



United Arab Emirates

United Arab Emirates (UAE) Nuclear Program Update

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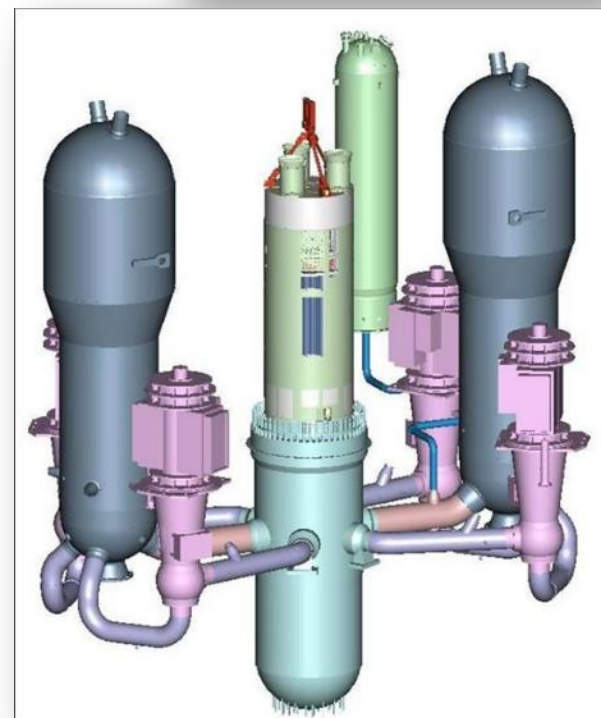
Wednesday, January 10th, 2018

Ft Lauderdale



Outline

- ⊗ The United Arab Emirates (UAE)
- ⊗ Federal Authority of Nuclear Regulation (FANR)
- ⊗ APR1400 Reactor
- ⊗ Status of Licensing
- ⊗ Photos, past and near current
- ⊗ RP related REGs
- ⊗ FANR Infrastructure
- ⊗ Status of Licensing
- ⊗ Radiation Protection at Barakah NPP



United Arab Emirates (UAE)

The United Arab Emirates is a constitutional federation of seven emirates, formed in 1971:

- Abu Dhabi,
 - Dubai,
 - Sharjah,
 - Ajman,
 - Umm al-Qaiwain,
 - Ras al-Khaimah
 - and Fujairah
- UAE lies along the south-eastern tip of the Arabian peninsula. Occupying an area of about 83,600 sq. km





UAE Before and After

1958



Source: www.thenational.ae

Present



Source: www.thenational.ae



UAE Nuclear Programme



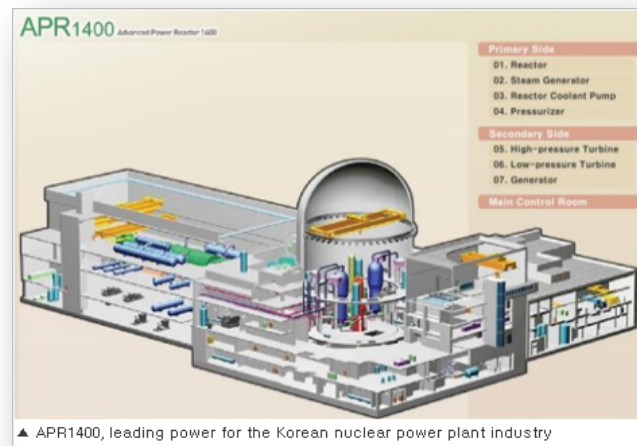


Issuance of Nuclear Law

In line with the UAE Policy & international treaties, the Federal Law by Decree No (6) of 2009, Concerning The Peaceful Uses of Nuclear Energy (the “Nuclear Law”) was issued by the President in September 2009 to:

- ⚗ develop & control UAE nuclear sector towards peaceful purposes
- ⚗ ensure Nuclear Safety & Security, and Radiation Protection
- ⚗ prohibit Enrichment & Reprocessing Facilities in UAE

