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Revision of the post-Fukushima National Action Plan of Hungary

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ENSREG National Action Plans Workshop
Brussels, Belgium, April 20-24, 2015

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Contents

- National Action Plan and its revision
- Progress and its supervision
- Items *a* to *g* as requested by the workshop TOR

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Summary information on NAcP developed in 2012

- All actions after stress tests are incorporated
  - Most actions come from Paks NPP Targeted Safety Reassessment
  - 51 actions (49 for Paks NPP)
  - Latest deadlines 15.12.2018
  - Scheduling: public procurement, most actions need outages, licensing needs, some action builds on others
- 1st NAcP Workshop
  - Stated compliance with ENSREG guidance (6 chapters including also Extra CNS outcomes)
  - One challenge was identified for HAEA

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Expected results after NAcP actions

- Probability of severe accidents due to loss of power supply and ultimate heat sink decreases
- Severe accidents of reactors and spent fuel pools can be prevented or mitigated
- Risk of damage by and consequences of extreme external events is reduced
- Capability to prevent and/or mitigate multi-unit accidents is enhanced
- Wider scope of emergency response solutions

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Revision of NAcP in 2014 December

- Based on ToR provided by ENSREG
- By HAEA with the contribution of Paks NPP
- Revised version was published in Hun and Eng on HAEA website
- Was described in the HAEA year-opening press conference
- Concept: the document was supplemented
  - With a summary text on revision
  - With a table describing the status of actions

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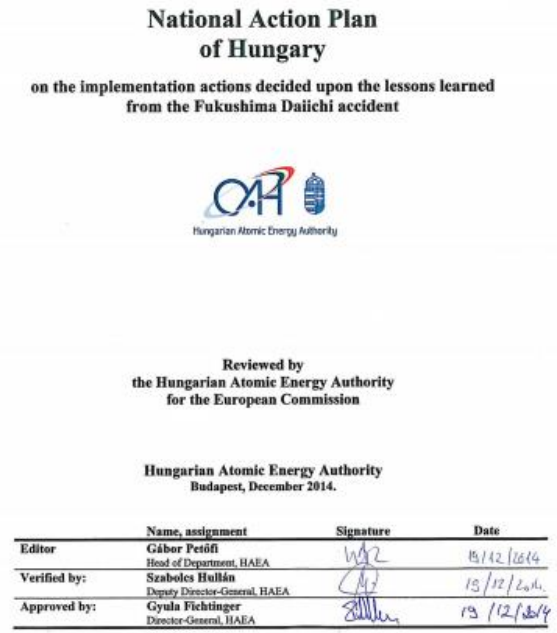
General progress in the actions

- Altogether 51 actions, 49 for Paks NPP
- 17 actions were finally closed by HAEA
  - 7 out of which at least half year before deadline
- 23 in proportional progress
  - Interim deadlines are met
- 5 in delay (see later)
- 6 is completed by plant and is under HAEA assessment



National Action Plan of Hungary

on the implementation actions decided upon the lessons learned from the Fukushima Daiichi accident

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Reviewed by the Hungarian Atomic Energy Authority for the European Commission

Hungarian Atomic Energy Authority
Budapest, December 2014.

	Name, assignment	Signature	Date
Editor	Gábor Petőfi Head of Department, HAEA		19/12/2014
Verified by:	Szabolcs Hullán Deputy Director-General, HAEA		19/12/2014.
Approved by:	Gyula Fichtinger Director-General, HAEA		19/12/2014

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Supervision of progress

- Half yearly status reports of licensee
  - Assessed by HAEA
- Yearly inspection of progress
  - Interviews with the designated experts of actions
  - Inspection protocol is taken (19 pages in 2014)
  - Extra reports, plans are requested and scrutinized by HAEA
- Assessment of license applications
  - With consultations, inspections, approvals etc.

Országos Atomenergia Hivatal

ELLENŐRZÉSI JEGYZŐKÖNYV

Ügyfél:	MVM Paksi Atomerőmű Zrt.	Helyszín:	MVM Paksi Atomerőmű Zrt. 101. épület I. emeleti tárgyaló
Időpont: 2014.09.18	Jegyzőkönyv száma: EJ-11-07/2014	Ügyiratszám:	OAH-2014-00866-0008/2014
Oldal: 1.			

