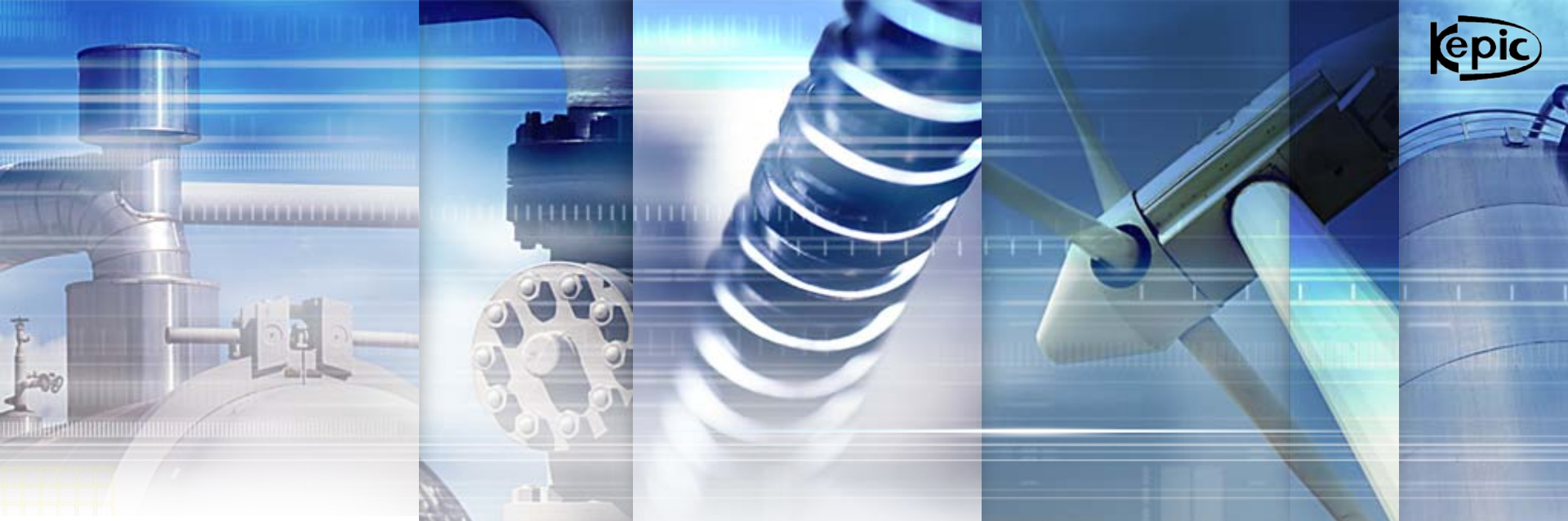

Korea Electric Power Industry Code, KEPIC

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Contents

Nuclear Power Generation in Korea

01

Electric Power Generation in Korea

Status of Installed Capacity

Power Source	Installed Capacity (MW)	Portion (%)
Coal	25,151	31.7
Gas	21,740	27.4
Nuclear	18,725	23.6
Oil	5,475	6.9
Others	8,251	10.4
Total	**79,342**	**100**

- **Others: Hydroelectric, Renewable, etc.**
- **Data Source: Korea Power Exchange (14 June, 2012)**

Electric Power Generation in Korea

Status of Electric Power Generation

Power Source	Electric Power (GWh)	Portion (%)
Coal	199,882	40.3
Nuclear	154,723	31.2
Gas	111,597	22.5
Oil	10,416	2.1
Others	19,343	3.9
Total	**495,961**	**100**

- **Others: Hydroelectric, Renewable, etc.**
- **Data Source: Korea Power Exchange (14 June, 2012)**

Operating NPPs in Korea

Unit	Installed Capacity (MW)	Reactor Type	Commercial Operation
Kori #1	587	Pressurized Light Water Reactor	29 Apr., 1978
Kori #2	650		25 July, 1983
Kori #3	950		30 Sep., 1985
Kori #4	950		29 Apr., 1986
ShinKori #1	1,000		28 Feb., 2011
Wolsong #1	679	Pressurized Heavy Water Reactor	22 Apr., 1983
Wolsong #2	700		1 July, 1997
Wolsong #3	700		1 July, 1998
Wolsong #4	700		1 Oct., 1999
Yonggwang #1	950	Pressurized Light Water Reactor	25 Aug., 1986
Yonggwang #2	950		10 June, 1987
Yonggwang #3	1,000		31 Mar., 1995

Operating NPPs in Korea

Unit	Installed Capacity (MW)	Reactor Type	Commercial Operation
Yonggwang #4	1,000	Pressurized Light Water Reactor	1 Jan., 1996
Yonggwang #5	1,000		21 May, 2002
Yonggwang #6	1,000		24 Dec., 2002
Ulchin #1	950	Pressurized Light Water Reactor	10 Sep., 1988
Ulchin #2	950		30 Sep., 1989
Ulchin #3	1,000		11 Aug., 1998
Ulchin #4	1,000		31 Dec., 1999
Ulchin #5	1,000		29 July, 2004
Ulchin #6	1,000		22 Apr., 2005
Total (21 units)	18,716	-	-

Under Construction and Planning NPPs

Status	Unit	Capacity (MW)	Reactor Type	Process (%)
Under Construction	ShinKori #2	1,000	Pressurized Light Water Reactor	99.97
	ShinKori #3	1,400		89.84
	ShinKori #4	1,400		89.84
	ShinUlchin #1	1,400		30.09
	ShinUlchin #2	1,400		30.09
	ShinWolsong #1	1,000		99.25
	ShinWolsong #2	1,000		99.25
Planning	ShinKori #5	1,400		(2019)
	ShinKori #6	1,400		(2019)
	ShinKori #7	1,400		-
	ShinKori #8	1,400		-
	ShinUlchin #3	1,400		(2021)
	ShinUlchin #4	1,400		(2021)
Total	13 (7+6) units	17,000	-	-

Safety Improvement Activities Response to Fukushima

02

Activities in Summary

◈ Ongoing Activities

52 ongoing improvements will be completed according to the established implementation plan by 2015.