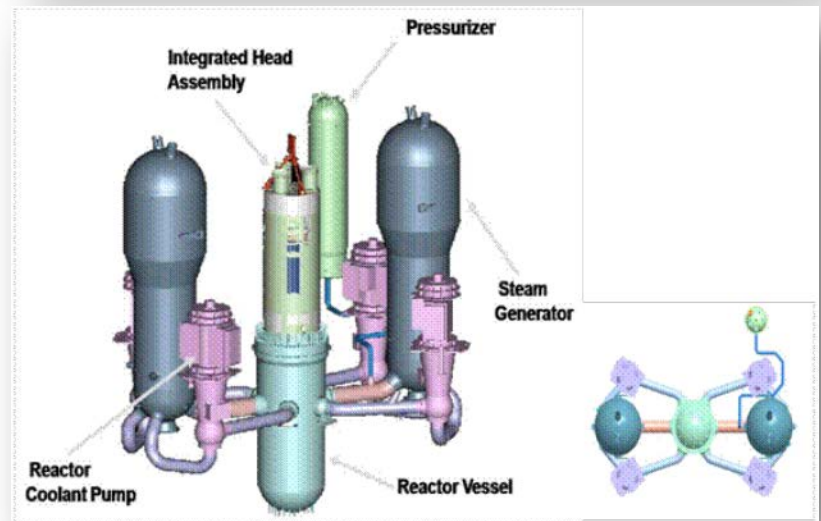
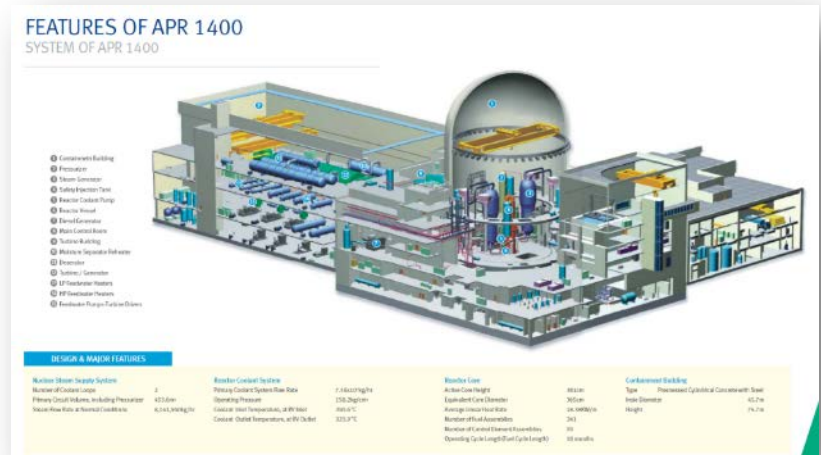
Barakah Nuclear Power Plants (BNPP) Korean APR1400





Barakah APR1400 Basic Features

- Core diameter: 364 cm
- # fuel assemblies: 241
- Fuel type: 16 x16, PLUS7
- Thermal power: 3,983 MWt
- Electrical power: 1,390 MWe
- Steam generators: 2
- Coolant pumps: 4
- Fukushima lessons learned incorporated into Barakah Design





Current Status of Facility Licensing

- FANR licenses issued to Emirates Nuclear Energy Corporation (ENEC) and latterly Nawah:
 - Site Selection Licence (2010)
 - Site Preparation Licence (2010)
 - Limited Construction Licence (2010)
 - Construction Licence for Barakah Units 1 & 2 (July 2012)
 - Construction Licence for Barakah Units 3 & 4 (September 2014)
 - FANR Approved transport package for fresh fuel [per TS-R-1]
 - Provided license for receipt, handling, storage of unirradiated fuel
 - Currently performing OR Inspections:
 - Constructed in accordance with requirements
 - Training programs
 - Operational programs/processes
 - Integrated Demonstration of Operational Readiness
 - Anticipated license to Operate Unit 1 2018, other units each year after:
 - SER near completion
 - RAIs and open inspection findings being closed





Google Earth Image of the Site (~early 2014)





Google Earth Image of the Site (~early 2014)

Concrete
Batch
plant and
Lab

Warehouses

Units 3
and 4

Units 1
and 2

Construction
workers
village

Currently
~ 20,000
workers





Google Earth Image of the Site (recent)



Units 1 and 2 Early Photos



All images from Google image search



Units 1 and 2 Early Photos



All images from Google image search



Units 1 and 2 Early Photos



All images from Google image search



Units 1 and 2 Early Photos

- Completion of the construction of the concrete dome for the Unit One Reactor Containment Building