Ellenőrzés tárgya: CBF feladatok előrehaladása

Ellenőrző szervezet képviselői, illetve személyek:

Vilimi András	MIG RTFO műszaki főszakértő	Kiss Ernő	MIG PFO projektvezető
Kató Balázs	BIG MINFO MO min. fel. mérnök	Nagy Ernő	MIG MFO IMO vez. ber. mérnök
Kohl József	BIG BIFO ÜBO birt. mérnök	Nagy Lajos	MIG MFO VIMO osztályvezető
Ács György	MIG RTFO RTO csoportvezető	Nyékiné Bach Éva	MIG PFO projektvezető
Berhardt Krisztián	MIG MFO IMO osztályvezető	Rauth Tamás	MIG MFO VIMO ber. mérnök
Csikszár Elemér	MIG PFO projektvezető	Tárnok László	MIG PFO projektvezető
Csibi István	KAIG ÜFFO HTO rendsz. mérnök	Tőke János	MIG RTFO RTO osztályvezető
Harman Attila	BIG BEH szakterületi mérnök	Törjék Ferenc	KAIG ÜPFO HTO osztályvezető
Hadz János	MIG MFO GMO ber. mérnök	Ulrich István	MIG PFO projektvezető
Ignics Miklós	MIG PFO műszaki főszakértő		

Hatósági ellenőrök (név, szervezeti egység és beosztás):

Mészáros István, FEFO mb. főov. — **Szepes Károly**, FEFO főorh.

Petőfi Gábor, MFO főov.

A japán Fukushima Daiichi atomerőműben 2011 márciusában történt baleset miatt az Európai Unió által kezdeményezett Célzott Biztonsági Felülvizsgálatot (CBF) az MVM Paksi Atomerőmű Zrt. (MVM PA Zrt.) elvégezte és a nukleáris biztonság szintjét emelő intézkedéseket fogalmazott meg. Az Országos Atomenergia Hivatal (OAH) a felülvizsgálatot a HA5544 számú határozatában értékelte és az MVM PA Zrt. által szükségesnek tartott intézkedéseket további feladatokkal kiegészítette. A feladatok végrehajtásának ütemezéséről a hatóság a HA5589 számú határozatában rendelkezett.

A hatósági ellenőrzés célja annak vizsgálata, hogy a HA5589 számú határozatban előírt feladatok időarányosan teljesülnek-e.

A hatóság az OAH-2014-00866-0008/2014 számú levelében értesítette az MVM PA Zrt-ét az ellenőrzésről.

A hatóság képviselője figyelmeztette az ellenőrzés alá vont szervezet képviselőit jogaikra és kötelességeikre:

a) A helyszíni ellenőrzés során nyilatkozatot tehetnek, vagy a nyilatkozatot megtagadhatják, továbbá jogosultak betekinteni az eljárás során keletkezett iratokba.

b) Igazmondási kötelezettség alatt állnak, az eljárás során kötelesek jóhiszeműen eljárni, magatartásuk nem irányulhat a hatóság megtévesztésére vagy a döntéshozatal, illetve a végrehajtás indokolatlan késleltetésére.

Az OAH képviselője nyilatkozott, hogy elfogadja azt, hogy az eljárás során a feladatok ellenőrzése a végrehajtó szervezetek szerinti csoportosításban történjen.

Aláírás: a hatósági ellenőrzés alá vont szervezet képviselőjének jogaival kötelezettségeivel tisztában van. | Aláírás: a hatósági ellenőrzés alá vont szervezet nyilatkozattételre jogosult képviselője | Aláírás: hatósági ellenőr

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a. Response/clarification on any issues identified in the rapporteur's report from the 2013 workshop

- One challenge was identified in 2013
  - Verify that the external containment cooling solution is suitable (action 30) (actually containment overpressure protection)
- Inspection on September 18, 2014 for action 30
  - Work on designing is contracted
  - Preliminary safety assessment to arrive to authority 2015 Spring
  - Original deadline can be kept (2017-18).

