, then the CE/CS shall forward the change to the Configuration Control Office (CCO) for processing by the Configuration Control Board (CCB). The CCB is defined in RHIC-QAI-4.1. After the appropriate CCB signatures are obtained, the CE/CS shall forward the ECR to the Design Room for further processing.

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RHIC-MAG-Q-1003-B

Page 9 of 13

- 5.12.2.2 If the ECR is a Class II change, it shall be forwarded to the Design Room for further processing.
- 5.13 When the approved ECR is returned to the Design Room, it will officially become an ECN. The Design Room Administrator shall:
- [1] Check that the ECN contains the proper approval and concurrence signatures and dates and enter an "A" into the appropriate field of the ECR/ECN data base and tracking system.
 - [2] Cross out "ECR" in the ECR/ECN number box.
 - [3] Mark all affected drawings with outstanding ECN number.
 - [4] Check revision level of drawings and enter into ECR/ECN data base and tracking system.
- 5.13.1 The Design Room Supervisor shall assign the package to a Designer for incorporation of the ECN into the drawing. The Designer shall incorporate the ECN; sign and date it, and forward the package to the checker.
- 5.13.2 The checker shall insure that all changes called for by the ECN have been completely and correctly incorporated, and if they have, shall sign and date the ECN. If all the changes have not been properly incorporated, then the checker shall return the package to the designer.
- 5.13.3 When the checker has signed the ECN, the designer shall plot all drawings, and the Design Room Administrator shall plot all PLs. The Design Room Supervisor shall be responsible for verifying that the drawing and PL are plotted correctly and shall give the package to the Design Room Administrator for the data entry, distribution, final filing, etc.
- 5.13.3.1 The Design Room Administrator shall:
- [1] Enter into the ECR/ECN data base, the names of the persons who incorporated the ECN and the names of the persons who checked the incorporation.
 - [2] Stamp the original drawing "FINAL".
 - [3] Make prints and distribute according to the ECN Distribution List and additional individuals as designated by the CE/CS. For Class I ECNs, the

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RHIC-MAG-Q-1003-B

Page 10 of 13

CCO shall make the initial distribution including the Design Group.

- [4] File original drawing and discard replaced down rev drawing.
- [5] Send a copy of the ECN, stamped "Information Copy" to the CCO.

NOTE:

When a rework or repair action is required per the "Disposition of Items Covered by Referenced Drawing/Specification" section of the ECN, the CE/CS shall designate an individual for additional distribution, who is responsible to implement the action. When making distribution to this individual, the Design Room Administrator shall attach an "ACTION REQUIRED" cover sheet (Fig. 1). The designated individual is responsible to complete the work required per the ECN, or to contact the CE/CS for further direction.

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RHIC-MAG-Q-1003-B
Page 11 of 13



MAGNET DIVISION

ACTION REQUIRED

PER THIS ECN NO. _____

NOTE: Please review ECN and complete work required
or
contact Cognizant Engineer for further direction.

Figure 1