- 4 improvements were finished in 2011

◈ Lessons Learned from Fukushima

Additional improvements which reflect lessons learned from Fukushima will be continuously applied to domestic NPPs.

- International Institute Reports: IAEA, WANO, INPO, NRC, etc.
- National Reports: Japan, USA, France, etc.
- EU Stress Test Results
- Safety Improvements of Overseas NPPs

Safety Review

◈ Korea Hydro & Nuclear Power (KHNP)

KHNP reviewed safety of all operating NPPs from 16 March to 18 March, 2011.

◈ Korean Government

The Government also reviewed safety of them from 23 March to 3 May, 2011.

◈ What they reviewed?

- Safety of structures and equipment against earthquake and tsunami,
- Safety of electrical power and cooling systems in case of flooding,
- Severe accident & emergency response systems.

Results

Identified Improvements

- 50 short to long term improvements were verified to secure safety, even for worst case events similar to the Fukushima accident.

- 46 of 50 improvements to be performed by KHNP, 4 by other organizations.

- 10 additional improvements to be performed were verified from cross-checking with 83 items recommended by IAEA, Japan, NRC, and France.

7 Areas of 56 Improvement Plans

1. Coastal Barrier
   - Making the coastal barrier higher at Kori site
2. Portable Emergency Diesel Generator (EDG)
   - Preparing a vehicle with a portable EDG at each site
3. Battery
   - Securing the safety of emergency battery power from flooding
4. EDG
   - Installing watertight doors at EDG facilities
5. Drain Pump
   - Water-proof sump pumps
6. Containment Building
   - Installing passive H_2 removal systems which operate without electricity
7. Exhaust
   - Installing exhaust and decompression equipment

Improvements Completed in 2011

1. Firefighting Plan

- Improved firefighting plan established effective cooperation systems between the internal and external fire stations of the NPP

2. Training for Severe Accidents

- KHNP developed various severe accident scenarios and extended the training time from 8 hours every 2 years to 10 hours per year

3. Radiation Emergency Plan

- KHNP amended the radiation emergency plan to cope with simultaneous natural disaster emergencies at multiple units

4. Purchase Quality Assurance System

- KHNP reinforced quality requirements in the purchase spec. to avoid using defective parts for equipment that can induce a reactor's shutdown

Key 12 Improvement Activities

1. Installing Automatic Seismic Trip System (by 2013)
   - Reactors are automatically shut down when detecting an earthquake above a certain seismic level (0.18g)

2. Extension of Kori NPP Seawall (by 2012)
   - The height of Kori NPP seawall is extended to equal the height level (10 m) of other NPPs site

3. Installation of Waterproof Gates (by 2014)
   - Waterproof gates in structures that are seismically designed to cope with the flooding

4. Movable Vehicle for a Generator (by 2014)
   - Vehicle-mounted portable emergency generators

Key 12 Improvement Activities

5. Alternative Cooling of the Spent Fuel Pool (by 2012)

- Supplementary method for cooling water using a fire truck and a connection point

6. Wall Barriers for Outdoor Tanks (by 2014)

- Wall barriers to cope with potential damage to the outdoor tanks

7. Passive Hydrogen Removal Equipment (by 2013)

- Passive Autocatalytic Recombiner (PAR) can operate without power supply

8. Filtered Ventilation System (by 2015)

- Filtered vent facilities within the containment buildings to prevent the excessive rise of pressure in preparation for severe accidents

Key 12 Improvement Activities

9. Nuclear Reactor Emergency Cooling Water from External Sources (by 2015)

- Primary and secondary injection conduits for emergency cooling water

10. Additional Protection Equipments A (by 2012)

- Additional potassium iodine (KI) and gas masks for protecting residents near NPPs

11. Additional Protection Equipments B (by 2012)

- Additional protection devices such as protective clothing radiation detectors at more than 200 % of the current inventory levels

12. Reinforcing the Radiation Emergency Training (by 2012)

- A practical scenario for earthquake and coastal flooding and using it for training

Introduction to KEPIC

03

Definition of KEPIC

- **A set of integrated standards applicable to the whole phases of design, manufacturing, installation, operation, testing, inspection and maintenance of electric power facilities and components so as to ensure their safety and reliability.**

Administrative Requirements

- Quality Assurance
- Certification
- Administration

Technical Requirements

- Material
- Design
- Manufacture
- Installation
- Testing & Inspection
- Operation
- Maintenance

Ensure safety & reliability of electric facilities

Basic Policies of KEPIC Development

◈ Technical requirements

Compliance with related national rules such as Electric Utility Act, Atomic Energy Act, Building Act, Framework Act on Fire Services.

◇ **Developed by the adaptation of foreign reference standards applied to electric power facilities in Korea.**

◇ **Identical to the reference standards except for some editorial changes such as the use of KEPIC's own categorizing & numbering system.**

◇ **Developed on the basis of advanced domestic technologies in the absence of proper foreign reference standards.**

Basic Policies of KEPIC Development

◈ Administrative requirements

Based on ASME BPVC Sec.Ⅲ NCA "General Requirements" and modified to be suitable for the industrial circumstances and situation in Korea.

◇ Established KEPIC's own Certification System for nuclear safety-related items including nuclear certification, authorized inspection, RPE, etc.

◇ Adopted the ISO 9000 quality system and the authorized inspection system for non-nuclear safety related and thermal power items.

Application Scopes of KEPIC

- **Overall electric industry fields such as nuclear power plants, thermal power plants, transmission·transformation·distribution facilities, etc.**

- **Whole phases including design, manufacturing, installation, operation, testing, inspection, maintenance, etc.**

History of KEPIC

Phase 1 ('87~'88)

Feasibility study and planning

Phase 2 ('92~'95

- KEPIC '95 Ed.