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b. Progress on implementation and update of the NAcP

- Progress has been indicated for each item in the action plan
- Interim deadlines are used to keep track of progress of individual actions
- Delay is indicated in the case of 4 actions
  - 2, 11, 48, 49
  - Changes compared to 2014 December status: Action 3 will not delay
- A risk assessment is requested in the case of delays
- Decision on needed actions will be made based on the assessment

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Delayed actions

- 2: change of technical content (see below)
- 11: Reinforcement of 400 kV and 120 kV substations
  - Would decrease probability of LOOP
  - Delay due to a transformer failure in 2014 which hindered implementation of the modification
  - According to assessment: half year delay causes a risk of 10-6 in CDF (2015 June instead of end of 2014)

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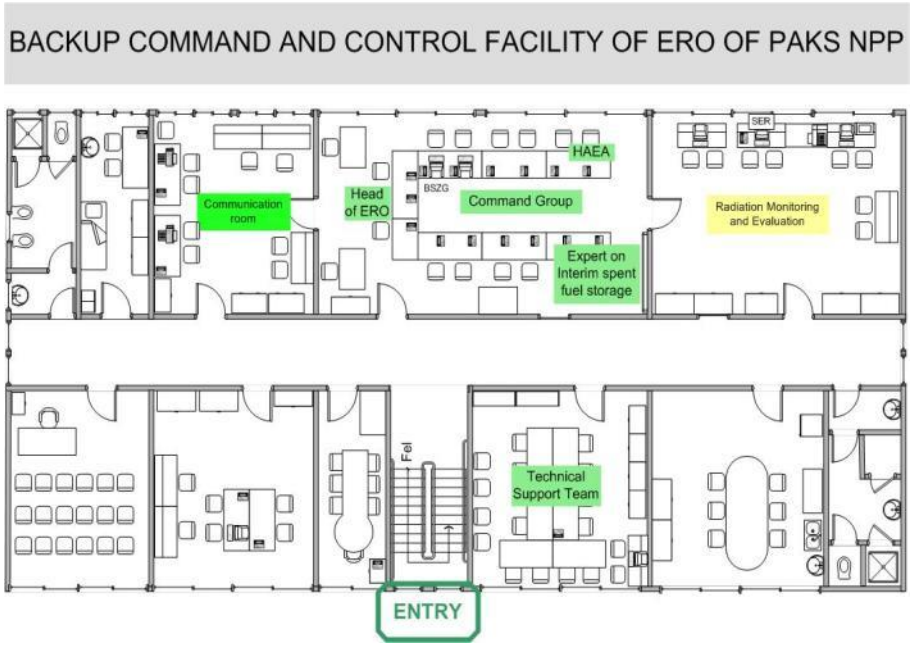
Delayed actions

- 49: Construction of a new Backup Command Centre
  - Change of location: constructed together with the new Counter-terrorist Centre: further security requirements were set (1,5 year public procurement procedure)
  - Problems with secured data transmission
  - 5-6 km from the plant on a little hill



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Delayed actions

- 48: Air-conditioning and power supply of Protected Command Centre
  - Seismic qualification showed that PCC should be reinforced (Task 47)
  - It is unjustified due to technical reasons to reconstruct the air conditioning and power supply before reinforcement
  - Reinforcement could start when Backup Command Centre is ready, to provide continuous performance of function

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c. Main changes in the NAcP since the 2013 workshop with justification

- No additional actions
- No removed actions
- Modified actions:
  - 2: New fire brigade barrack instead of reinforcement – delay to 2017 (from 2015.12.15)
  - 3: instead of protection of demineralized water tanks, the reinforcement of building – but no delay
- Otherwise only mentioned changes in schedule

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d. Technical basis leading to the main changes identified in the NAcPs

- 2: New fire brigade barrack
  - Reinforcement is not possible, since function could not be provided on a continuous basis
  - Implementation plans are ready
  - Public procurement planned in 2015
  - Completion by 2017
- 3: Reinforcement of medical and laboratory building
  - Instead of new or reinforced demineralized water tanks
  - Reason: significant financial difference

