US-APWR

3rd Pre-Application Review Meeting

Quality Assurance of US-APWR at DC Application

November 28, 2006

Mitsubishi Heavy Industries, Ltd.

Meeting Attendees

- Naoki MIYAKOSHI (Responsible for Quality Assurance)
  - General Manager
  - Nuclear Energy Systems Quality and Safety Management Department
  - Nuclear Energy Systems Headquarters
  - Mitsubishi Heavy Industries, LTD.
- Kei IMAMURA (Responsible for Quality Assurance)
  - Manager
  - Nuclear Energy Systems Quality and Safety Management Department
  - Nuclear Energy Systems Headquarters
  - Mitsubishi Heavy Industries, LTD.

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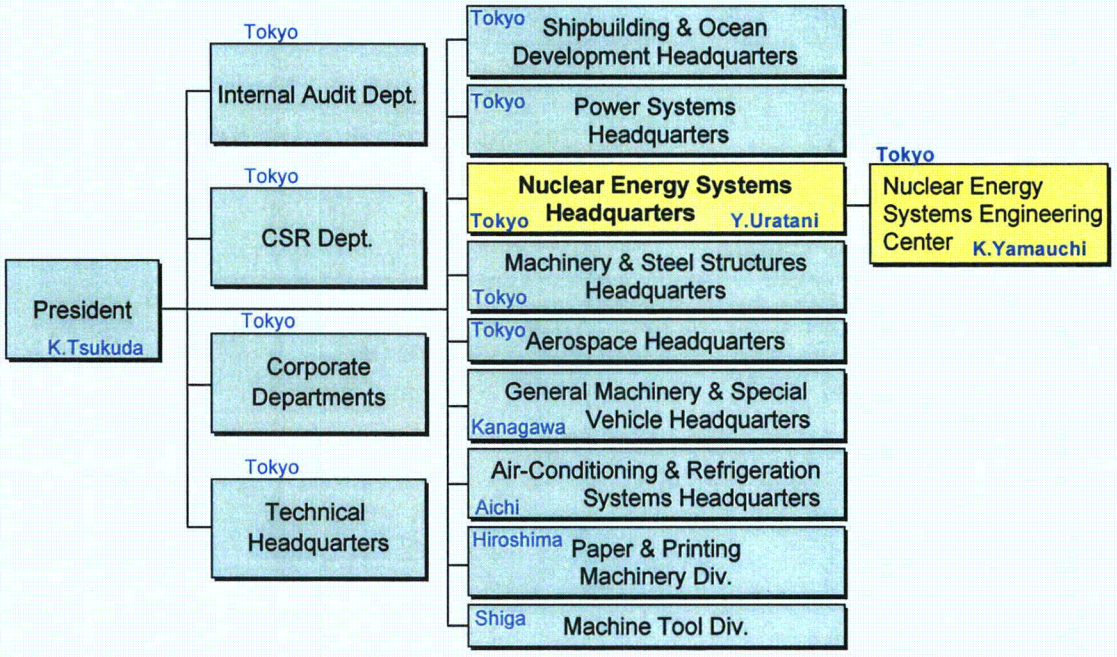
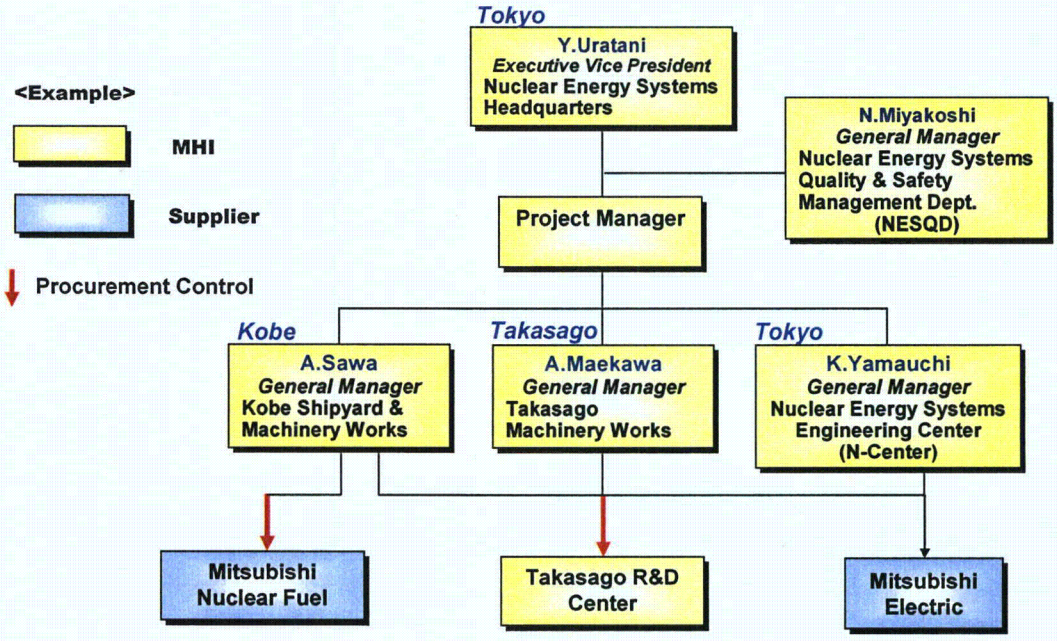
1. MHI Organization