Standards for nuclear & fossil power generation

1995 edition Issue
- 5 parts, 33 Vol.,
- Approx. 12,000 pages

Phase 3 ('96~'00)

- KEPIC'00 Ed.

Standards for transmission, transformation and distribution

2000 edition Issue
- 6 parts, 59 Vol.,
- Approx. 20,000 pages

Phase 4 ('01~'05)

- KEPIC'05 Ed.

Standards for rad-waste facility and radiology

2005 edition Issue
- 6 parts, 82 Vol.,
- Approx. 25,000 pages

Phase 5 ('06~'10)

- KEPIC'10 Ed.

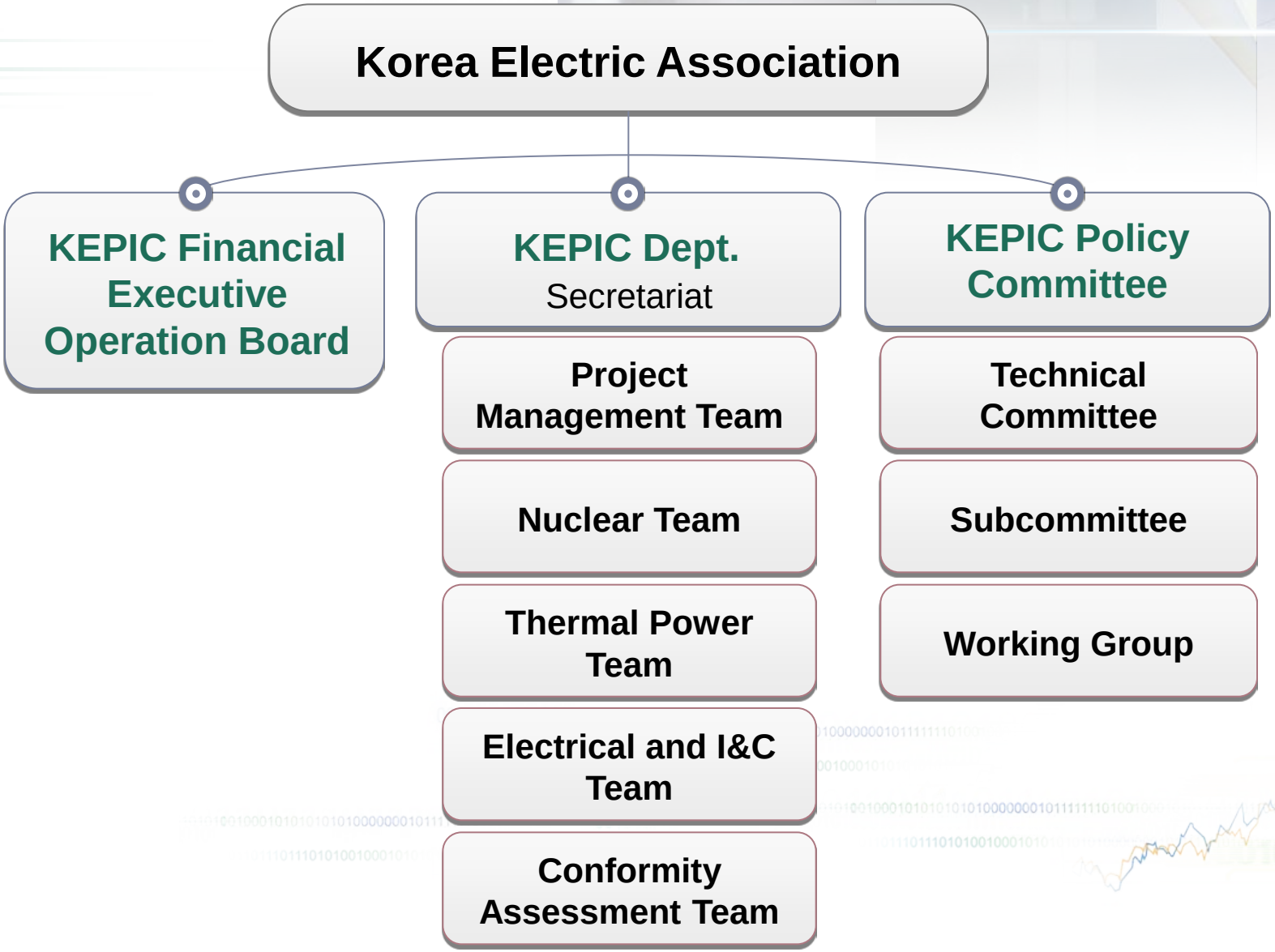
Standards for environmental facility

R&D studies for the improvements of the developed standards

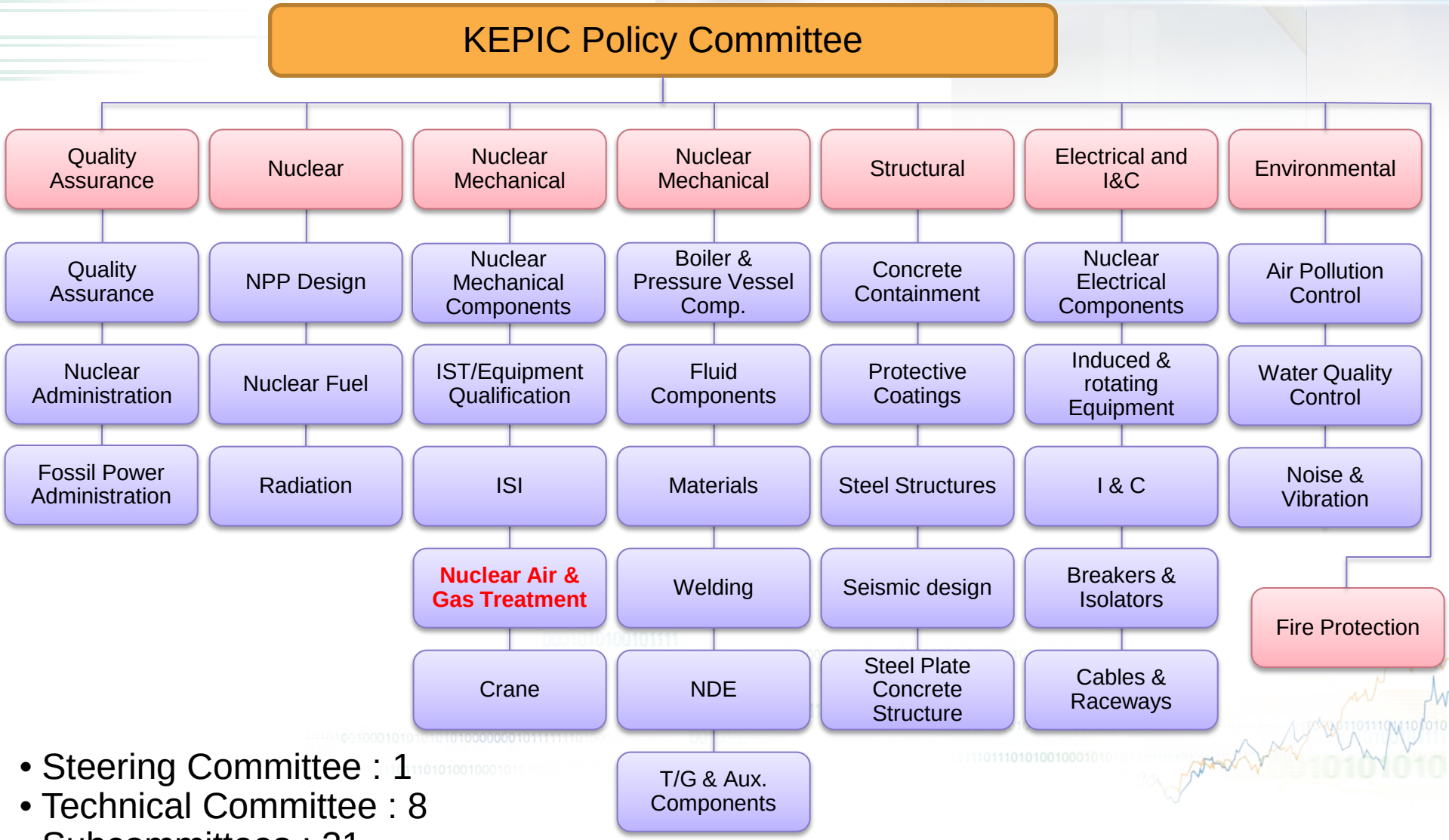
2010 edition Issue
- Bilingual edition,
- 138 Vol.,
- Approx. 60,000 pages

❖ Period of Phase 6 is from 2011 to 2015.
❖ 2011 Addenda was published in November, 2011.