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New fire brigade barrack

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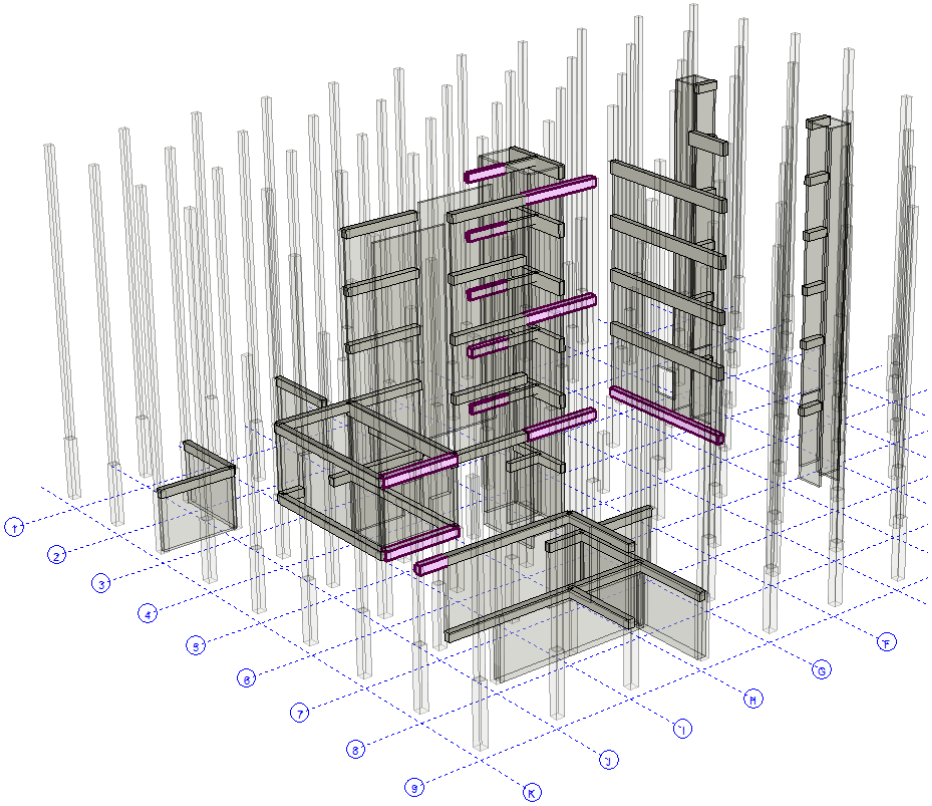
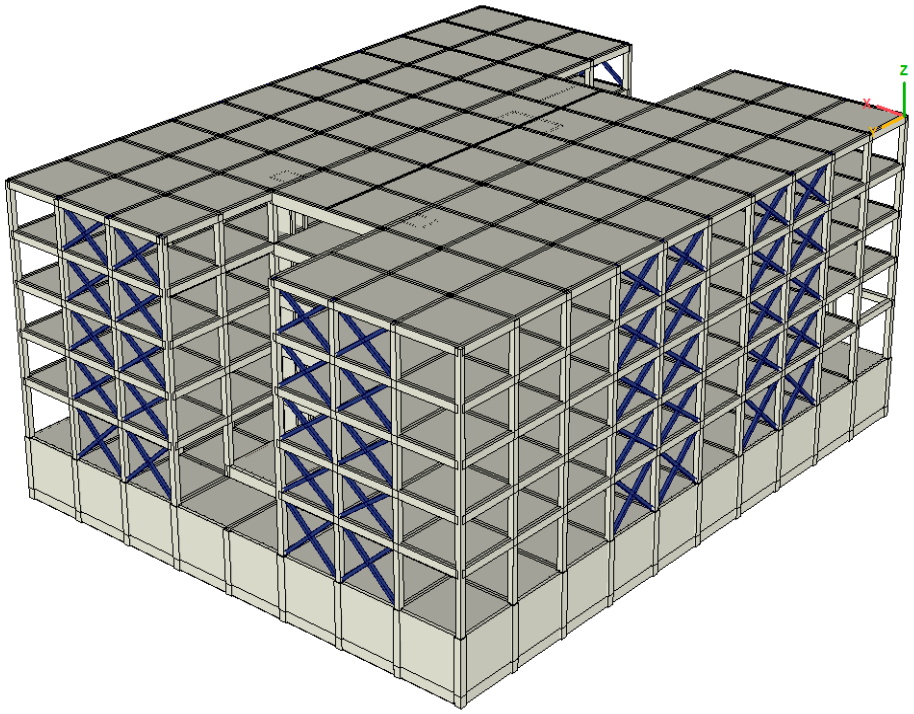
Medical and laboratory building: weakest beams and a possible solution





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e. Relevant outcomes of studies and analyses identified in the NAcPs, and completed since the 2013 workshop