Recent Video





Units 1 and 2 Recent Photos



Units 1 and 2 Recent Photos





Latest Images



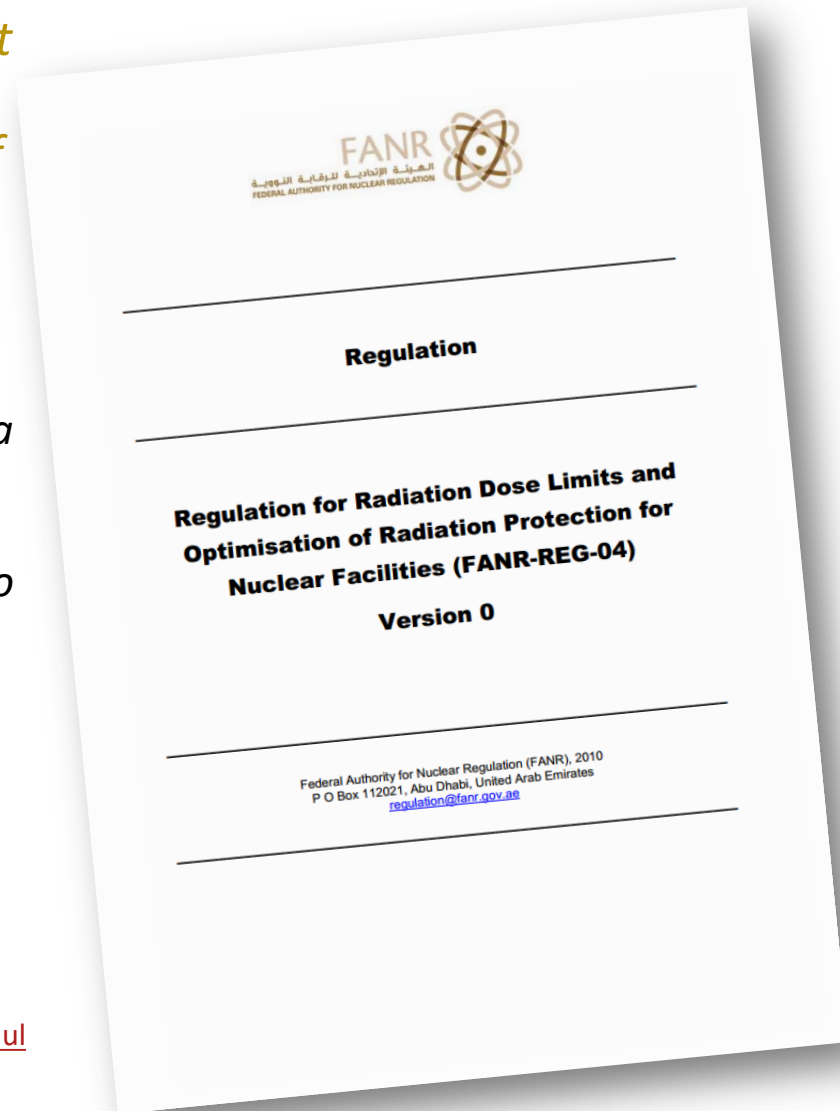


Key FANR Regulations relating to Radiation Protection and ALARA

- FANR-REG-01 '*Regulation for Management Systems for Nuclear Facilities*'
- FANR-REG-03 '*Regulation for the Design of Nuclear Power Plants*'
- FANR-REG-04 '*Regulation for Radiation Dose Limits and Optimisation of Radiation Protection for Nuclear Facilities*'
 - 20 mSv/yr, averaged over 5 years (50 mSv in a single year) – workers
 - 1 mSv/year – public
 - Establish dose constraint lower than above, to be approved by FANR
- FANR-REG-06 '*Regulation for an Application for a Licence to Construct a Nuclear Facility*'
- FANR-REG-11 '*Regulation for Radiation Protection and Predisposal Radioactive Waste Management in Nuclear Facilities*'

All Regs and Reg Guides @

<http://www.fanr.gov.ae/En/RulesRegulations/RegulationsGuides/Pages/default.aspx> (in English and Arabic)





Recent Updates (RP Related)

- Fuel Shipping Cask Fabrication Inspection (ROK)
- Fuel Packing Inspection in ROK (KNF)
 - Visual inspection, accelerometers, surveys, shipping docs, FME, etc.
- Received Fuel in U1 (1.25 cores worth)
 - Stored in new fuel racks and in SFP (dry)
- Performed RP readiness inspection prior to FOS (limited RPP scope)
- RP inspection after FOS
- EP Inspection (TSC, OSC, Simulator, EOF, EOC)
- Full Scale Emergency Exercise (Oct 2017) – 2nd one
- Training Inspections, inc. RP (Systematic Approach to Training)
- RP Programs Inspection (programs, processes, implementing procedures)
- RP Equipment Inspection (portable and installed, Inc. effluent monitors, TLD readers, whole body counters)
- FANR Inspection summaries can be seen:
<https://www.fanr.gov.ae/en/open-data/inspection-reports>



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Thank you