APR 1400 Fluidic Device Verification Experiment

Quality Assurance Manual

Revision No.: - 0 -
Issue Date: September 22, 2003
☐ Controlled copy
☐ Uncontrolled copy
Distributed to: N/A
Distribution Date: N/A

Advanced Reactor Development
KOREA ATOMIC ENERGY RESEARCH INSTITUTE

Author : Chang Hwan Chung (QA coordinator) **signature:** *signed in Korean version* **Date:** September 20, 2003

Reviewer : Nam Jin Lim (QA manager) **signature:** *signed in Korean version* **Date:** September 20, 2003

Reviewer : Chul Hwa Song (Project Manager) **signature:** *signed in Korean version* **Date:** September 22, 2003

Approver : Jong Kyun Park (Vice President of Advanced Reactor Development) **signature:** *signed in Korean version* **Date:** September 22, 2003

1. Organization

1.1 Overview

In this chapter, organization structure, responsibility and authority of the project of 「APR 1400 Fluidic Device Verification Experiment」(referred as 'FD verification experiment' below) are described.

1.2 Organization structure

Structure of the organization that performs FD verification experiment is shown in Figure 1.

1.3 General

1.3.1 Each organization that performs FD verification experiment may delegate any part of the work to other organizations while retaining responsibility therefor.

1.3.2 All personnels who perform FD verification experiment should conform with this quality assurance manual(referred as 'QA Manual') and each personnel is responsible for quality achievement of his/her own job.

1.3.3 QA department or personnels shall have sufficient authority and organizational independence so that they objectively verify implementation of this QA Manual and do the followings regardless of schedule or cost:

1) Identification and address of any quality problem
2) Initiating solutions to the quality problem
3) Verification of implementation of solutions
4) Direct report to the management

1.4 Responsibility and authority

1.4.1 President of KAERI

1) The president is in final charge of general atomic energy research, development and business executed by KAERI and possesses authority to make decisions over major policy and to commission services.
2) The president should commission QA department or personnel sufficient authority to perform quality verification service independently and report the result.

1.4.2 Vice president of Advanced Reactor Development

1) The vice president is in charge of research, development and test facility operation related to advanced reactor development carried out by KAERI, and assign FD verification experiment project manager the responsibility and authority required in the job performance by the authority of the vice president.
2) The vice president approves QA Manual.

1.4.3 FD verification experiment project manager(refered as 'PM')

(1) Responsible for goal achievement of FD verification experiment project and to assign job to each area
(2) Establishing executive organization of the FD verification experiment project and supervising
(3) Reviewing QA Manual
(4) Approving QA procedure
(5) Approving experiment procedure
(6) Approving experiment/evaluation report

(7) Establishing experiment personnel education/training plan and having general responsibility for the execution

1.4.4 FD experiment manager

(1) Establishing experiment plan and carrying out experiment
(2) Setting up experimental method and standard
(3) Preparing experiment procedure
(4) Collecting and interpreting the experiment result
(5) Preparing experiment report
(6) Control of Measuring and experiment equipment

1.4.5 FD evaluation manager

(1) Interpreting and evaluating the experiment material
(2) Reviewing experiment report
(3) Preparing experiment result evaluation report

1.4.6 QA coordinator

(1) Preparing QA Manual
(2) Preparing QA procedure
(3) Reviewing education/training plan
(4) Verifying implementation of QA program and observing the experiment
(5) Reviewing experiment procedure
(6) Verifying the disposal of nonconforming experiment

1.4.7 QA manager

(1) Reviewing QA Manual

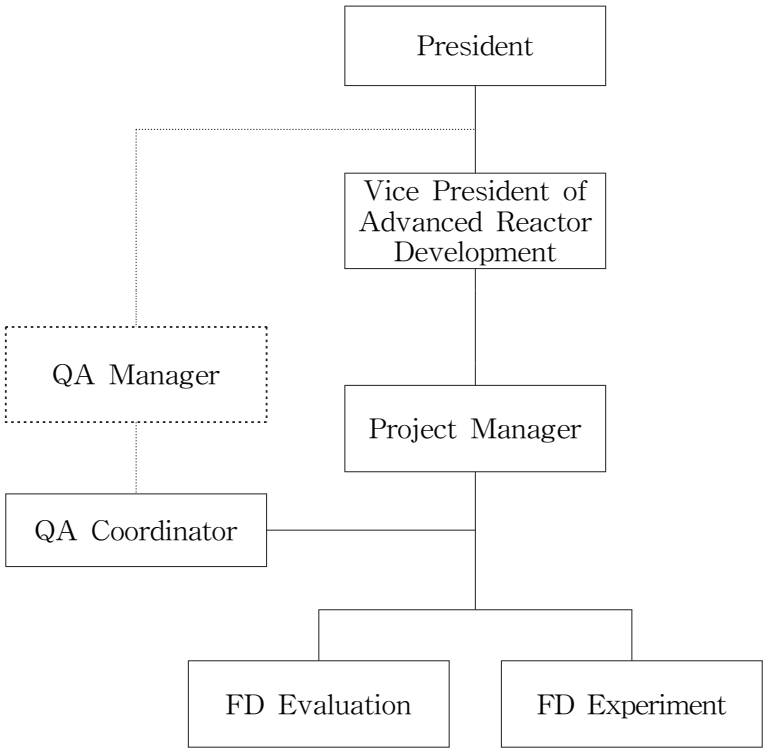

Figure 1. Executive organization of the FD verification experiment

2. Quality assurance program

2.1 Overview

In this chapter, operational direction of QA system required to execute 「APR 1400 Fluidic Device verification experiment」(referred as 'FD verification experiment' below) is described.

