

Current Status of Quality Assurance for NHDD Project

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1. Introduction

Nuclear Hydrogen R&D Quality Assurance (QA) activities are performed as a part of the “Development of Key Technologies for Nuclear Hydrogen” Project.

R&D Quality Assurance Manual (QAM) and R&D Quality Assurance Procedures (QAP) are developed for the “Development of Key Technologies for Nuclear Hydrogen” Project, which are based on the GEN- IV’s Quality Management System (QMS) Guidelines released on Feb, 2007.

In this study, we have developed the Nuclear Hydrogen Document Management System to use resources effectively and efficiently and to ensure that sufficient documentation is maintained to demonstrate achievement of the required objectives.[2]

2. QAM and QAP

QAM and QAP are developed based on the GEN- IV QMS Guidelines. The GEN- IV QMS Guidelines have total 19 elements, which should address the relevant quality management requirements of the IAEA Safety Series No. 50-C/SG-Q(1996) “Quality Assurance for Safety in Nuclear Power Plants and other Nuclear Installations”, the American Society of Mechanical Engineer (ASME) NQA-1-2004 “Quality Assurance Requirements for Nuclear Facility Applications” and the ISO-9001-2000 “Quality Management System” [1]

Several quality elements have been identified as having limited application depending on the R&D category (Basic, Applied, Developmental Work and R&D Support Activities) assigned. QAM and QAP were developed and released regarding the Nuclear Hydrogen project as a basic stage.

QA Plan is released Dec, 2008 to adopt appropriate quality elements to project as R&D works are increasing.

The QA plan is presented in the Table 1.[3]

Table 1. QA plan and Applied Elements

Quality Assurance Program Elements	App.
1. Organization	<input checked="" type="checkbox"/>
2. Quality Assurance Program	<input checked="" type="checkbox"/>
3. Design Control	<input type="checkbox"/>
4. Control of Purchased Items & Services	
- Control of Purchased Items & Services	<input checked="" type="checkbox"/>
- Supplier Evaluation and Selection	<input type="checkbox"/>
5. Identification and Control of Items	<input checked="" type="checkbox"/>
6. Instructions, Procedures and Training	

- Instructions and Procedures	<input checked="" type="checkbox"/>
- Training	<input checked="" type="checkbox"/>
7. Identification and Control of Processes	<input type="checkbox"/>
8. Experimental Systems	<input checked="" type="checkbox"/>
9. Data Reduction and Analysis	<input checked="" type="checkbox"/>
10. Special Processes	<input type="checkbox"/>
11. Inspection, Test and Operating Status	<input type="checkbox"/>
12. Test Control	
13. Control of Measuring and Test Equipment	<input type="checkbox"/>
14. Early Detection of Quality Problems	<input type="checkbox"/>
15. Continuous Quality Improvement	<input type="checkbox"/>
16. Document Control	
- Document Control	<input checked="" type="checkbox"/>
- Document Numbering System	<input checked="" type="checkbox"/>
17. Quality Assurance Records	<input checked="" type="checkbox"/>
18. Audits and Assessments	
- Audits and Assessment	<input checked="" type="checkbox"/>
- Auditor Qualification and Control	<input checked="" type="checkbox"/>
19. Independent Verification	<input checked="" type="checkbox"/>

3. Document Management System

The Nuclear Hydrogen Document Management System has been developed and operated to enhance document control activities efficiency as a part of QA activities. It enables each project participant to up/download research resources and create document numbers as access website.

3.1 System Menus

Nuclear Hydrogen Document Management System is developed using the MS Sharepoint Portal Server 2003, the ASP 3.0 and the MS SQL Server Desktop Engine on the Windows server 2003. Main page is presented in the Figure 1.

As shown the Figure 1, there are five website menus. The functions of the each menu are as follows;

Home : Main Nuclear Hydrogen Homepage.

Nuclear Hydrogen : Introducing nuclear hydrogen , ways to produce hydrogen, very high temperature reactor (VHTR) , tri-isotropic(TRISO) Fuel and Sulfur Iodine(SI) process.

Quality Assurance : Download QAM and QAP and search each QAM and QAP chapter in particular.

Documents Management : Download and upload of QA Documents and Research results related project.
Pictures Management : Download and upload of pictures related to project.[4]

- [2] KAERI QA team, Gen IV R&D Project Quality Assurance Manual, KAERI, 2008
- [3] KAERI QA team, Project Quality Assurance Plan, KAERI, 2008
- [4] Tae-Hoon Lee, Nuclear Hydrogen QA document management systems construction , KAERI, 2007



Fig. 1. Nuclear Hydrogen Document Management System Main page.

3.2 Document management method

Documents are classified as sub-project, document producing year, document attributes in the documents management menu. Each project participants can up/download various QA documents, research results and search document lists.

Document numbers are created automatically in regular sequence as the QAP's document control, which enable document numbers maintain consistency and systematization of document control. Document numbers creating menu are shown in the Figure 2.

신규 문서 데이터 입력

부서선택 : 부서 선택
 문서종류 : 부서 선택
 작성연도 : 원자력수소 기술종합과제
 문서제목 : 초고온가스로 요소기술개발과제
 작성자 : 파복입자핵연료 기술개발과제
 검토자 : IS공정기술개발과제(KIER)
 승인자 : IS융합핵융합분해공정 기술개발과제(KIST)

신규데이터 입력

Fig. 2. Document numbers creating menu.

4. Conclusions

QA has been improved and QA activities efficiency and effectiveness have been achieved by operating of the Document Management Systems.

But it is needed to reflect changes in QA plan, QAM, QAP and Document Management System in order to improve effectiveness of QA activities considering QA changing environments and requirements.

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REFERENCES

- [1] GEN-IV International Forum, Quality Management System Guidelines, Nuclear Technology, 2007.