1) MHI Organization



1. MHI Organization

2) Organization For Domestic Nuclear Business



➢ ASME & ISO Certification, Personnel Qualification

ASME & ISO Certification	Personnel Qualification
KOBE ASME N-Stamp 1974~ TAKASAGO ASME U-Stamp 1975 ~ KOBE ISO-9001 1996 ~	KOBE ➢Performance Demonstration Initiative (PDI) ➢Qualified Data Analyst(QDA) for ECT on PWR SG tubes

➢ Export Experience

Reactor Vessel and RV Closure Head	15 Plants (U.S.A) 2 Plants (China) 3 Plants (Sweden)
Steam Generator and Parts	3 Plants (U.S.A) 1 Plant (England) 3 Plants (Belgium) 2 Plants (France)
Main Turbine	4 Plants (Spain, Taiwan, Slovenia)

Quality Assurance Background

Nuclear Component Export Experience (1/3)

North America

	Plant	Applicable Standard / ASME Stamp	Delivery
Reactor Vessel Closure Head	Surry #2	ASME Sec. III / NPT	2003
	Kewaunee	ASME Sec. III / NPT	2004
	Farley Unit #1	ASME Sec. III / NPT	2004
	Farley Unit #2	ASME Sec. III / NPT	2005
	H. B. Robinson	ASME Sec. III / NPT	2005
	Millstone #2	ASME Sec. III / NPT	2005
	Point Beach #1	ASME Sec. III / NPT	2005
	Point Beach #2	ASME Sec. III / NPT	2004
	Prairie Island #2	ASME Sec. III / NPT	2005
	Prairie Island #1	ASME Sec. III / NPT	2006
	Fort Calhoun	ASME Sec. III / NPT	2006
	South Texas #1	ASME Sec. III / NPT	(2009)
	South Texas #2	ASME Sec. III / NPT	(2010)
	San Onofre #2	ASME Sec. III / NPT	(2011)
	San Onofre #3	ASME Sec. III / NPT	(2012)
Containment Vessel	Laguna Verde #1 (MEXICO)	ASME Sec. III / -	1981
Pressurizer	Fort Calhoun	ASME Sec. III / N	2006
Steam Generator	Fort Calhoun	ASME Sec. III / N	2006
	San Onofre #2	ASME Sec. III / N	(2008)
	San Onofre #3	ASME Sec. III / N	(2009)
Main Turbine	Laguna Verde #1 (MEXICO)	- / -	1975
	Laguna Verde #2 (MEXICO)	- / -	1976

Quality Assurance Background

Nuclear Component Export Experience (2/3)

Europe

	Plant	Applicable Standard /ASME Stamp	Delivery
Reactor Vessel	Olkiluoto #3 (FINLAND)	RCC-M,EN / -	(2006)
Reactor Vessel Closure Head	Ringhals #2 (SWEDEN)	ASME Sec. III / -	1996
	Ringhals #3 (SWEDEN)	ASME Sec. III / -	2004
	Ringhals #4 (SWEDEN)	ASME Sec. III / -	2005
Steam Generator	Tihange #1 (BELGIUM)	ASME Sec. III / -	1995
	Tihange #2 (BELGIUM)	ASME Sec. III / -	2001
	Doel #2 (BELGIUM)	ASME Sec. III / -	2004
	Unit F (FRANCE)	RCC-M / -	(2008)
	Unit G (FRANCE)	RCC-M / -	(2008)
Steam Generator Tube Sheet	Sizewell (England)	ASME Sec. III / NPT	1986
Main Turbine	Vandellos #2 (SPAIN)	- / -	1999
	Krsko (SLOVENIA)	- / -	2006

Quality Assurance Background

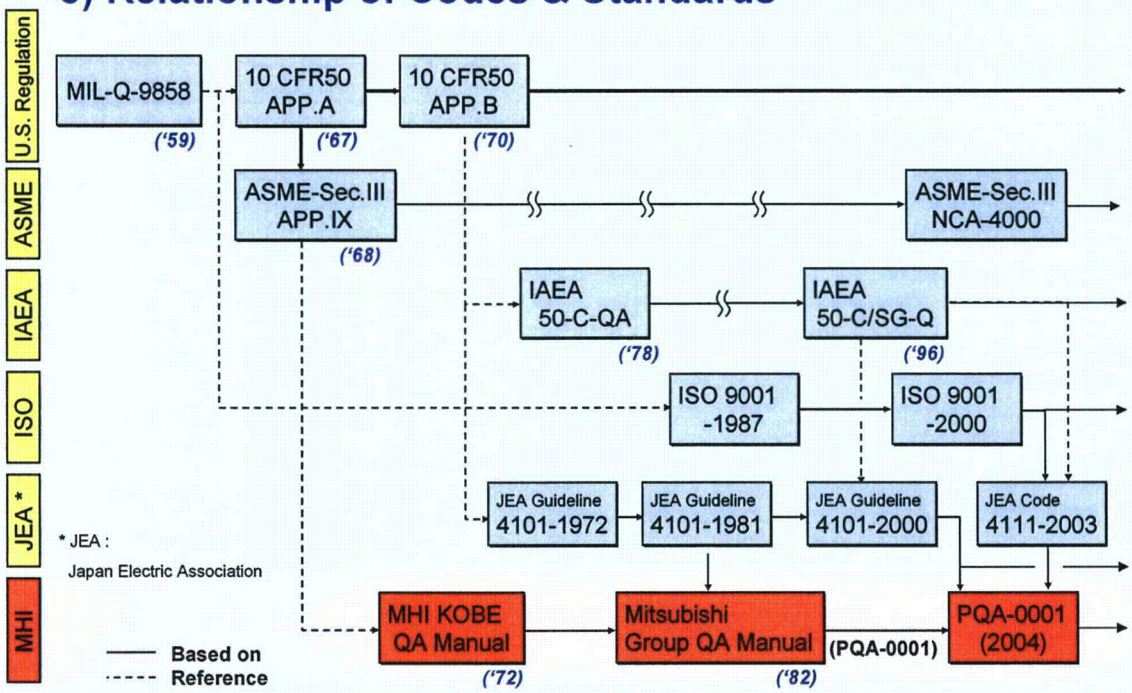
Nuclear Component Export Experience (3/3)

