Introduction to enesG

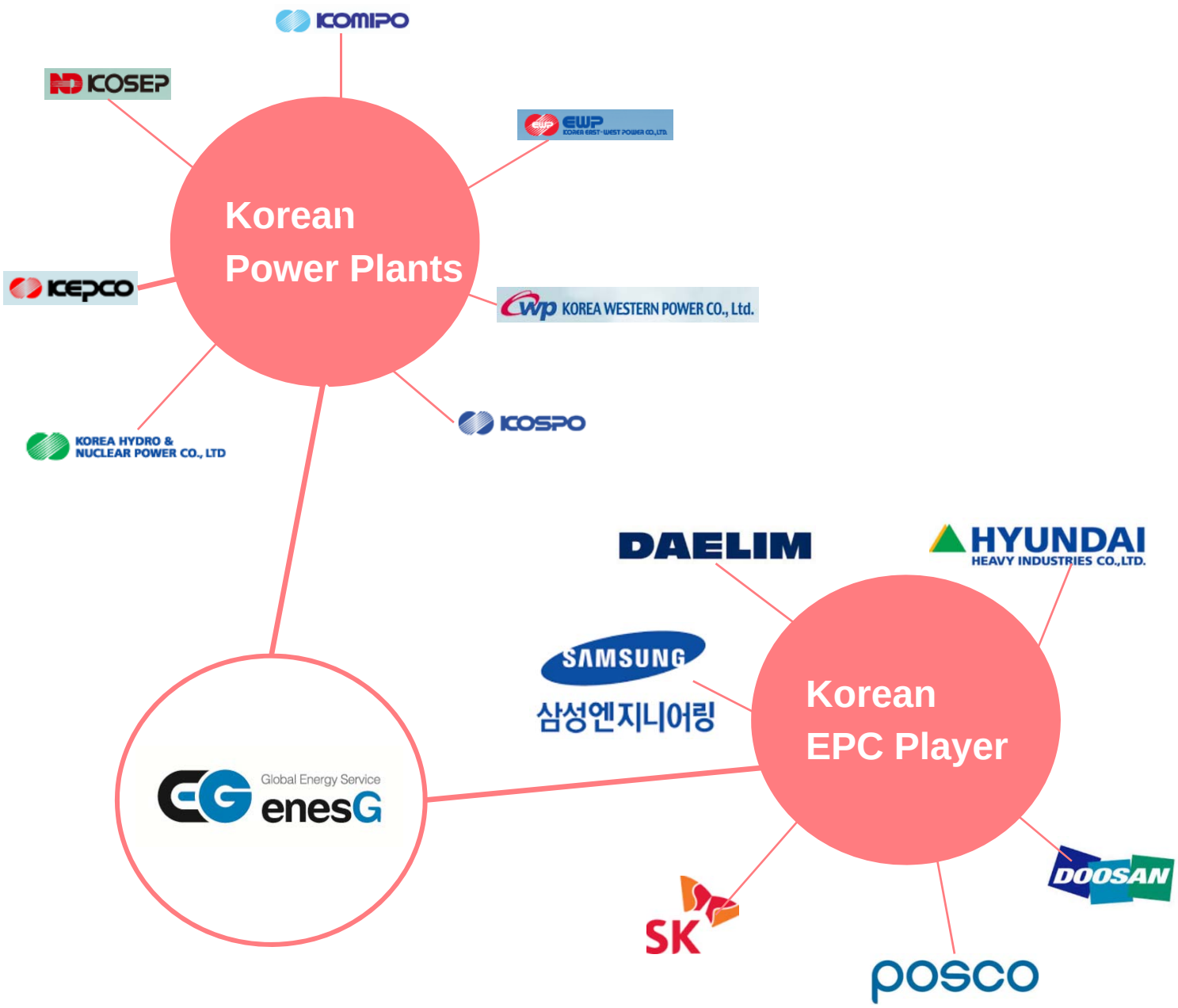
We are driving a key technology to create a new energy

Global Energy Service
enesG worldwide

“ Our success lies in our ability to hold excellent Korean power plant service engineers and heritage of Korean Power plant”

Who is enesG

- Established on 03. 2002
- Cooperating partner as shared growth company of KHNP on Dec 21, 2009
- Received the several awards from MKE, Korean Government for the contribution of technology
- Made an agreement for KOSEP(Korea South-East Power Co.) World Class-30
- Hitachi Vendor (2013)



Major Customer & Network

- enesG has strong relationship with Korean Power Plant customers as well as foreign technology company and Korean government.

