

EU stress test – Second Public Meeting Questions

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Fukushima not only raised questions about the technology. It also clearly demonstrated how licensees and regulators suppressed disconfirming evidence for instance about their assumptions for the tsunami hazard. Scientific and historic knowledge – such as the historic record on the Jogan earthquake and tsunami – that would have shown that the design basis was inadequate has clearly been suppressed.

Now the obvious question from that lesson learned is directed at the regulators themselves. Can they be trusted to rethink their positions?

Like Mr. Stritar showed on his slide on the circle of trust, I think public engagement is the key element in following up on that question. It is imperative that critical questions be followed up in an accountable way.

With that I come to my question to M. Krs: Your slides didn't mention how the public input flowed into the process. To my knowledge there is not one shred of evidence that it has even been looked at. What can you say about that?

I am going to talk about the Swiss report and the Mühleberg plant in specific, but that doesn't matter. This is just an example, how stress test conclusions are worthless, when the card house of trust, *from* the licensee, *up* to the regulator and finally *up* to the peer review team fails.

Let's face it: there are very strong human and economic factors that work against unconditional honesty. True public engagement with true accountability would be one way to counter-balance these factors a bit. In the EU stress test, this mechanism failed miserably. Here's the example:

In 1972 the Mühleberg NPP was put into service. Because of significant concerns about the adequacy of emergency cooling, it received a series of half-year, and one-year permits only.

In 1992, on the condition of having retrofitted a special emergency system with a separate safety train, the NPP finally received its license, as valid today.

Only *this* new safety train was designed against external events such as earthquake or flood. As documented in the license base report and the two subsequent PSRs¹, it was the outspoken safety concept of the plant, to only rely on the special emergency system for these hazards.

¹ Gutachten zum Gesuch um unbefristete Betriebsbewilligung und Leistungserhöhung für das Kernkraftwerk Mühleberg, Würenlingen, Oktober 1991 (HSK 11/250, KSA 11/150), Seite 3-18, Seite 6-2

For twenty years, critics complained that important safety systems are only supplied from the old safety train. Most notably the Core Spray, the Borating System, and that's just two out of 15 safety classified systems that are officially not available in the Design Basis Earthquake².

The Main Control Room – in deed all personnel rooms – are situated in buildings that failed Design Basis Earthquake requalification or never had one. In a Design Basis Earthquake one must expect to lose the whole crew.

For twenty years, the regulator and the licensee claimed that all this was no problem. *But* - along came Fukushima and along came the EU stress test. Now it seemed, they weren't so sure anymore. For Brussels they dramatically changed the safety concept:

In its stress test plant report, the licensee simply resurrected the old safety train and declared it earthquake proof. Buildings, that housed essential systems of the old safety train –but that failed earthquake qualification in current PSRs – were *simply left out of the report*. Notably the Machine House with the diesel generator and the pump house with its inlet, band screen and pumps³.

The regulator knows the plant for 40 years. I think they should know when whole buildings are missing. However it does not seem to be the intention of the regulator to call the bluff. In a marvelous twist the regulator actually manages *not* to lie: I quote: *„Insofar as is explicitly reported, the safety trains of all the Swiss nuclear power plants have safety margins against seismic hazard level H2.“*⁴

„Insofar as is explicitly reported“ - if this wasn't about nuclear safety it would actually be quite funny.

Needless to say, from this point on, the old safety train is fully credited in all the EU stress test scenarios and safety margin discussions.

A third building that has failed earthquake qualification in current PSRs is the operations building. It houses the main control room with all the operators. They couldn't easily "forget" that one in the report. How did they push that one through?

Earthquake hazard analysis for Swiss NPPs dates from around 1977. To this day, published deterministic safety assessments are based on 35 year old numbers.

Since the 1980es it was suspected; since 2004 with the so-called PEGASOS study we know for sure, that these old earthquake hazards are too low by a factor of at least two⁵. With the argument that statistical uncertainty was supposedly too large, the nuclear industry somehow convinced the

² Sicherheitstechnische Stellungnahme zur Periodischen Sicherheitsüberprüfung des Kernkraftwerks Mühleberg (HSK 11/1100); 2007; p 6-3ff. (structures) and p. 3-8ff.(safety classification, availability in the DBE/SSE) http://static.ensi.ch/1314202963/psu_muehleberg_2007.pdf

³ On page 59 the utility writes: „Die Bauwerke, deren Versagen die Funktionsfähigkeit der Systeme beeinträchtigen könnte, werden ebenfalls in die Abfahrpfade aufgenommen“. „The structures whose failure could jeopardize the function of systems, are included in the success path“. The actual table 15 lists neither machine house nor pump house.

⁴ EU Stress Test: Swiss National Report, p. 22, Hervorhebung nicht im Original

⁵ Neubestimmung der Erdbebengefährdung an den Kernkraftwerkstandorten in der Schweiz (Projekt PEGASOS), Seite 3, Gegenüberstellung alte/neue Gefährdung, Seite 9. http://static.ensi.ch/1314201207/pegasos_juni_07.pdf

regulator to defer deterministic safety assessments based on these new numbers⁶ and instead launch a follow-up study by the plant owner's association to "refine" these numbers. At least the regulator demanded it finished by 2007. Needless to say: it is still running, eight years and counting. In the meantime, several PSRs were wrapped up, still using the old numbers.