Asia

	Plant	Applicable Standard /ASME Stamp	Delivery
Reactor Vessel	Qinshan I (CHINA)	ASME Sec. III / -	1986
	Qinshan II #1 (CHINA)	ASME Sec. III / -	1999
Reactor Vessel Closure Head	KEDO #1(KOREA)	ASME Sec. III / NPT	Under Suspension
	KEDO #2 (KOREA)	ASME Sec. III / NPT	Under Suspension
Reactor Coolant Pump	Qinshan II #1 (CHINA)	ASME Sec. III / -	1999
	Qinshan II #2 (CHINA)	ASME Sec. III / -	2001
	Qinshan II #3 (CHINA)	ASME Sec. III + RCC-M / -	(2009)
	Qinshan II #4 (CHINA)	ASME Sec. III + RCC-M / -	(2010)
Main Turbine	Taiwan 4th Nuclear Power Station #1 (TAIWAN)	- / -	(2006)
	Taiwan 4 th Nuclear Power Station #2 (TAIWAN)	- / -	(2006)

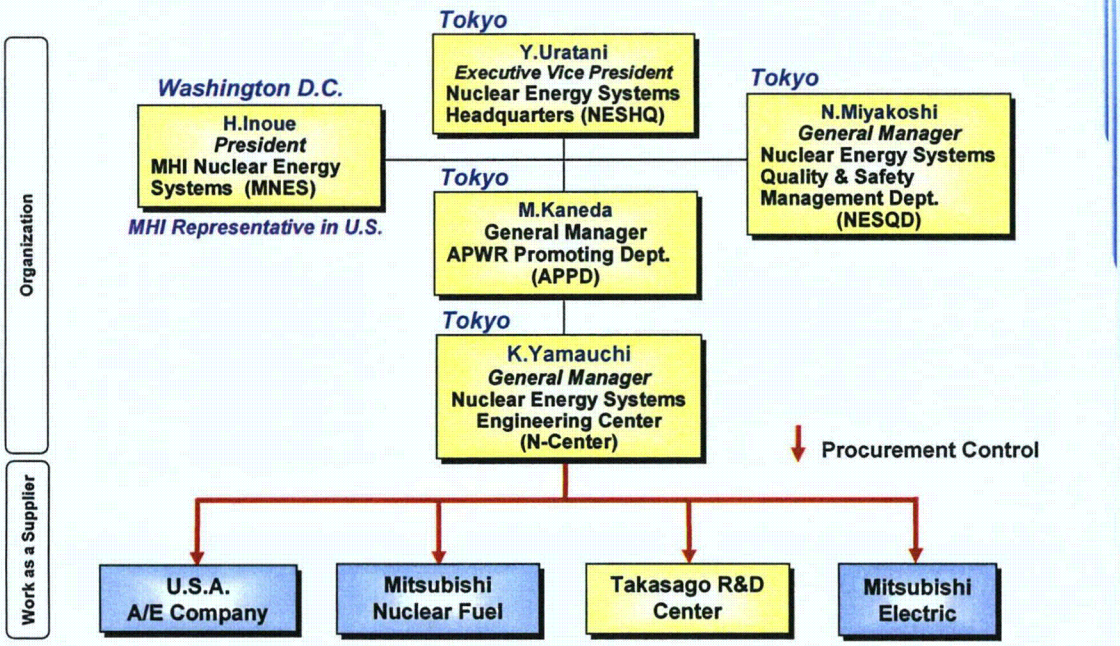
1. MHI Organization

3) Relationship of Codes & Standards



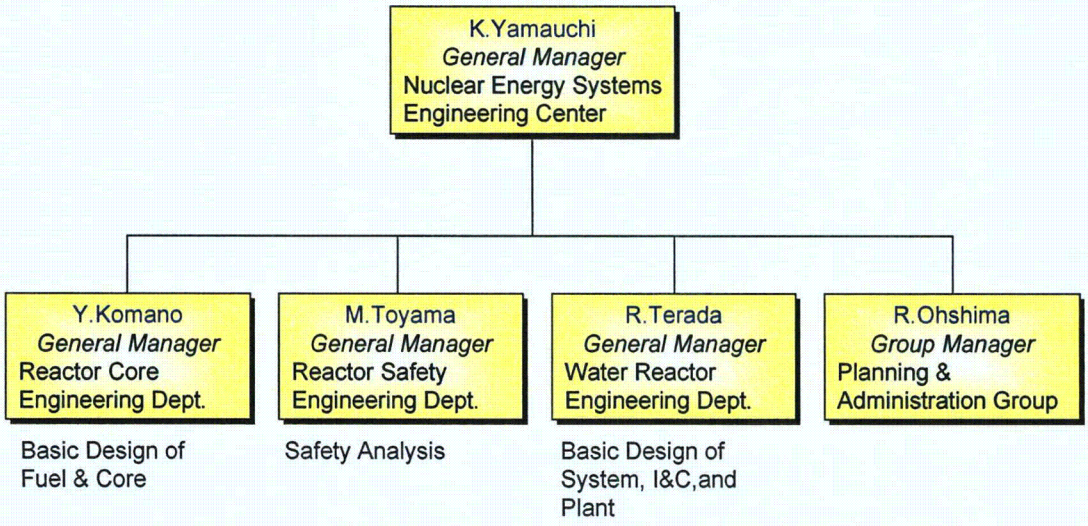
1. MHI Organization

4) Organization for US-APWR in DC Application



1. MHI Organization

5) Organization of N-Center



1. MHI Organization

6-1) Responsibility of APPD

➢ **APWR Promoting Dept. Manager is responsible for :**

a. Management of engineering and licensing activities relating to the Design Certification.
b. Control of the interface between internal and external organization.
c. Overseeing project schedule and resolving pending issues.
d. Establishing US-APWR concept design.
e. Reviewing design documents prepared by design departments.
f. Participating in design verification conducted by design departments.
g. Final approval of DCD and Topical Report for submittal.

1. MHI Organization

6-2) Responsibility of NESQD

➢ **General Manager of Nuclear Energy Systems Quality and Safety Management Dept. is responsible for :**

a. Establishing and maintaining the QA Program.

b. Evaluating compliance to the QA program.

c. Data acquisition and analysis of non-conformances.

d. Reporting significant quality matters to Executive Vice President of Nuclear Energy Systems Headquarters.