KEPIC Development Organizations

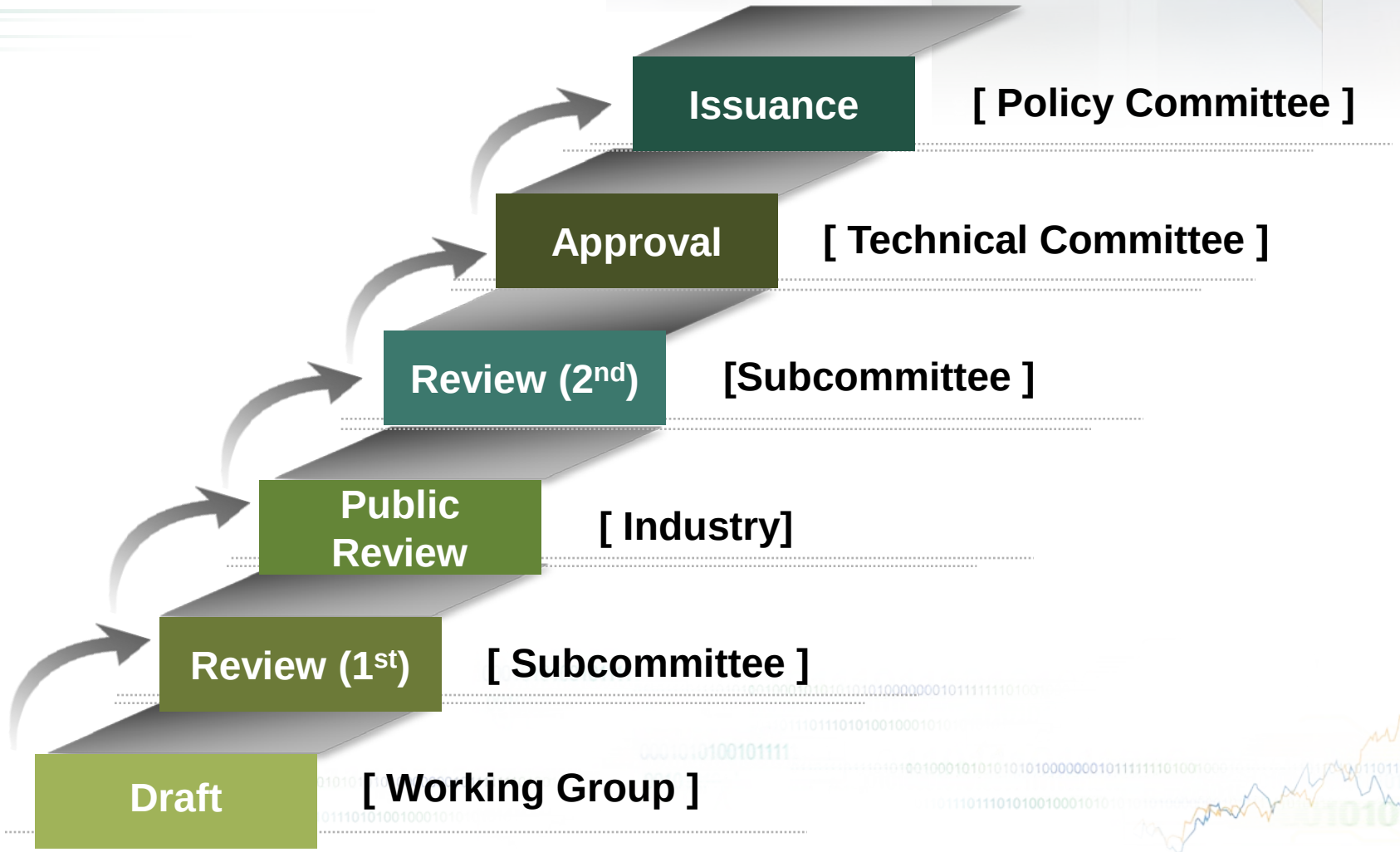


KEPIC Committees



- Steering Committee : 1
- Technical Committee : 8
- Subcommittees : 31

KEPIC Development Process



Editions and Addenda

Editions

Every five years, a revised and updated KEPIC Edition is published that incorporates all addenda issued during the last 5 years, including the newly developed codes and standards.

Addenda

KEPIC Addenda are issued annually to reflect and/or incorporate the followings:

- Changes in reference codes and standards,
- Feedbacks and comments from industrial applications,
- Requirements to be revised according to the result of the KEPIC inquiry and reply system,
- Other changes for improvements.

Structure of KEPIC & Reference Standards

Part	Subpart	Reference Standards
Quality Assurance (KEPIC-Q)	QAP : Nuclear Quality Assurance QAI : Authorized Inspection QAR : Registered Professional Engineer	ASME NQA-1 ASME QAI-1 ASME Sec.III. App.XXIII
Mechanical (KEPIC-M)	MN : Nuclear Mechanical Components MG : Non-nuclear Mechanical Components MC : Cranes **MH : Nuclear Air & Gas Treatment** MD : Materials ME : Non-destructive Examination MW: Welding & Brazing Qualification MI : In-service Inspection MO : In-service Testing MF : Qualification of Mechanical Equipment MB : Power Boilers MT : Turbine & Generators MP : Performance Test MM : Maintenance	ASME Sec.III. Div.1 ASME Sec.VIII, HEI, API ASME NOG-1, CMAA 70 **ASME AG-1** ASME Sec.II ASME Sec.V ASME Sec.IX ASME Sec.XI ASME OM ASME QME-1 ASME Sec.I Manufacturer's Spec. ASME PTC ASME PCC
Electrical (KEPIC-E)	EN : Class 1E Equipment EM: Measuring & Control Equipment EE : Electric Equipment EC : Cables & Raceways ET : Transmission, Transformation and Distribution	IEEE, ANSI, ISA, etc. IEEE, ISA, IEC, etc. NEMA, IEC, ANSI, etc. ASTM, NEMA, IEEE, etc. IEC, IEEE, etc.
Structural (KEPIC-S)	SN : Nuclear Structures SG : Non-nuclear Structures ST : Extra-Provisions for Structures SW: Structural Welding	ASME Sec.III, ACI 349, etc. ACI 318, AISC, etc. ASCE 4, 7 AWS D1.1, D1.3
Nuclear (KEPIC-N)	NF : Nuclear Fuels ND : Design of Nuclear Power Plants NR : Radiation Protection Design NW : Radioactive Waste Control NP : Probabilistic Safety Assessment	RCC-C, ASTM, etc. ANS 51.1, etc. ANS 6.4, etc. ANS 55.1, etc. ASME RA-S, ANS 58.21