It took Fukushima to speed things up. Finally in May 2011 a provisional result of the refinement study was compiled.

Strangely, one month later, the regulator explicitly directed the licensees *not* to use these results for the EU stress test. To justify this, the regulator suggested a supposedly inferior safety level in the EU, I quote in translation:

Contrary to most countries in Europe, hazards through earthquake and floods have been reanalyzed based on the newest scientific standards in Switzerland. [...] For comparability in the European context, hazard levels from the original design basis should be used for the stress tests.⁷

As said before the new numbers were available since Mai 2011 to both the regulator and the licensees, as a national Post-Fukushima earthquake reassessment was on-going in parallel. The licensees were also required to submit new fragilities for SCCs by the end of November 2011.

In a hair-raising contradiction, the regulator allowed the licensees to use these brand-new fragilities, that were of course entirely unconfirmed, in the EU stress test, while on the other hand claiming the hazard assessment from 2004, that had been "refined" for eight years, was too fresh to be included.

And that's how we get back to our operations building and the main control room. Without any structural improvement, the building suddenly shows an increase of earthquake resistance by more than a factor of three. It was 0.09g when it failed earthquake requalification, now they claim it takes 0.28g⁸.

Of course, the regulator disclaims all responsibility, as he admittedly didn't review the fragilities.

But wait a moment: Didn't the stress test specifically reserve non-classified equipment to only be considered in severe accidents⁹? What about the whole section "Issue G" in the WENRA Reactor Safety Reference Levels about safety classification? That's obviously just hot air.

Letting buildings disappear, using 35 year old hazard assessments that are known to be too low by a factor of 2, throwing out the whole safety- and earthquake classification? That's twenty-first century nuclear safety Made in Switzerland.

Now of course I reported all this and more on the Public Engagement Website, so the Peer Review Team could act on it. What did the team say? (Quote)

⁶ Speaking of deterministic safety assessments. Only those are legally binding to allow continued operation of the plant. The regulator demanded implementation of PEGASOS in PSAs. However not before allowing a deduction of 20%. Hidden from the public, the regulator allowed to increase the fragilities of SCCs by a factor of 1.5. When I uncovered this later, the headline was nice: „Amtlich bewilligte Trickerei bei AKW-Erdbebensicherheit“, Der Sonntag, 15.1.2012, p. 26

⁷ ENSI: Verfügung: Neubewertung der Sicherheitsmargen des Kernkraftwerks Mühleberg im Rahmen der EU-Stresstests, Seite 2, http://static.ensi.ch/1312475964/verfugung4_muhleberg.pdf

⁸ HSK Gutachten 1991 6-17 vs. KKM: EU-Stresstest Oktober 2011, AN-BM-2011/121, Seite 60

⁹ "For severe accident scenarios, consideration of non-classified equipment as well as realistic assessment is possible" EU Stress test specification, p. 5

The analyses undertaken to quantify the available margins to seismic events and flooding were up to date, thorough and in accordance with ENSREG specifications.¹⁰

Nice.

---- Had to finish here – the following was not voiced in the meeting ----

Regarding flooding, Station blackout and loss of the Ultimate Heat Sink (UHS), matters are even worse. Despite the stress test specification's clear definition of a UHS as a medium such as river, water table or atmosphere, they were happily counting multiple inlets on the same river as separate UHSs.

Despite the stress test specification demanding to assess, Quote: *"Consequence of loss of safety functions from any initiating event conceivable at the plant site"*, loss of UHS and Station Blackout scenarios were assessed in sunshine contexts only. Aside from the functions postulated to be lost, everything except the garden hose was happily credited to be available, regardless of earthquake qualification or any other consideration.

All this becomes even more hilarious, if you know the facts. In the official deterministic Design Basis Flood safety assessment done last year, they had to credit Accident Management to meet the acceptance criteria. The single static fine screen of the special emergency building water intake is assumed to be blocked by organic material mobilized in the flood.

Standing half a meter deep in the flood, emergency personnel is then supposed to operate multiple fire pumps, in order to feed cooling water into the intake as the only remaining UHS and worse: for cooling the only remaining AC power source, the water cooled diesel generators. Again, this is design basis.

I won't go any deeper into that because the latter is now the subject of a legal case in Switzerland. Maybe I'm wrong, and you really are supposed to credit fire hose swinging Accident Management inside the design basis. But if not, the court ruling will reflect badly, not only on the Swiss regulator but also on the EU Stress test and the specific peer review team for not having spotted this after my having pointed it out to them.

The question is: will the responsible people finally wake up and see, that we can't presume that licensees and regulators can be trusted - to rethink their position. We need public participation that is followed up, that is accountable.

¹⁰ Switzerland Peer Review Country Report, undated, published 26.4.2012, p. 4