e. Establishing hold points in design stage.

f. Reporting significant QA problems to Executive Vice President of NESHQ.

1. MHI Organization

6-3) Responsibility of N-Center

➢ **General Manager of Nuclear Energy Systems Engineering Center is responsible for :**

a. Basic design of fuel & core, safety analysis, and basic design of system, I&C, and plant

b. Preparation of DCD/TR

1. MHI Organization

6-4) Responsibility of MNES

- **The President of MHI Nuclear Energy Systems is responsible for :**

a. Washington D.C. representation of MHI Tokyo concerning DC application.

2. QA Policy for DC Application

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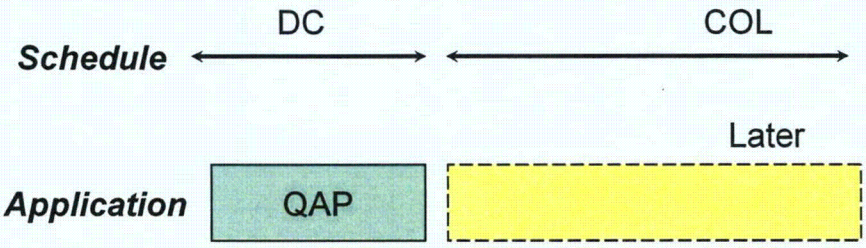
1) Scope of QAP

- SRP section 17.5 allows QAP to be submitted for both DC and COL, or separately.
- MHI has established QAP for DC Application.



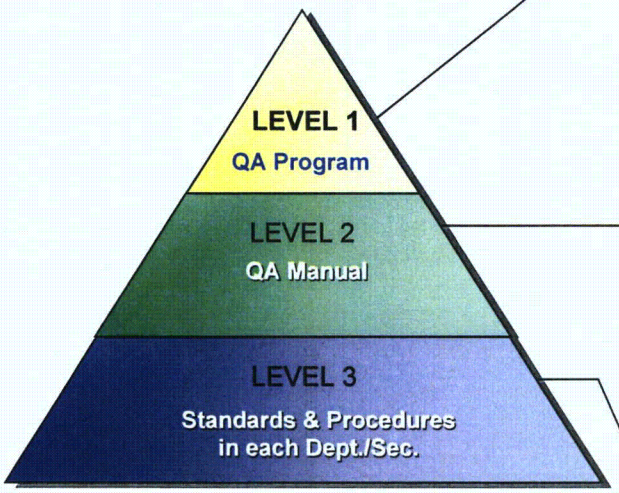
2. QA Policy for DC Application

2) Conformity to 10 CFR Part 50 App.B

	QA Requirements	Applicable status	Remarks (MHI QAP on US-APWR)
1.	Organization	✓	
2.	QA Program	✓	
3.	Design Control	✓	
4.	Procurement Document Control	✓	
5.	Instructions, Procedures and Drawings	✓	
6.	Document Control	✓	
7.	Control of Purchased Materials, Items and Services	✓	- At DC stage this applies to services such as analysis & test
8.	Identification and Control of Items and Materials	-	Not Applicable (NUREG-0800 17.5)
9.	Control of Special Processes	-	
10.	Inspection	✓	- At DC stage this applies to inspections for test facilities
11.	Test Control	✓	- At DC stage this applies to qualification tests
12.	Control of Measuring and Test Equipment	✓	
13.	Handling, Storage and Shipping	-	Not Applicable (NUREG-0800 17.5)
14.	Inspection, Test and Operating status	-	
15.	Control of Nonconforming Items	✓	
16.	Corrective Action	✓	
17.	QA Records	✓	
18.	Audit	✓	✓: Comply - : N/A