Fire Protection (KEPIC-F)	FN : Fire Protection for Nuclear Power Plants	NFPA, 803, 804, 805, etc.
Environmental (KEPIC-G)	GG : Air Pollution GS : Noise/Vibration GW : Water-treatment	None None None

KEPIC Editions Publication Status

Part	2000 Edition		2005 Edition		2010 Edtion	
	No. of Std.	Pages	No. of Std.	Pages	No. of Std.	Pages
Quality Assurance [Q]	3	241	3	383	3	433
Mechanical [M]	51	8,336	56	10,489	74	26,286
Electrical and I&C [E]	216	7,377	240	8,967	184	17,979
Structural [S]	12	2,022	13	3,000	14	6,491
Nuclear [N]	2	204	21	1,345	39	3,832
Fire Protection [F]	3	281	6	456	16	3,222
Environmental [G]	-	-	-	-	8	832
Total	287	18,481	339	24,640	338	59,819

※ 2010 Edition was issued as a bilingual (Korean-English) version.

Endorsement by Korean Government

Regulatory Body	Notice No.	Notice Title	Applicable KEPIC
Nuclear Safety and Security Commission	2012-13	Guidelines for Application of Korea Electric Power Industry Code (KEPIC) as Technical Standards of Nuclear Reactor Facilities	Endorsement of KEPIC 2000 edition and yearly addenda, KEPIC 2005 edition and 2006 1st and 2nd addenda, and MFA/ENA 2007 addenda
	2012-17	Detailed Requirements for Quality Assurance of Nuclear Reactor Facilities	Adoption of KEPIC-QAP
	2012-9	Regulation on Safety Classification and Applicable Codes and Standards for Nuclear Reactor Facilities	Adoption of KEPIC-MN, EN, SN
	2012-14	Standards for Safety Valves and Relief Valves of Nuclear Reactor Facilities	Adoption of KEPIC-MD, MN
	2012-10	Regulation on In-Service Inspection of Nuclear Reactor Facilities	Adoption of KEPIC-MI
	2012-23	Regulation on In-Service Test of Safety-related Pumps and Valves	Adoption of KEPIC-MO
	2012-25	Guidelines on Application of Technical Standards for Assessment of Continued Operation of Nuclear Reactor Facilities	Adoption of KEPIC-MO
Ministry of Knowledge Economy	2006-65	Electro-technical Regulations	Substitutive Application of KEPIC for Thermal Power Plants

Inquiry and Reply System

◈ Purpose

- To clarify the meaning of KEPIC requirements, and to prevent the misunderstanding of KEPIC users.

