

## Development of Quality Assurance System for Equipment Qualification

Jin Wook Ko <sup>a\*</sup>, Byung Duck Kim <sup>a</sup>, Sangho Sohn <sup>a</sup>, Kyung Ha Ryu <sup>a</sup>, Jae Hyung Kim <sup>a</sup>, Jun Hee Sin <sup>a</sup>  
<sup>a</sup> Korea Institute of Machinery and Materials, Department of Nuclear Industrial Equipment, Daejeon  
\*Corresponding author: jwko@kimm.re.kr

### 1. Introduction

The equipments (valve, pump, etc.) which are installed in Nuclear Power Plants (NPPs), have to be qualified following KEPIC MF, END and ASME QME-1. The domestic NPPs equipment manufacturers made a request the foreign institutes for Equipment Qualification (EQ), because there are no EQ institutes, which have high capacity (high pressure, high flow rate), in Korea. Korea Institute of Machinery & Materials (KIMM) is constructing the EQ facility has high capacity (Design Condition: 200 bar, 400 °C) now. But there are some problems in maintenance. That's why KIMM is on developing of Quality Assurance System (QAS).[1]

### 2. Quality Assurance System

Last year, the government notified that the EQ institutes have to be imposed on EQ by government notification.[2] So EQ institute have to be certified by Korea Electric Association (KEA) following Korea Electric Power Industry Code (KEPIC).

EQ is divided up into Environmental Qualification (KEPIC END-1100), Seismic Qualification (KEPIC END-2000) and Functional Qualification (KEPIC MFC) largely. Also, the KEPIC define the Certification of EN, take care of Environmental and Seismic Qualification for the nuclear safety related electric equipment, and MF, take care of active valves and pumps.

KIMM has experience to get a Certification of KEPIC EN (Certified No.: QN-506) last year. Also KIMM already has Quality Assurance System based on KEPIC EN.

In this section, it's described about KIMM's QAS is applied, based KEPIC EN [3] and MF [4].

#### 2.1 Organization

To perform EQ, the parts have to be formed following KEPIC QAP-1. [5] KIMM had QAS based on KEPIC EN.

The Representative has responsibility to protect EQ members from the outside pressure like delivery, budget, etc. The QA is guaranteed the independence to report on the important quality violation items to the Representative.

The group was formed EQ teams follow work scope. The EQ group is fig. 1.

- 1) Representative
- 2) Quality Assurance Part (QA)
- 3) Documentation
- 4) Environmental Part
- 5) Seismic Part

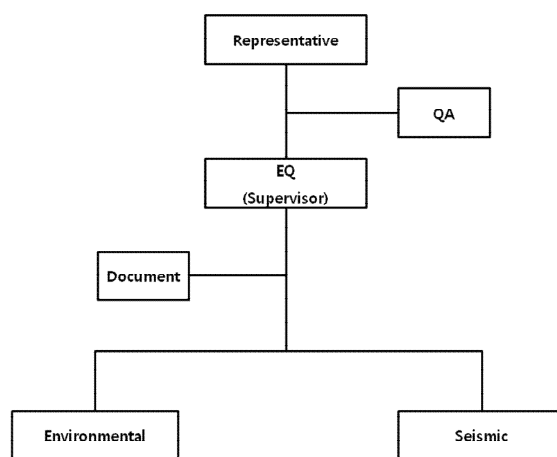


Fig. 1. EQ Group based on KEPIC EN

And The Group is restructured EQ teams added functional qualification team for valves. The functional qualification team takes care of active valves and pumps based on KEPIC MF. The new group is fig. 2.

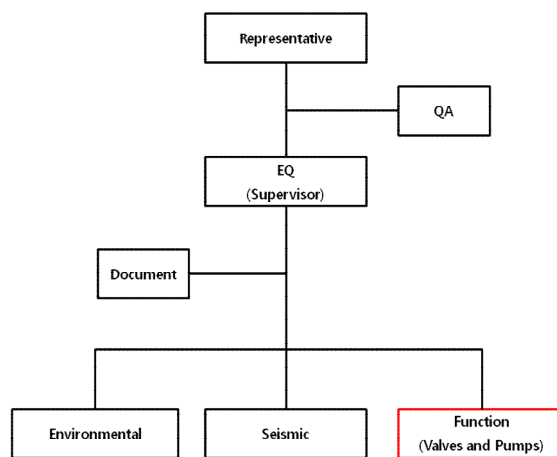


Fig. 2. EQ Group based on KEPIC EN & MF

#### 2.2 Authorized Qualification

All EQ members have to receive a Quality & Technical education and evaluation the work ability

following the EQ member Training Procedure. QA has to plan the EQ member's training course and report one's result of training to the Part Leader.

### *2.3 Test Procedures*

The Test Procedures are written by tester, reviewed by QA, and approved by Part Leader. The test procedures are prepared following equipment specification and application codes. Also the test procedure includes as follows:

- 1) Test Name
- 2) Test Sequence
- 3) Application document
- 4) A blank for checking Hold Point or Witness Point
- 5) Test data sheet

### *2.4 EQ Facilities*

EQ Facilities is controlled by tester and inspector. The tester selects the measurement units be test requirement (accuracy, tolerance, etc.). And the inspector has to check the selection of measurement units. Also the tester and inspector have to control the calibration of measurement units.

The testers give a tag number each measurement unit, control through list. The list of measurement unit includes as follows:

- 1) Tag No.
- 2) Calibration cycle
- 3) Calibration plan
- 4) Calibration institute

### *2.5 Documentation*

Each a part leader have responsibility to prepare and control the documents. Also the documents, which are controlled by part leader, are as follows:

- 1) Quality Assurance Manual / Procedure
- 2) Technical Manual / Procedure
- 3) Qualification Plan / Report
- 4) Qualification Specification
- 5) Application Codes / Standards

## **3. Approach**

The objective of this study is as follows:

- 1) To get a Certification of KEPIC MF Certification from KEA
- 2) Development of Equipment Qualification Experts and Quality Assurance Experts.
- 3) Management of the Equipment Qualification Facilities under KEPIC Quality Assurance System.

## **4. Summary**

KIMM constructs Quality Assurance System meet requirements as follows:

- 1) KEPIC QAP-1
- 2) KEPIC EN and MF
- 3) To manage and maintain EQ facilities
- 4) Development of EQ Experts
- 5) Development of QA Experts

## **REFERENCES**

- [1] Technology development of operating performance test for steam equipment, Phase I report, The Ministry of Knowledge Economy 2008.
- [2] Ministry of Education, Science and Technology Notification No. 2010-28.
- [3] KEPIC EN
- [4] KEPIC MF
- [5] KEPIC QME-1
- [6] KIMM's Quality Assurance Manual