- 9: automatic shutdown due to seismic event
  - Not justified, because of increased risk of LOOP, which increase risk of SBO (and collapse of whole national system)
  - For stronger quakes the reactors will stop automatically because of several other signals from protection systems

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e. Relevant outcomes of studies and analyses identified in the NAcPs, and completed since the 2013 workshop

- 28: PSA for closed reactor states under 150 °C primary circuit temperature
- Result: time limitation (2 weeks), measures should be taken to reduce risks after 2 weeks
- Basis: safety analysis
  - This operation state can occur in transition to and from power operation
  - It might persist due to some obstacles or problems during transition or result of a failure
  - Risk of system configuration in this state might differ
  - Risk of loss of ultimate heat sink is higher in this state depending on configuration
  - According to analysis of former operating experience a 2 weeks limitation is suitable to maintain the risk at a reasonable level
  - Safety analysis should be carried out when stuck in this state to introduce measures after 2 weeks

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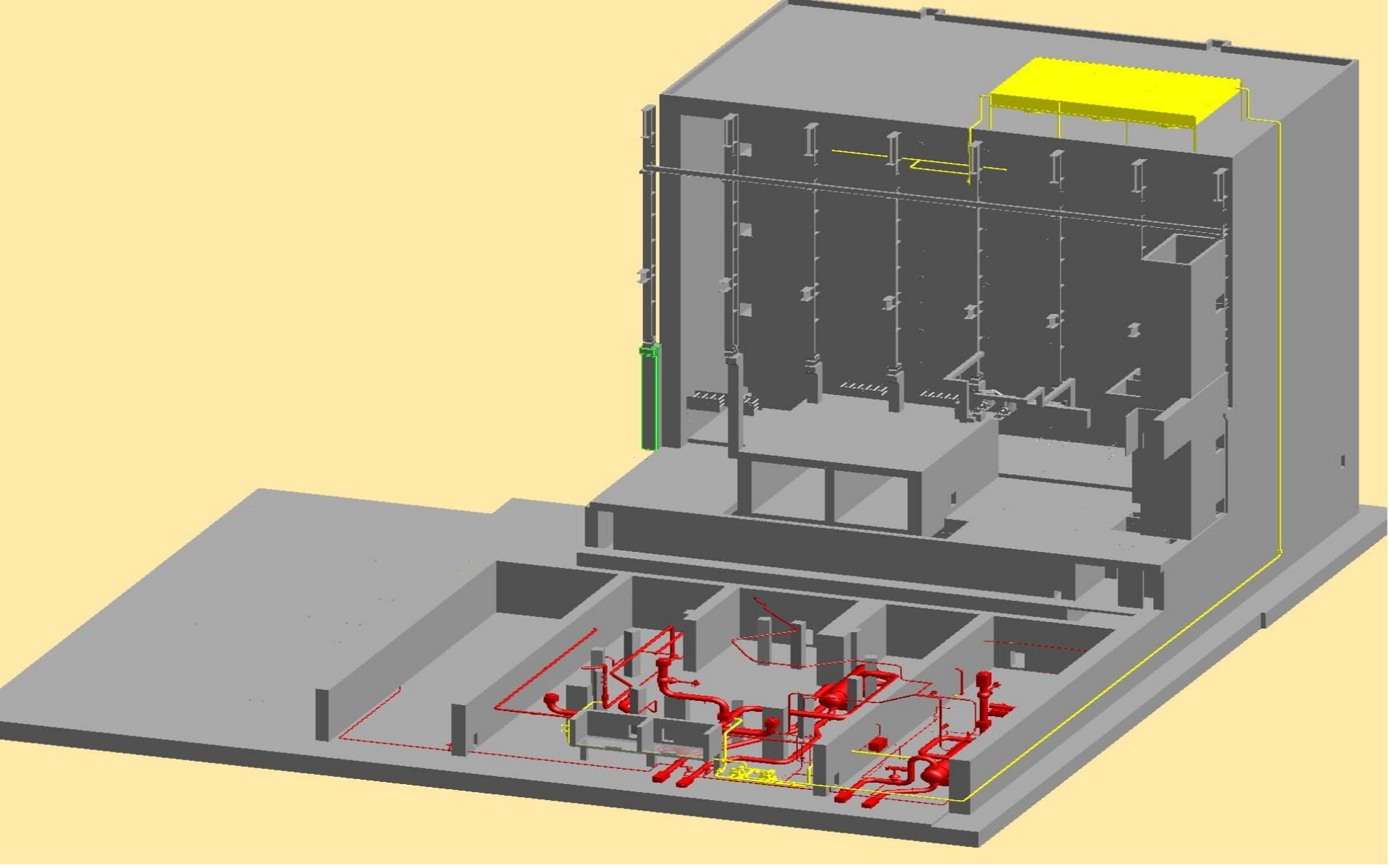
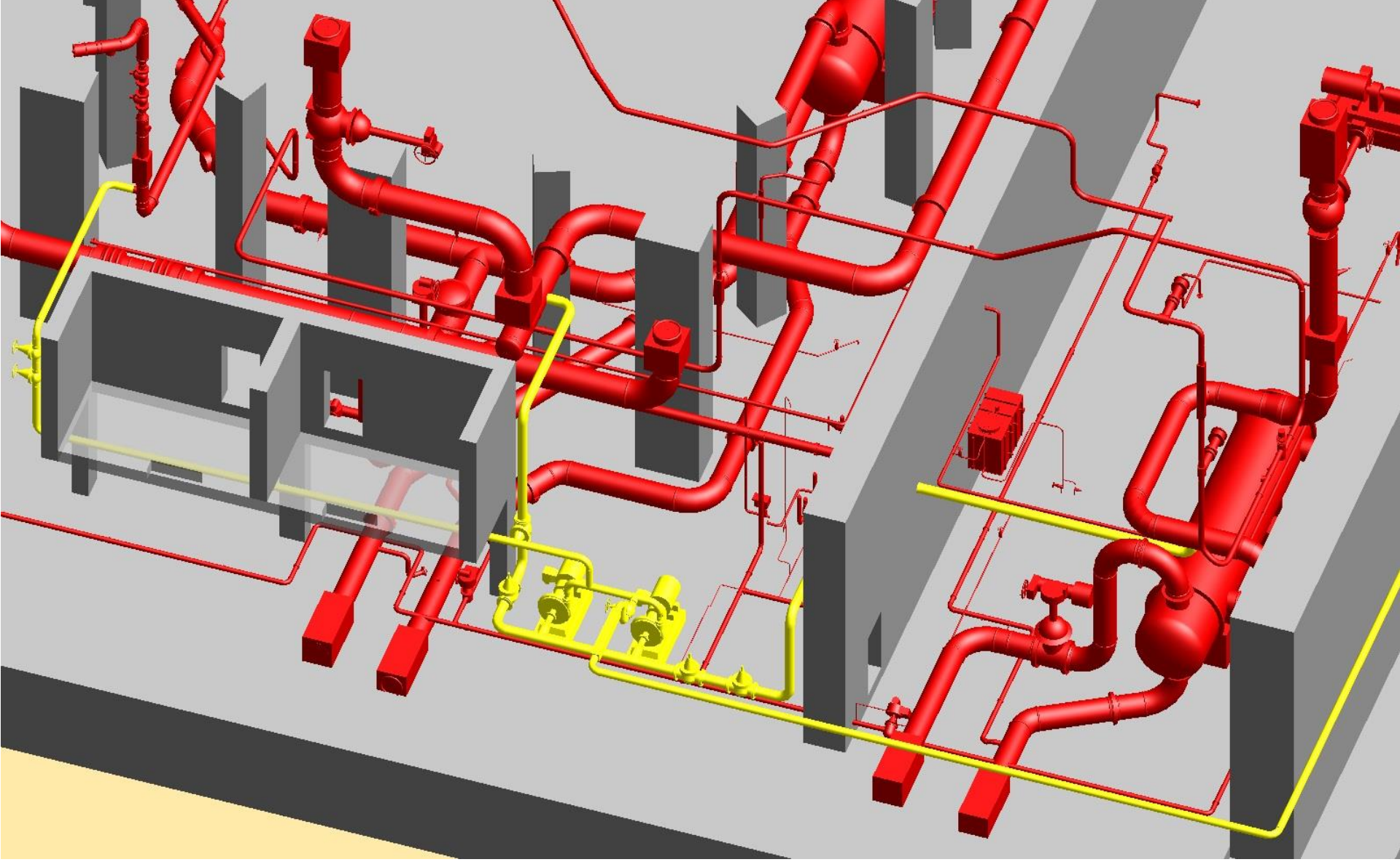
e. Relevant outcomes of studies and analyses identified in the NAcPs, and completed since the 2013 workshop