- Through this strong rapport, ENESG could achieve the growth of beneficial by appropriate adaptation of market policy as well as securing core resources in engineering fields by rapid supporting the customers.

enesG HUMAN RESOURCES COMES FROM

Korean Key Player of Power Plant Business

- **Operation & Maintenance**
- **Research & Development**
- ***Former KHIC***
- **Major Equipment Supplier**
- **Field maintenance service**

Global Energy Service enesG worldwide

- **Excellent engineering body**
- **Flexible for its business**

And has great network with Korean supply chains as well as Korean best talent pool.

What enesG can provide..

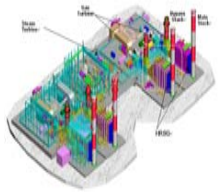
Performance Engineering

Safety & Diagnosis For Old Power Plant

Integrity Services

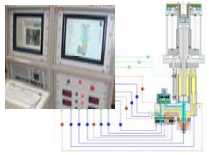
Network Of Korean Vendors

Performance Engineering Division



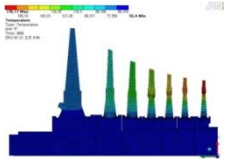
- As a de facto unique professional engineering body in Korea
- Exclusively performs heat performance diagnosis for Korean Nuclear power plant

Hydraulic System Technology Division



- Supplies hydraulic actuator for TBN valve with more enhanced durability and reliability than existing products to Nuclear, Fossil & Combined power plants.

Integrity Evaluation Engineering Division



- Supplies Integrity Service and life assessment through the In-Service inspection about the main components of power plants, which is the major requirement of the Korea Institute Nuclear Safety.

Power Plant Maintenance

- Performing maintenance and facility improvement of core equipment for NSSS and main piping system. Also ENESG is providing comprehensive engineering services of manufacturing, developing special equipment for NSSS main facilities

Performance Engineering Division

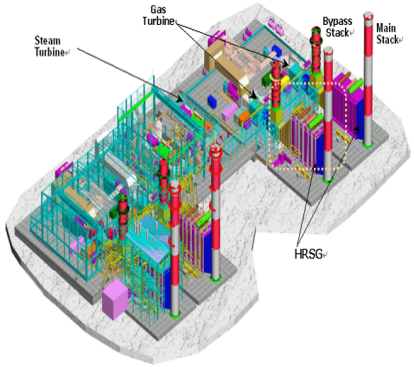
Performance Engineering Division is playing a vital role of power plant thermal performance evaluation and test instrumentation as a de facto unique professional engineering body in Korea and appreciated on equal or far better than overseas technologies. Also, Performance Engineering Team expands overseas marketing actively towards overseas power plants as well as domestic power plants with its distinctive competency.

Main Business

International Code Test

Performance acceptance testing and third party performance acceptance testing supervision according to international standards

- Overall Power Plant
- Fired Steam Generator
- Gas Turbine HRSG
- Steam Turbines
- Gas Turbines
- Heat Exchangers
- Test Uncertainty Analysis



Heat performance Diagnosis

- Establishment of efficient baseline performance for power plant
- Diagnosis of abnormal aging, degradation
- Steam Path Audit and evaluation
- Cycle Isolation valve leakage detecting service

Flow Section Calibration Facility

- Capacity : 10,000 to 75,000 kg
- Calibration process : ASME/ANSI MFC-9M-1988.
- Measurement uncertainty band of 0.2% (ASME PTC 6)