2. QA Policy for DC Application

3) Structure of QA Documents on US-APWR Project



QA Program for US-APWR

N-Center QA Manual

- ✓ Document Control
- ✓ Design Control
- ✓ Design Interface Control
- ✓ Design Verification Control Revised
- ✓ Computer Software Control
- ✓ Qualification Procedure of personnel responsible for management of the implementation of the QAP New
- ✓ Procurement Control
- ✓ Control of Nonconformance
- ✓ Corrective Action
- ✓ Control of QA Record Revised
- ✓ Audits etc.

Dept. / Sec. Standards & Procedures

- ✓ Control of Computer Software Code and Verification Control
- ✓ Qualification & Certification Procedure of Lead Auditor
- ✓ Auditor Qualification Procedure, etc

3. QA Commitments

3. QA Commitments (1)

QA program complies with :

- 10 CFR 50 Appendix B and the additional guidance of Standard Review Plan NUREG-800 Section 17.5
- ASME NQA-1-1994
  - ✓ PART I, including supplements with clarifications and exceptions proposed by NEI
  - ✓ PART II Subpart 2.7 "Quality Assurance Requirements of Computer Software for Nuclear Facility Applications"

3. QA Commitments (2)

QA program will include :

- Quality Assurance Requirements for non-safety related regulated events in accordance with regulatory guidance

ATWS	G.L. 85-06
Station Blackout	R.G. 1.155
Fire Protection	R.G. 1.189

- Quality Group Classifications and Standards for Water-Steam- and Radioactive-Waste-Containing components of Nuclear Power Plants R.G. 1.26
- Seismic Design Classification R.G. 1.29
- Requirements for managing QA records in electronic mode per