- 30: long term depressurization of containment (by 2018 Dec.)
- Feasibility study has been developed
  - Long term depressurization without filtered venting
  - Heat should be removed from where it is generated
  - No active components within containment
  - Minimum number of leaktight penetrations
  - Minimum surveillance needs
- Dry cooler on top of bubble condenser building





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f. Good practices and challenges identified during implementation so far

- Challenges
  - Management of delays
  - Public procurement
  - HAEA to keep track of actions
- Good practice
  - Severe accident simulator for Technical Support Centre staff
  - Robust and distant Backup Command Centre
  - All pre-Fukushima severe accident managment measures have been fully completed

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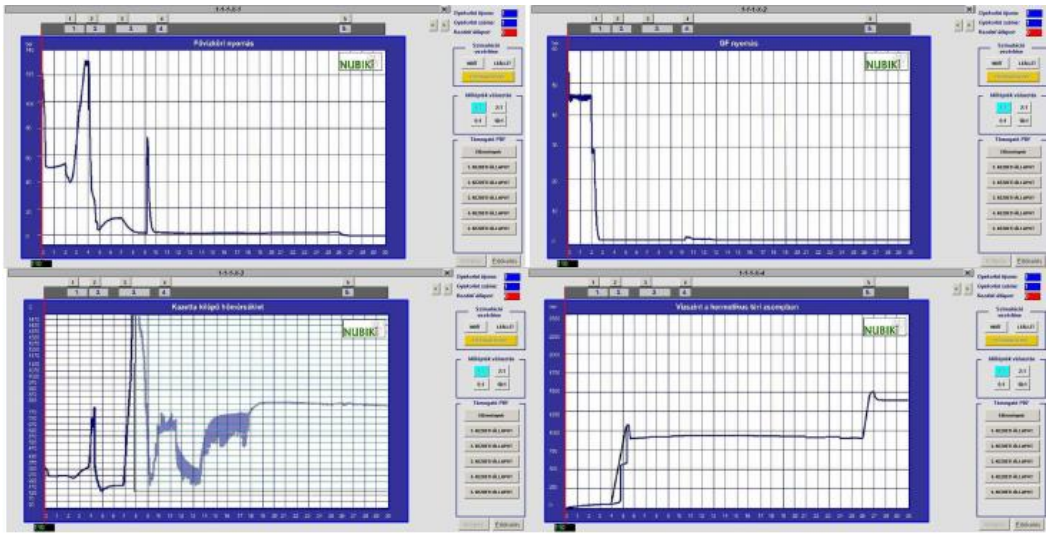
SAM Simulator

- To train TSC and MCR staff
  - SAM measurement chain flow-charts
  - Identification of states and causes
  - SAM monitoring
  - SAM schemes
  - Check success of intervention
  - Selection of mitigation strategy (consideration or pros and cos)



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SAM Simulator

- Three forms of training
  - TSC at Protected Command Centre
  - Together with unit simulator
  - Complex emergency exercises
- Separate version for instructors
- Extendable scenario scope (only 1 yet: SBO + secondary break)

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g. Response/clarification on the questions/comments raised on the 2014 version of NAcP

- Severe accident measures implemented for all 4 units
- 24: a new 4 MW air cooled diesel generator:
  - SA and safety functions
  - Dedicated consumer list
  - Designed for BDBA external loads (10-5/y)
- 49: Back up command centre design basis: 10-5/y mean
- 46: Possibilities to improve radiation monitoring system
  - From 24 to 72 hours power supply of gamma monitoring stations (19)
  - Radio communications
  - Water discharge monitoring stations (2) will be reconstructed
  - Battery to stack gamma monitoring (in addition to safety supply)
  - New mobile doserate measurement system

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g. Response/clarification on the questions/comments raised on the 2014 version of NAcP

- Action 4: assessment of underground lines due to building settlement
  - Input is needed from Action 5
  - Pipelines have been surveyed
  - Flexible compensators planned (max. 50 cm displacement)
    - < ∅120 mm: from the shelf solution
    - > ∅120 mm: individual development is necessary

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Thank you for your attention!