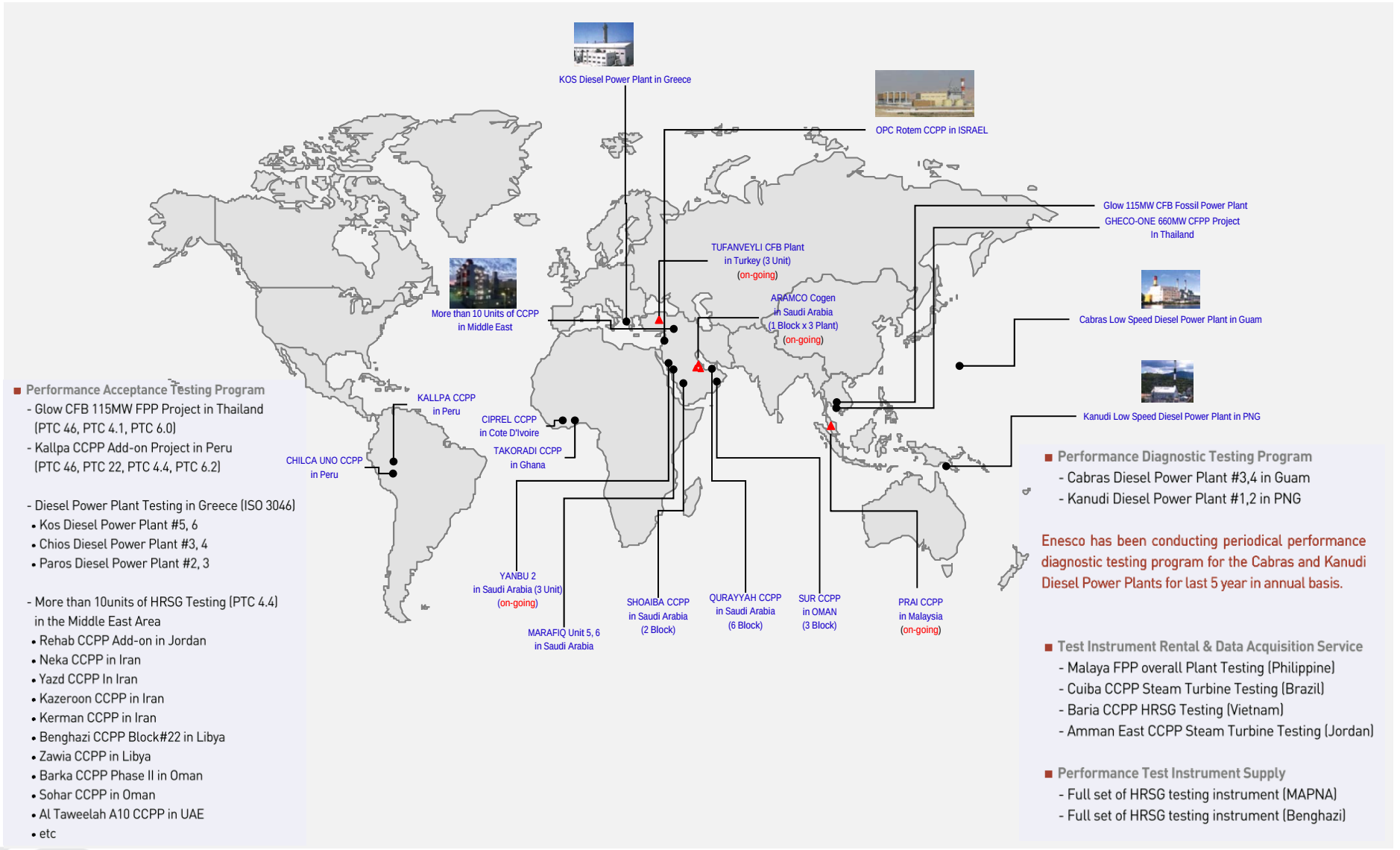
Software Service

- Customized heat balance for plant or major component analysis using Excel add-in module
- Developing customized modular tool for performance diagnosis
- Real time based PMS (Performance monitoring system)

Contractual Supporting

- Consulting the performance guarantees in contract from ITB stage to the acceptance test.
- Review and consulting on guaranteed heat balance
- Developing types of test program in accordance with international test code.

Recent 5 years Experience – Overseas | Performance Engineering Division



■ Performance Acceptance Testing Program
- Glow CFB 115MW FPP Project in Thailand (PTC 46, PTC 4.1, PTC 6.0)
- Kallpa CCPP Add-on Project in Peru (PTC 46, PTC 22, PTC 4.4, PTC 6.2)

- Diesel Power Plant Testing in Greece (ISO 3046)
  - Kos Diesel Power Plant #5, 6
  - Chios Diesel Power Plant #3, 4
  - Paros Diesel Power Plant #2, 3

- More than 10units of HRSG Testing (PTC 4.4) in the Middle East Area
  - Rehab CCPP Add-on in Jordan
  - Neka CCPP in Iran
  - Yazd CCPP In Iran
  - Kazeroon CCPP in Iran
  - Kerman CCPP in Iran
  - Benghazi CCPP Block#22 in Libya
  - Zawia CCPP in Libya
  - Barka CCPP Phase II in Oman
  - Sohar CCPP in Oman
  - Al Taweelah A10 CCPP in UAE
  - etc

■ Performance Diagnostic Testing Program
- Cabras Diesel Power Plant #3,4 in Guam
- Kanudi Diesel Power Plant #1,2 in PNG

Enesco has been conducting periodical performance diagnostic testing program for the Cabras and Kanudi Diesel Power Plants for last 5 year in annual basis.