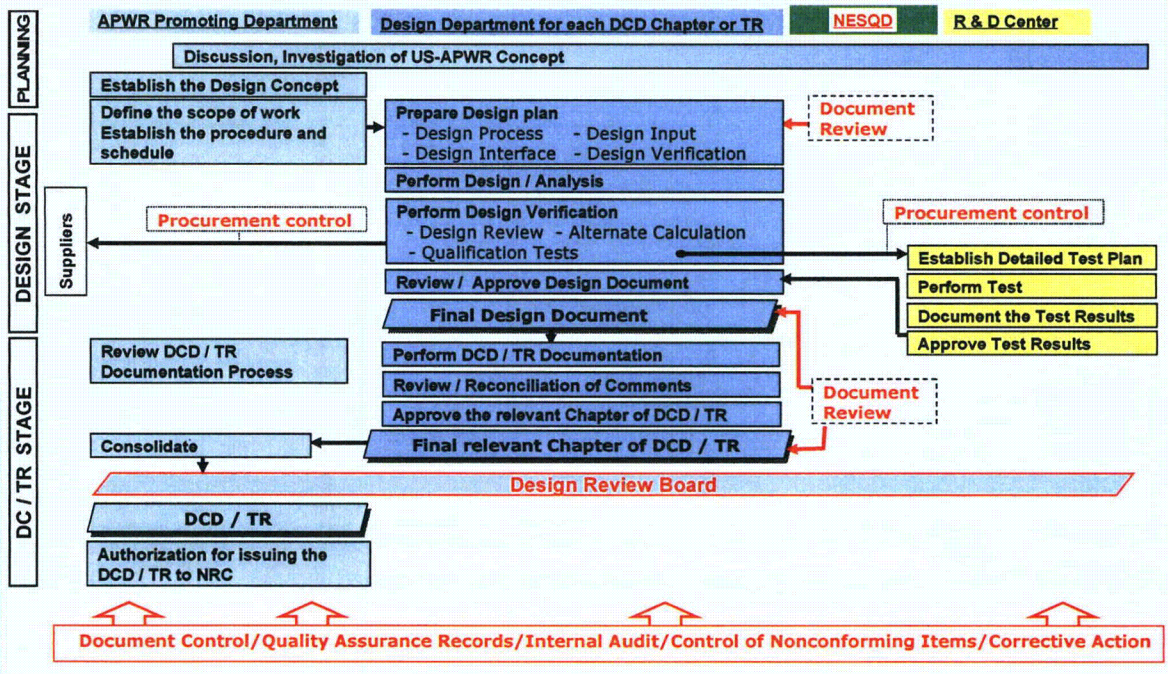
  G.L. 88-18 Optical Discs, RIS 2000-18

  NIRMA Technical Guides 11-1998, 15-1998, 16-1998, 21-1998

4. Quality Assurance in Design Stage

4. Quality Assurance in Design Stage

1) Process Chart Over DCD / TR Application Stage



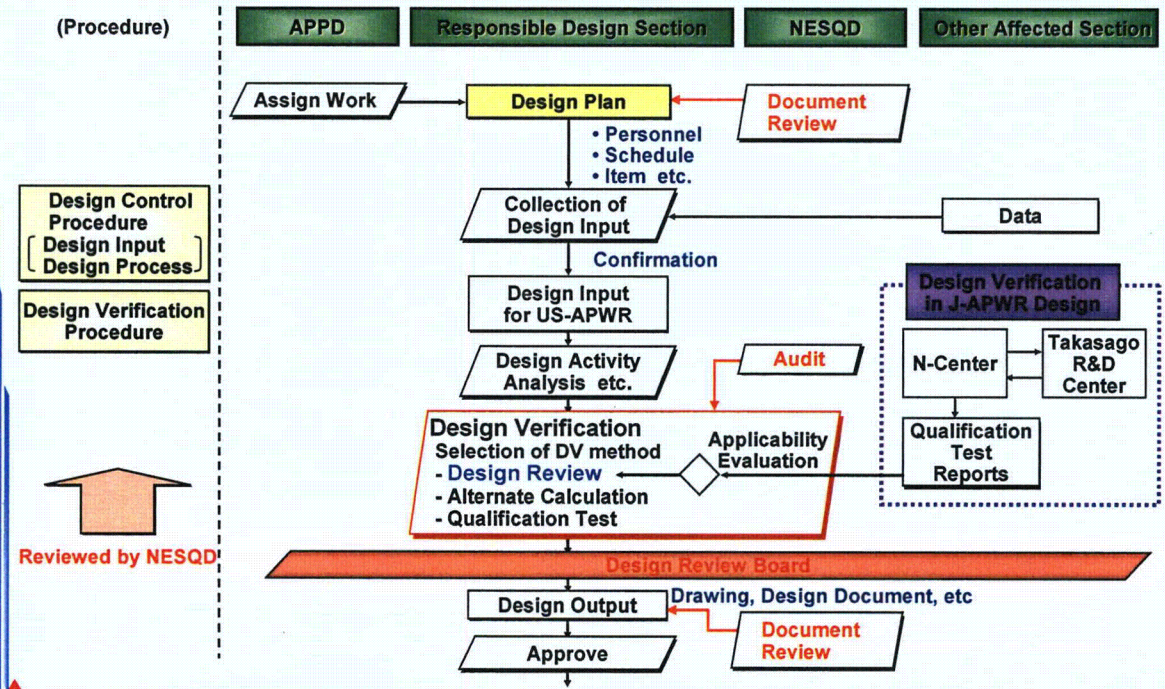
4. Quality Assurance in Design Stage

2) QA Role Defined in QA Program

1. Establishing and maintaining QA program for US-APWR
2. Conducting internal audit and follow up
3. Personnel Qualification (Auditor, Lead Auditor, QA Personnel engaged in US-APWR)
4. Reviewing design personnel qualification results
5. Reviewing standards and procedures in design stage
6. Reviewing design documents including purchase specification
7. Assessment of suppliers
8. Control of nonconformances and directing corrective action
9. Identifying and reporting significant problems directly to Executive Vice President
10. Conducting periodic management review