◈ Inquiry

- a brief and accurate inquiry which could be answered clearly "Yes" or "No".
- Inquiry is available in the KEPIC homepage (www.kepic.or.kr).

◈ Reply

- Reply is prepared in conformity to related inquiry guides and, if required, published as interpretations or code cases after review and approval by respective KEPIC committee.

◇ Interpretation

It provides means to understand technical and administrative viewpoints and contents of KEPIC but is not part of KEPIC.

◇ Code Case

It is a specific case to clarify the intent of KEPIC requirements or a new provision to urgently provide supplementary rules for any incomplete requirement of KEPIC. It is a part of the KEPIC and has the equivalent effectiveness.

Nuclear Certification Program

◈ KEPIC Certification Program

- The KEPIC certification program is a system that the qualified organizations and personnel by KEA (Korea Electric Association) in accordance with KEPIC requirements perform their appropriate code activities for nuclear safety-related items so as to achieve the safety and reliability goals of electric power facilities, especially nuclear power plants.

◈ Background

- The KEPIC certification program has been established by referring and modifying certification programs of foreign codes and standards which had previously been applied to domestic industries.

◇ Correcting the problem that unauthorized foreign certification programs in Korea were applied.

◇ Easy acquisition of certificates and related information through the program operated by domestic certification and accreditation body.

◇ Economizing costs needed for acquisition and holding of one or more foreign certificates.

Nuclear Certification Program

◈ Scope

◇ **Organization Certification**

- plant owner & designer, manufacturer, installer & constructor, material organization, and service organization,
- authorized inspection agency (AIA),
- pressure relief device testing laboratory,
- equipment qualification (EQ) testing organization.

◇ **Personnel Qualification**

- authorized nuclear inspector/supervisor
- registered professional engineer (RPE)

Nuclear Certification Program

◈ Certification of Quality Assurance System

- KEPIC certification system, being similar to ASME's N-type certificate system for pressure equipment (KEPIC-MN), has been extended to class 1E electrical and I&C items (KEPIC-EN), seismic category I reinforced concrete and steel structure (KEPIC-SN), and HVAC (KEPIC-MH). Nuclear safety-related organizations should obtain KEPIC Certificate from KEA in accordance with general requirements of each nuclear standard.

◈ Organization and work scope

Field	Applicable KEPIC	Organizations	Work Scope
Mechanical	KEPIC-MN	owner, manufacturer, installer, material organization, service organization	Activities for Class 1, 2, 3, MC, and CS components
Electrical and I&C	KEPIC-EN	owner, manufacturer, installer, EQ testing organization	Activities for Class 1E equipment
Structural	KEPIC-SN	owner, designer, auxiliary item manufacturer, constructor, material org., service organization	Activities for Seismic Category Ⅰ structures or equipment
HVAC	KEPIC-MH	manufacturer, installer	Safety class air cleaning unit/air conditioning unit and components

Nuclear Certification Program

◈ Certification for Authorized Inspection Agency/Authorized Inspector

- The pressure equipment manufacturer and installer shall be inspected by an authorized inspector who is employed by the Authorized Inspection Agency (AIA). It is necessary for Authorized Inspector and Authorized Inspector Supervisor to take the training program and pass the qualifying examination. And then AIA makes application for their registration to KEA.
- Scope: KEPIC-MNX, MIX, SNB, MGB, MGE, MBB

◈ Qualification for Registered Professional Engineer (RPE)

- RPE reviews the nuclear pressure equipment's design documents, such as the design specifications and design reports, and certifies those documents with an RPE stamping of acceptance. The person who intends to be qualified as a KEPIC RPE must possess the appropriate national technical qualification certificate and must be equipped with enough code knowledge and experiences.
- Scope: KEPIC-MNX, SNB

Nuclear Certification Program

◈ Certification for a Pressure Relief Device Testing Laboratory

- KEA certifies testing laboratories and designated organizations which perform the relieving capacity test and also certify the capacity in accordance with KEPIC-MNX, KEPIC-MGB, and KEPIC-MBB.