■ Test Instrument Rental & Data Acquisition Service
- Malaya FPP overall Plant Testing (Philippine)
- Cuiba CCPP Steam Turbine Testing (Brazil)
- Baria CCPP HRSG Testing (Vietnam)
- Amman East CCPP Steam Turbine Testing (Jordan)

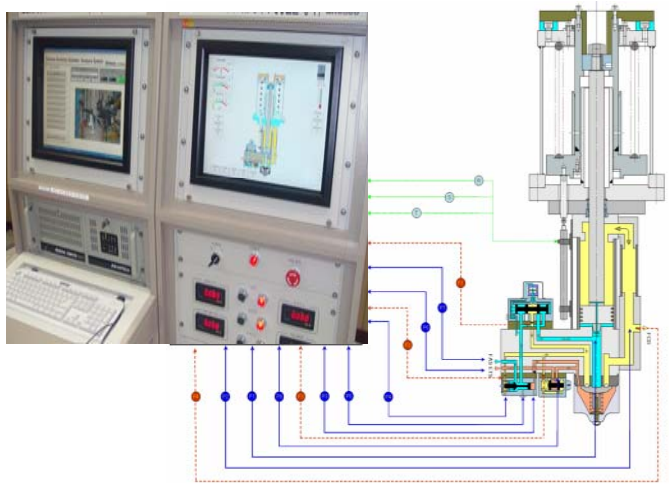
■ Performance Test Instrument Supply
- Full set of HRSG testing instrument (MAPNA)
- Full set of HRSG testing instrument (Benghazi)

Hydraulic System Technology Division

Engineering, Maintenance, Design, Manufacturing and comprehensive performance test services for Hydraulic Actuator

Main Business

- Hydraulic actuator for fossil, nuclear, combined cycle power plant
- Diagnostic equipment specimens manufacture
- ETS (Emergency Trip System) test and maintenance



Hydraulic actuator technology is essential to capture the reliability of hydraulic system for the operation of steam turbine valve.
ENESG got certified as NET[1)] holding company for reliability of hydraulic technology from MKE[2]. Also ENESG supplies hydraulic actuator for TBN valve with more enhanced durability and reliability than existing products to nuclear, fossil & combined power plants.

1) New Excellent Technology. ENESG's NET is the Technology of Static and Dynamic Characteristics Diagnosis for Turbine Valve Hydraulic Actuator utilizing THASA(Turbine Valve Hydraulic Actuator System Analyzer) and buffer

1) MKE: Ministry of Knowledge Economy of Korea

Performance Test Facilities

Performance Test & Evaluation System	Hydraulic Actuator Test Controller	Performance Test System linked with Front Standard

Products & Maintenance | Hydraulic System Technology Division

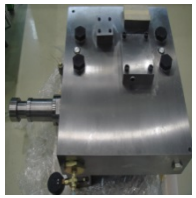
Fossil

Product	Size
CV 1,2,3	Cylinder 5", 10" Stroke
CV 4	Cylinder 5", 10" Stroke
CV 1,2,3	Cylinder 6", 10" Stroke
CV 4	Cylinder 6", 10" Stroke
CV 1,2,3	Cylinder 12", 10" Stroke
CV 1,2,3	Cylinder 10", 4" Stroke
IV 1,2	Cylinder 5", 12" Stroke
IV 1,2	Cylinder 6", 12" Stroke
IV 1,2	Cylinder 7", 12" Stroke
IV 1,2	Cylinder 8", 14" Stroke
RSV 1,2	Cylinder 10", 12" Stroke(Non-Control Type)
RSV 1,2	Cylinder 8", 8" Stroke(Non-Control Type)
RSV 1,2	Cylinder 7", 8" Stroke(Non-Control Type)

Product	Size
RSV 1,2	Cylinder 8", 10" Stroke(Non-Control Type)
RSV 1,2	Cylinder 10", 10" Stroke(Non-Control Type)
MSV 1	Cylinder 6", 6" Stroke(Non-Control Type)
MSV 2	Cylinder 6", 6" Stroke(Control Type)
MSV 1	Cylinder 8", 8" Stroke(Non-Control Type)
MSV 2	Cylinder 8", 8" Stroke(Control Type)
MSV 1	Cylinder 9", 8" Stroke(Non-Control Type)
MSV 2	Cylinder 9", 8" Stroke(Control Type)
MSV 1	Cylinder 9", 9" Stroke(Non-Control Type)
MSV 2	Cylinder 9", 9" Stroke(Control Type)
CRV	IV# 1~2, Cylinder 5", 12" Stroke
CRV	RSV# 1~2, Cylinder 4", 8" Stroke
LPA CV	4-1/4"DIA.× 239.9mm Stroke(Control Type)