2.2 Quality Assurance (QA) program

2.2.1 This QA program applies to assignments required to perform the service of FD verification experiment.

2.2.2 QA program is executed in documented form consisting of QA Manual, QA procedure and experiment procedure.

2.2.3 QA program should be assessed regularly to maintain its adequacy and validity.

2.2.4 Activities affecting quality should be carried out under the following conditions:

1) Using appropriate equipment
2) Preparing appropriate environment to execute the project including cleaning
3) Status where all prerequisite conditions are satisfied

2.3. Education and training of personnel

2.3.1 Education/training plan should be established so that the experiment quality required in FD verification experiment can be achieved, and education/training

should be carried out accordingly.

3. Document Control

3.1 Overview

In this chapter, requirements to adequately control document that describes activities affecting quality of 「APR 1400 Fluidic Device verification experiment」(referred as 'FD verification experiment' below) are described.

3.2 General requirement

3.2.1 To assure that the document properly include quality requirement, preparation, review, approval, distribution, revision and discard should be carried out according to the procedure.

3.2.2 Every document should be prepared and distributed before the initiation of the work so that it can be used in the place where the work to which the document is applied.

3.2.3 The document that stipulates QA activity should be used by developing relevant form.

3.2.4 Review and approval of a revision of a document should be carried out by the organization that reviewed and approved the original document except in the cases stipulated otherwise.

3.2.5 Revised document should be distributed to the organization that carries out the job to which the document applies, and control methods such as recalling or withdrawal should be established to prevent the use of invalidated document.

3.2.6 Identification and distribution method of latest revision number of documents should be established to assure the use of valid document.

4. Instructions and Procedures

4.1 Overview

In this chapter, control requirements of instructions and procedures (referred as 'experiment procedure' below) to perform the service of 「APR 1400 Fluidic Device Verification Experiment」(referred as 'FD verification experiment' below) are described.

4.2 General requirement

4.2.1 For experiments needed in FD verification experiment, experiment procedure should be prepared and the experiment should be executed following the procedure. For experiments that already use a standardized method in laboratory, separate experiment procedure may not be prepared.

4.2.2 Experiment procedure should be prepared conforming to the requirement of this manual.

4.2.3 In the case of experiment that includes acceptance/rejection decision, quantitative or qualitative acceptance criteria should be included in the experiment procedure.

4.2.4 Preparation, review, approval, distribution, revision and withdrawal should follow 「Document Control」 in Chapter 3 of this Manual.

4.2.5 Experiment procedure should specify prerequisite requirement, calibrated instrument, appropriate equipment, trained personnel and adequate

environment of the experiment.

5. Experiment and Inspection

5.1 Overview

In this chapter, control requirement of inspection required to verify that activities of 「APR 1400 Fluidic Device Verification Experiment」(referred as 'FD verification experiment' below) conform with the established requirement and control requirement to assure that the experiment is executed in an appropriate way are described.

5.2 General requirements

5.2.1 Inspection should be planned and executed according to the plan. If any test or measurement is needed in inspection, this should be specified in the inspection plan.

5.2.2 Inspection on important experiment process should be performed by someone who does not perform the experiment.

5.2.3 The experiment should be executed by personnels that trained according to approved procedure and relevant standard.

5.2.4 Experiment result should be documented according to the experiment procedure and reviewed by a qualified person.

6. Control of Measuring and Experiment Equipment

6.1 Overview

In this chapter, requirements to control measuring and experiment equipment (referred as 'equipment' below) used in performing 「APR 1400 Fluidic Device Verification Experiment」(referred as 'FD verification experiment') are described.

6.2 General requirements

6.2.1 Equipment used in experiment should be calibrated before use, and be controlled to be used in satisfactory condition.

6.2.2 Calibration cycle should be determined following national standard, or accuracy, objective, frequency of use, stability and conditions that influence on measurement.

6.2.3 Measurement result of equipment is intended to secure retroactivity to national standard in principle. In case that the application of this principle is hard, the bases for calibration should be documented.

6.2.4 Calibrated status of equipment should be identified.

6.2.5 Nonconforming equipment should be identified and controlled to prevent its use.

7. Control of Nonconforming Experiment

7.1 Overview

In this chapter, general requirements to control nonconforming experiment found during the service of APR 1400 Fluidic Device verification experiment」 (referred as 'FD verification experiment') are described.

7.2 General requirements

7.2.1 Experiment performed by improper method, condition, procedure, equipment, and personnel should be controlled by documented procedure.

7.2.2 Nonconforming experiments should be identified and controlled until the disposition is completed to prevent the use of the result.

7.2.3 Details, cause and characteristics of nonconforming experiment should be reviewed and the disposition should be determined by the review result. The disposition should be one of followings:

(1) Use-as-is
(2) Repair
(3) Re-test, and
(4) Reject

7.2.4 For nonconforming experiments determined to be 'use-as-is' or 'repair', technical justification of the disposition or the cause should be reviewed and documented.

8. Quality Assurance Records

8.1 Overview

In this chapter, control requirements of quality assurance records produced in the course of performance of 「APR 1400 Fluidic Device Verification Experiment」 (referred as 'FD verification experiment') are described.

8.2 General requirements

8.2.1 QA records provides the evidence proving that activities affecting quality have been performed conforming to the requirement, and at least following data should be controlled as QA record:

1) Experimental data produced during the performance of the experiment
2) Experiment result
3) Experiment procedure
4) Calibration record
5) Document related to nonconforming experiment
6) Experimental test report

8.2.2 In inspection and test record, at least inspector or record keeper, method, result, the disposition of defect, and if necessary, acceptance decision should be included.

8.2.3 QA records should be able to be identified and retrieved.

8.2.4 Preserving period, preserving place and management responsibility should be determined.