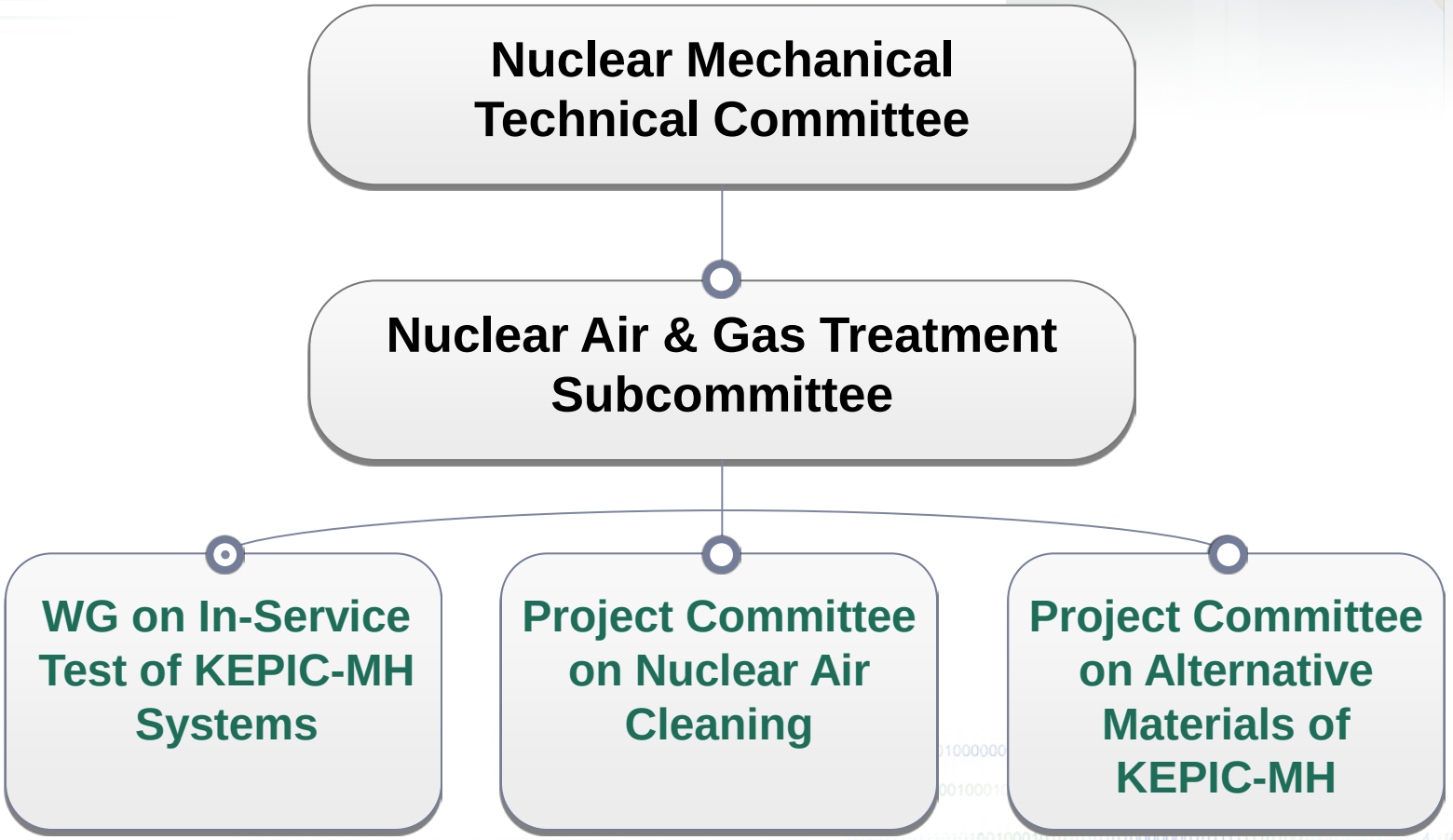
◈ Certification for an EQ Testing Organization or Service Organization

- Equipment qualification testing organizations shall be certified by KEA.
- Organizations which perform service activities such as non-destructive examination, pressure equipment design, and heat treatment shall be certified by KEA or KEPIC certificate holders.

KEPIC-MH Nuclear Air & Gas Treatment

04

Structure of the Subcommittee



Role of WG and Project Committees

WG or PC	Role or Duty
WG on In-Service Test of KEPIC-MH Systems	- Develop the new draft of KEPIC-MHN 511 to be published in 2012 referencing ASME N-511
Project Committee on Nuclear Air Cleaning	- Feasibility study on adaptation of ASME N-509, N-510, and N-511 to new KEPIC-MH standards (terminated in Dec., 2011) - Develop the draft of KEPIC-MH 2012 Addenda referencing ASME AG-1a-2009.
Project Committee on Alternative Materials of KEPIC-MH	- Study on developing an acceptable Korean Standard (KS) materials table equivalent to or more ASME/ASTM material specification listed in KEPIC-MH.

Status of KEPIC-MH

◈ KEPIC-MH vs. ASME AG-1

- **KEPIC-MH identically adopted ASME AG-1,**
- **excluding national law.**

◈ Example of National law in KEPIC-MH

Article	KEPIC-MHA	ASME AG-1, Div. 1
AA-1130 Definitions and Terms	**safety-related equipment :** equipment for air and gas treatment systems or equipment that is essential to - the capability to shut down the reactor and maintain it in a safe shutdown condition -the capability to prevent or mitigate the consequences of accidents that could result in offsite exposures in excess of the limits stated in Atomic Energy Act(1). Note (1) It refers to Item 2, Article 12 (Standards for Permit), Atomic Energy Act and Article 13, Notice of the Minister of Science and Technology No. 1996-35 (Sep. 13, 1996).	**safety-related equipment :** equipment for air and gas treatment systems or equipment that is essential to - the capability to shut down the reactor and maintain it in a safe shutdown condition -the capability to prevent or mitigate the consequences of accidents that could result in offsite exposures in excess of the limits stated in 10 CFR 100.

Status of KEPIC-MH

◈ Adoption Gap between KEPIC-MH and ASME AG-1

KEPIC-MH	2000 Edition (Korean)	2003 Addenda (Korean)	2005 Edition (Korean)	2006 2nd Add. (Korean)	2010 Edition (Bilingual)	2011 Addenda (Bilingual)	2012 Addenda (Bilingual)
ASME AG-1	1997 Edition	2000 Addenda	2003 Edition	2004 Addenda	2007 Addenda	2009 Edition	2009-1a Addenda

※ KEPIC-MH 2000 Edition was re-issued as a bilingual (Korean-English) version at 1 Sep. 2010 to be applied to abroad NPPs, especially to UAE Braka units.
※ KEPIC-MH 2012 Addenda will be published late 2012 including the new KEPIC-MHN 511 referencing ASME N511.
※ New standards will be developed referencing AMCA standards by 2020.

◈ Structure of KEPIC-MH

◇ KEPIC-MHA = ASME AG-1 Div. I General Requirements
◇ KEPIC-MHB = ASME AG-1 Div. II Ventilation Air Cleaning & Ventilation Air Conditioning
◇ KEPIC-MHD = ASME AG-1 Div. IV Testing Procedures

Revision Drafts (KEPIC-MH only)

◈ Spot Flame Resistance Requirements of Sec. FC & FK

◇ Background

- Filter manufacturers and a filter test laboratory in Korea asked KEPIC Nuclear Air & Gas Treatment Subcommittee for updating the spot flame resistance requirements of KEPIC-MHB, Articles FC 5160, FK 5160, FK 5260, FK 5460.
- First issue: an additional requirement was needed for the sophisticated structure of HEPA filters.
- Second issue: if a filter continues flaming on the upstream even though flaming on the downstream has been extinguished, it can satisfy the requirement.
- Third issue: they want to clarify the sustaining time limit of flaming on the downstream.