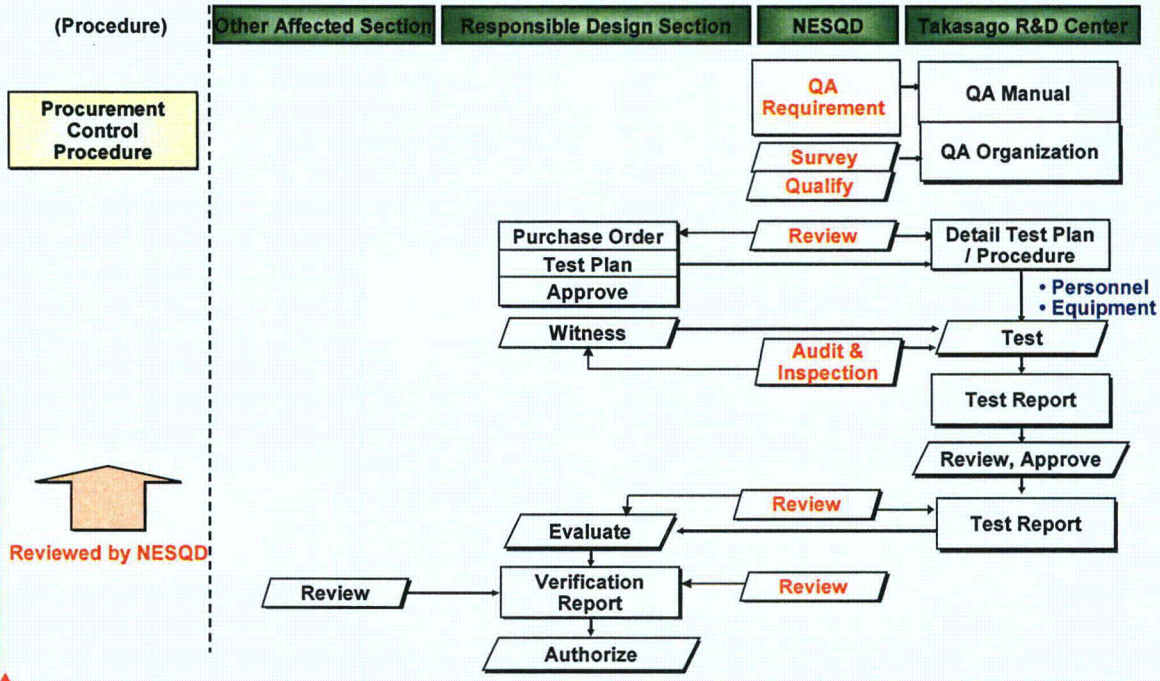
4. Quality Assurance in Design Stage

3) Design Control Process



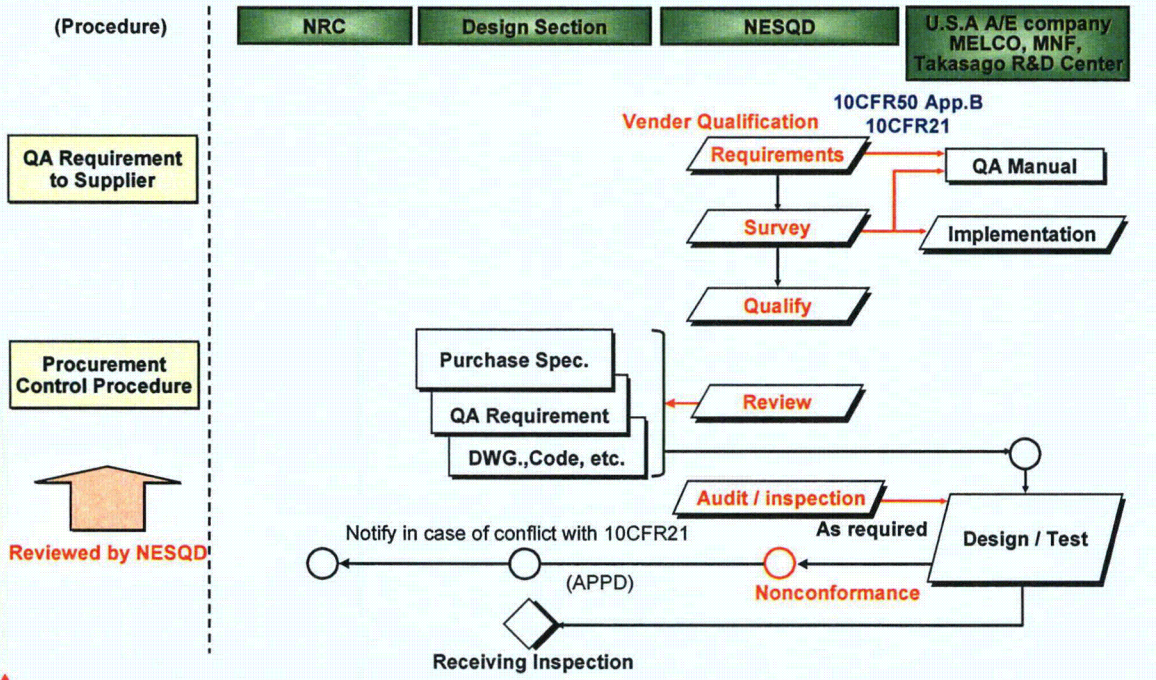
4. Quality Assurance in Design Stage

4) Qualification Test



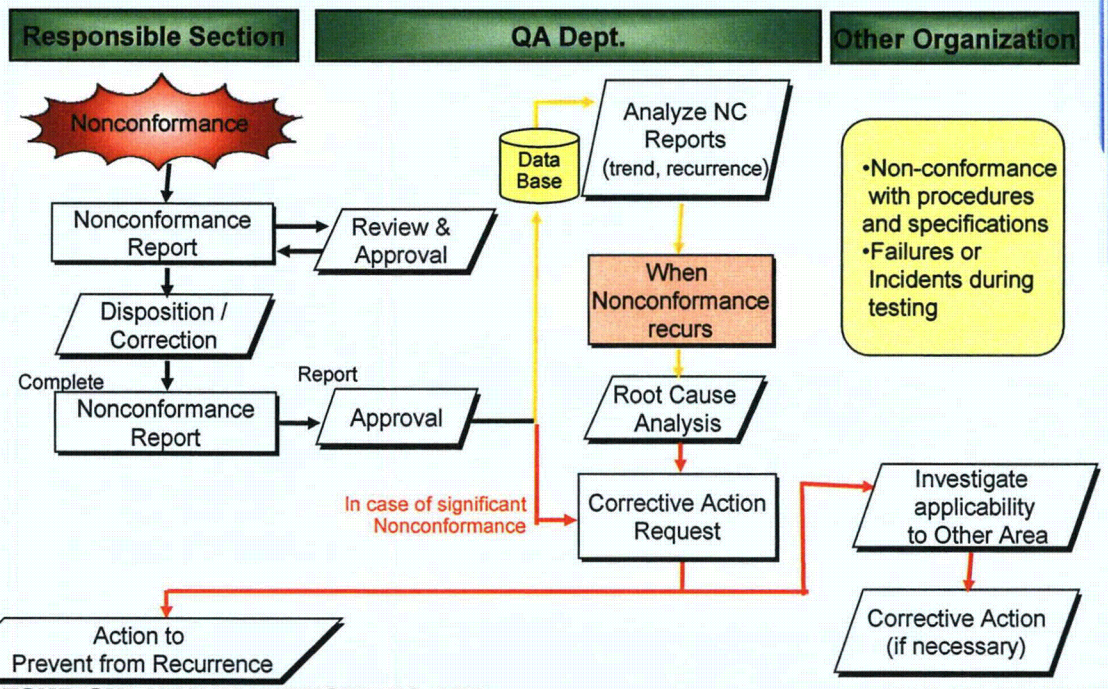
4. Quality Assurance in Design Stage

5) Procurement Control



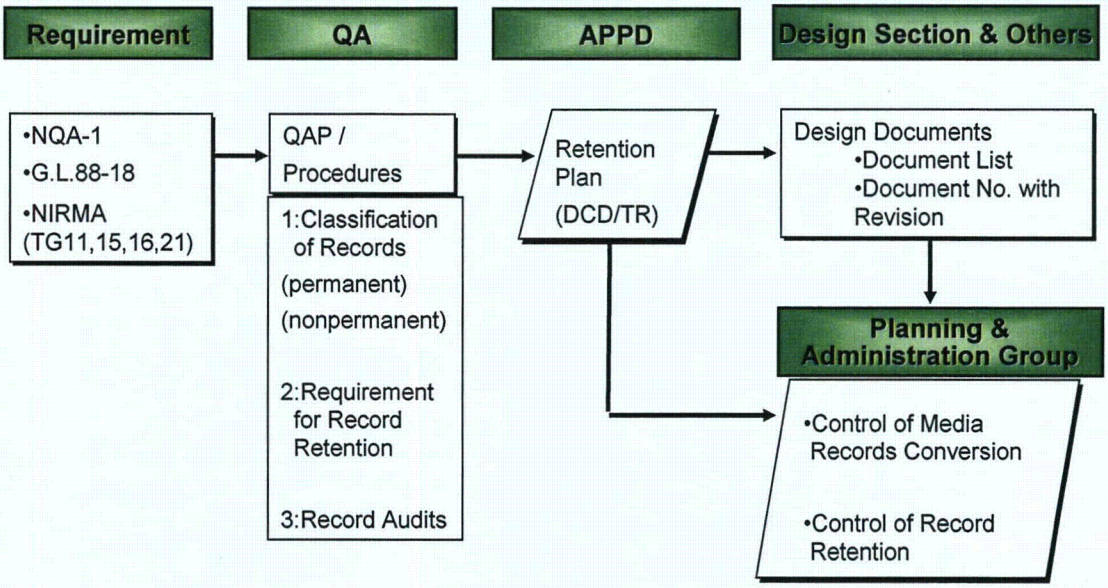
4. Quality Assurance in Design Stage

6) Nonconformance Control & Corrective Action



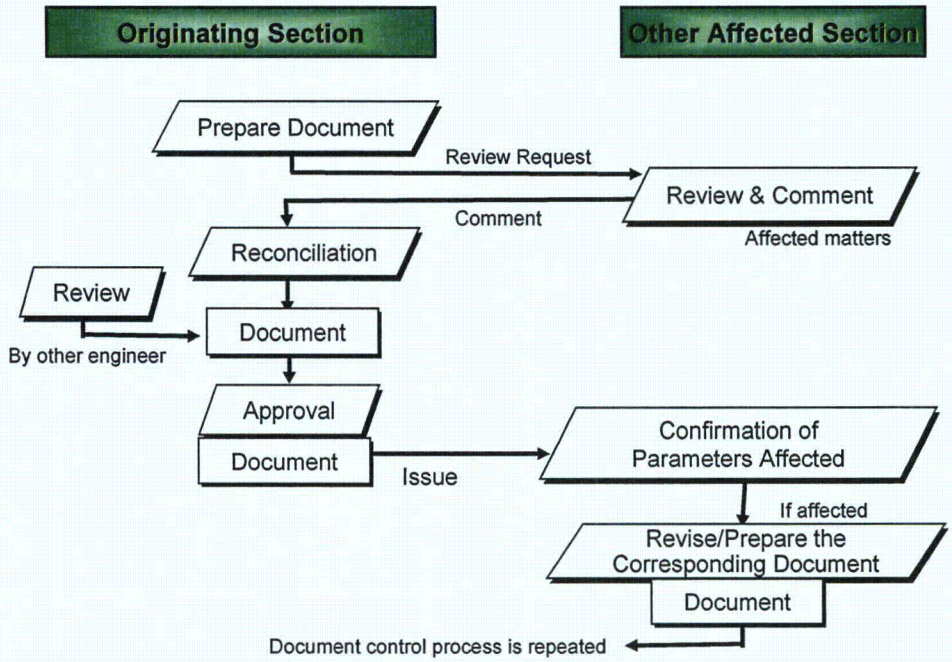
4. Quality Assurance in Design Stage

7) Record Control



4. Quality Assurance in Design Stage

8) Document Control



5. Format & Contents of the QA Topical Report

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Format : MHI US-APWR QA program description is similar to the template developed by NEI.

Content : Address Appendix B & the draft standard review plan NUREG-800 Section 17.5

6. Current Status & Future Activities

6. Current Status & Future Activities

- Current status & future activities
  - ✓US-APWR design is ongoing and utilizes Japanese APWR experience.
  - ✓QA Topical Report is scheduled to be submitted January 2007.
  - ✓MNES and MHI are available to meet with NRC to discuss and resolve questions.

End