Nuclear

Product	Size
CV 1,2,3	Cylinder 10", 14" Stroke
CV4	Cylinder 10", 12" Stroke
MSV 1,3,4	Cylinder 10", 12" Stroke (Non-Control Type)
MSV 2	Cylinder 10", 12" Stroke (Control Type)
IV 1,2,3	Cylinder 5", 14" Stroke
IV 4,5,6	Cylinder 5", 14" Stroke (Non-Control Type)
ISV 1~6	Cylinder 8", 12" Stroke (Non-Control Type)
TV 1,2,3,4	Cylinder 8", 8" Stroke
GV 1,2,3,4	Cylinder 7", 20" Stroke
IV 1~6	Cylinder 6", 10" Stroke
RV 1~6	Cylinder 6", 10" Stroke


CV


MSV

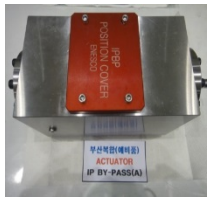

IV


RSV

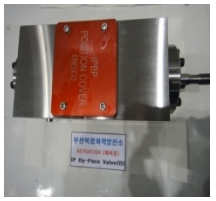

GCV


IGV


HPBP

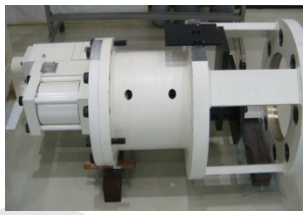


IPBP(A)


IPBP(B)


IPBP(C)

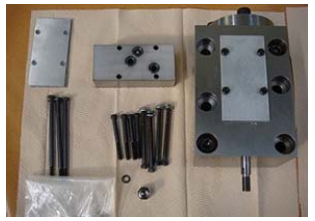

CV

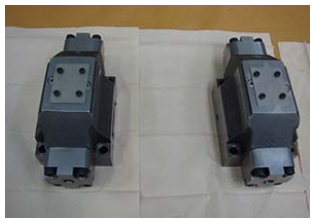

MSV


EHPC
(Boiler Feed Water System)


Over Speed Trip Ass'y
(Turbine Front Standard)


Mechanical Trip V/V
(TBN Front Standard Emergency Trip System)

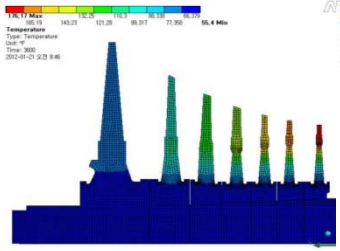

Electrical Trip Valve
(TBN Front Standard Emergency Trip System)

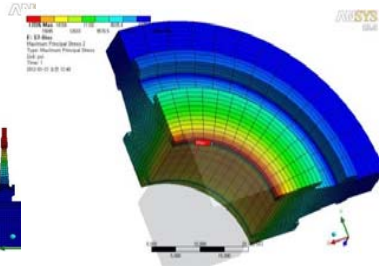

Lock-out Valve
(TBN Front Standard Emergency Trip System)

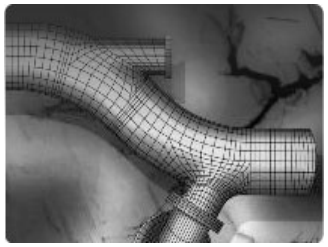
Integrity Evaluation Division

Main Business

- CPP Rotor Bore Inspection
- CPP Rotor Disk/Blade Inspection
- NPP Rotor Bore Inspection
- NPP Rotor Disk/Blade Inspection
- Modeling, Structure & Thermal Analysis, Crack Propagation Analysis







enesG **Integrity Evaluation Division is playing a role of Integrity Service and life assessment through the In-Service inspection about the main components of power plants, which is the major requirement of the Korea Institute Nuclear Safety.**

As a project to prove and assure the reliability for the MRO(Maintenance, Repair, Operation) of main components, the purpose of this engineering service is to prevent any personal or material loss that may cause the breaking down of the major facilities

MT & Honing Machine & Equipment

Portable Boring & Honing Machine

20,000Amp HWDC & FWDC MT Equipment

The New World of Energy

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