◇ Status

- The subcommittee accepted the 3rd draft and then decided to put it on the next agenda of KEPIC Nuclear Mechanical Technical Committee.
- If the draft is approved by the Technical Committee, it will be adopted into KEPIC-MH 2012 addenda.

Revision Drafts (KEPIC-MH only)

◇ 3rd Revision Draft for the Spot Flame Resistance

Article	Before Revision (2010 edition)	After Revision (2012 Addenda)
KEPIC-MHB FC 5160, FK 5160, FK 5260, FK 5460 Spot Flame Resistance	The Bunsen burner flame shall then be directed into a top corner of the filter unit in such a manner that the tip of the blue cone contacts the case, filter pack, and sealing materials. The flame shall be applied for a period of 5 min. The test shall be repeated upon the opposite top corner of the sample filter unit.	The Bunsen burner flame shall then be directed into a top corner of the filter unit in such a manner that the tip of the blue cone contacts the case, filter pack, and sealing materials. The flame shall be applied for a period of 5 min. In case of structure of filter that is hard to contact flame on filter pack, frame and sealant, the Bunsen burner flame shall be compulsorily directed into a top corner of the filter in minimum one place. The test shall be repeated upon the opposite top corner of the sample filter unit.
	After removal of the test flame at each point of application, there shall be no sustained flaming on the downstream face of the unit. An Underwriters Laboratories label with a traceable control number or UL-586 designation shall be acceptable objective evidence of compliance with FC 5160.	After removal of the test flame at each point of application, the downstream face of filter shall not continue to flame more than 2 seconds. Also there shall be not continually sustained flaming on the upstream face of the unit, because it must have self-extinguishing. An Underwriters Laboratories label with a traceable control number or UL-586 designation shall be acceptable objective evidence of compliance with FC 5160.

Revision Drafts (KEPIC-MH only)

◈ Field Acceptance Test Requirement of TA 3300

◇ Background

- The Owner in Korea required KEPIC Nuclear Air & Gas Treatment Subcommittee to clarify the testing organization of the field acceptance test requirement of KEPIC-MHD, Article TA 3300.
- Issue: The manufacturers have low reliability for the reason that several test results performed by themselves have been proved by the regulatory body as not in compliance with KEPIC-MH. The Owner suggested to specify the testing organization as the Owner or an independent test facility or organization.

◇ Status

- The subcommittee accepted the 2nd draft and then decided to put it on the next agenda of KEPIC Nuclear Mechanical Technical Committee.
- If the draft is approved by the Technical Committee, it will be adopted into KEPIC-MH 2012 addenda.

Revision Drafts (KEPIC-MH only)

◇ 2nd Revision Draft for the Acceptance Test Requirement

Article	Before Revision (2010 edition)	After Revision (2012 Addenda)
KEPIC-MHD TA 3300 Inspections and Test Requirements	Acceptance tests ~ an integrated system. The Owner shall define system test boundaries and evaluate system performance with respect to system functional requirements in accordance with the Owner's design specifications. Field acceptance tests shall be implemented as applicable and in accordance with this section. Test designations associated with tests required by Article TA 4000 are listed in Table TA 3000-2. Within the context of Article TA 4000 ~ a test requirement.	Acceptance ~ an integrated system. The Owner shall define system test boundaries and evaluate system performance with respect to system functional requirements in accordance with the Owner's design specifications. Field acceptance tests shall be implemented by the Owner or an independent test facility or organization as applicable and in accordance with this section excluding the equipment manufacturer and supplier. Test designations associated with tests required by Article TA 4000 are listed in Table TA 3000-2. Within the context of Article TA 4000 ~ a test requirement.
KEPIC-MHD TA 1130 Definitions and Terms	<No definition for the term, 'Independent Test Facility or Organization for field acceptance testing'>	**Independent Test Facility or Organization for field acceptance testing**: an autonomous body not affiliated with manufacturer or supplier of air treatment, heating, ventilating, and air conditioning system in nuclear facility subject to this Code section but capable of performing the tests necessary to demonstrate the ability of field acceptance testing to meet this Code section.

Possible Independent Test Facility

◈ Korea Filter Testing Laboratory (KFTL)

◇ KFTL is a unique laboratory in Korea that possesses public certification approved by Korea Laboratory Accreditation Scheme (KOLAS), the government official organization. The certification implies the testing and qualification of air and gas filters, air cleaning units and HVACs.

◇ KFTL professionals have unique experience and expertise in the performance, design, construction, acceptance testing, and quality assurance for special High Efficiency Particulate Air (HEPA) filters.

◇ Annually this expertise has been used to provide useful technical information to engineers working in nuclear power plants or related company and also used to training them the testing method for in situ leakage and air cleaning technology.

Improvement Activities

Activity	Status	Period	Remark
Feasibility study on adaptation of ASME N-509, N-510, and N-511 to new KEPIC-MH standards	Result: develop only ASME N-511 as a ne KEPIC standard excluding N-509 and N-510.	July, 2011 ~ Dec., 2011 (6 mon)	Project Committee on Nuclear Air Cleaning
Study on developing an acceptable Korean Standard (KS) materials table equivalent to or more ASME/ASTM material specification listed in KEPIC-MH	Reviewing related documents and books including internal documents of material suppliers to define the term, ‘equivalent to or more’.	Jan., 2012 ~ June, 2013 (18 mon)	Project Committee on Alternative Materials of KEPIC-MH
Study on standardization of procedures for tests and inspections of KEPIC-MH equipments	Three major manufacturers have submitted their internal procedure documents for fans, dampers, electric heating coils, and chillers to the Nuclear Air & Gas Treatment Subcommittee.	Apr., 2012 ~ Sep. 2013 (18 mon)	Nuclear Air & Gas Treatment Subcommittee


Thank You!
KEA 대한전기협회