

From: Jerry Dozier, *NRP* *IP* *MP*  
 To: *NRP* - Frank Gillespie; John Ramsey; OES; Peter Koltay; Richard Wessman  
 Date: 4/21/03 4:16PM  
 Subject: Paks Reactor - Hungary - INES 3

Thanks and have a great day!

Dear Frank,

Jerry Dozier, Reactor Systems Engineer  
 US Nuclear Regulatory Commission  
 11555 Rockville Pike (MS 012H2)  
 Rockville, Maryland 20852  
 Telephone: (301) 415-1014  
 Fax: (301) 415-2279  
 e-mail: [jxd@nrc.gov](mailto:jxd@nrc.gov)

>>> John Ramsey 04/18/03 08:52AM >>> *IP*  
 Dick,

I just received the attached from the Hungarians. It's in response to my earlier request for additional info. It provides a brief description of the cleaning process the spent fuel assemblies were being subject to (some kind of chemical treatment) and gives a little additional info on the event.

Jack

Begin Earlier Message of Friday, April 18

Dick,

The guy that's the [ ] *Ex 4*  
 is a friend of mine. I sent him an e-mail asking him for additional info on this cleaning machine. Hopefully I'll hear back later today. If not, I'll give him a call.

I know they usually do post-irradiation inspections of their fuel assemblies. They usually do this one or two at a time. This is what I thought they were probably doing so this is why I mentioned in one of my earlier messages that I thought that they had most likely damaged one or two assemblies. Based upon the more recent info, it seems pretty clear that they were doing something different than I thought. In all honesty,

Information in this record was deleted  
 in accordance with the Freedom of Information  
 Act, exemptions 415  
 FOIA- 2006-0273

*B(1)*

I'm not at all familiar with this cleaning machine. This is why I've asked [ Ex. 4 ] is he can amplify on what it is.

Jack

>>> Richard Wessman 04/17/03 03:52PM >>> NSIR  
Heads up.

The fuel damage and release, in conjunction with a cleaning operation has been upgraded to an INES 3. I've asked Nader Mamish to develop some information on this situation and how it may or may not relate to US NPPs. Will seek to have some information Friday.

Dick

CC: Andrew Szukiewicz; Brian McDermott; Brian Sheron; Charles Serpan; Donna-Marie Perez; Doug Weaver; Edward Baker; Elizabeth Doroshuk; Gordon Fowler; Jack Foster; Jane Gunn; Janice Dunn Lee; Jim Blaha; Karen Henderson; Kirstin Riesbeck; Michael Cullingford; Michael Weber; Nader Mamish; Ralph Caruso; Ralph Meyer; Richard Borchardt; Robert Stransky; Roy Zimmerman; Samuel Collins; Scott Morris; Suzanne Black; Theodore Sherr; William Beckner

## Summary

of the serious incident on the unit 2 of Paks NPP, set in on the 10<sup>th</sup> April 2003

The Unit 2 of the Paks NPP was shut down for yearly refuelling and maintenance works on 29 March. In addition to the routine operations, maintenance works included chemical cleaning works of the fuel assemblies unloaded from that unit. This operation has been performed in a dedicated tank housing 30 assemblies, about one tenth of the full load of the reactor. The cleaning system has previously been used for cleaning 5 charges of assemblies.

The cleaning of the sixth charge was started 9<sup>th</sup> April 2003 and was suspended in the afternoon of 10<sup>th</sup> April 2003. On the same day, late in the evening, the radiation monitoring system indicated the presence of radioactive gases. Consecutively the maintenance staff decided to remove the lid of the cleaner tank. The removing operation was unsuccessful due to the break of the lifting rope, and the lid remained in a partially lifted position on the cleaning tank.

Paks NPP issued a press release about the event and notified also the Hungarian Atomic Energy Authority. HAEA also issued a press release with its own evaluation of the situation, and relying on the available information classified the event severity as Level 2 on the International Nuclear Event Scale (INES). On the same day HAEA notified the IAEA, too. Nuclear Safety Directorate of the HAEA established a Special Committee to investigate the circumstances of the event.

After several attempts, the maintenance crew of the NPP succeeded in removing the lid of the fuel-cleaning tank. Thereafter, following a predefined programme, they performed visual inspection in the cleaning tank using video camera. Discordantly with the original suppositions, the visual inspection gave evidence of all of the 30 assemblies being damaged and a number of heavily damaged assemblies were observed. Having studied the photos, the NPP declared the site emergency state and the severity of the incident was increased to Level 3.

The radioactive materials released from the plant have been measured continuously both in the stack of the unit and via the monitoring network around the plant. Furthermore a concise sample collecting field activity has been initiated soon after the release in order to scan the near and farer vicinity of the plant.

According to the plant measurements the release of airborne radioactivity can be characterised by the following values:

<u>Period</u>	<u>Noble gases [TBq]</u>	<u><sup>131</sup>I-equivalent [GBq]</u>
April 10.	12,4	143
April 11:	160,0	204
April 12.	24,8	4,44
April 13-17	130,0*	7,0*

(\* second half of April 17 extrapolated)

The monitoring network in the 3 km vicinity of the plant (consisting 9 stations measuring gamma-dose-rates) has not shown any increase above the daily fluctuations related to the cca. 100 nSv/h average value, except for one station showing a marked increase up to near the 500 nSv/h warning limit on April 11.

Field measurements in the plant and in the surrounding area yield as typical values of <sup>131</sup>I surface contamination between a few Bq/m<sup>2</sup> and a few hundred Bq/m<sup>2</sup>.

Correspondingly no countermeasures whatsoever have been introduced or are foreseen on-site, neither out of the site.

Budapest, April 18, 2003.

Summary of the Paks, Hungary, Fuel Cleaning Incident  
April 10, 2003

The following account has been assembled from a variety of sources including the Hungarian Atomic Energy Authority, the Paks Nuclear Power Plant, the International Atomic Energy Agency and Nucleonics Week. Where considered appropriate, passages are highlighted by quotation marks. In other cases, it was considered appropriate to include the direct language from press releases, resulting in slight differences from what would be used by native English writers.

The Paks, Hungary, Nuclear Power Station consists of 4 units of VVER-440/213 reactors. Unit 2 had been shut down for yearly refuelling and maintenance activities on March 29, 2003, including the chemical cleaning of partially burned fuel assemblies. Apparently, the fuel elements in the Paks reactors had experienced a form of crud buildup that impeded coolant flow so an apparatus was designed and built by Framatome-Siemens to remove it. The cleaning tank of the apparatus was understood to be submerged in the "Pool no. 1" which is adjacent to the fuel pool, which in turn is adjacent to the reactor vessel. Both pools are normally open to the atmosphere on the main floor of the reactor hall, which houses two reactor units. According to documents describing the equipment provided by Framatome, the cleaning tank would be submerged under 14 meters of borated water. (*Ten m per Nucleonics Week.*)

Five charges of fuel assemblies had been successfully cleaned previously, when a sixth charge, consisting of 30 assemblies was started on April 9, 2003. Processing was suspended (apparently normally) at 4:55 PM April 10, 2003, but at about 10:30 PM, dosimetry systems of the plant exhaust stack showed a sudden increase in released noble gas activity (max  $4.14 \times 10^{13}$  Bq/10 min). (A summary of the releases is given in Table 1 below). At the same time, radiation monitors for noble gas activity in the reactor hall indicated alarm level as well, resulting in instruction to the staff to immediately leave the reactor hall and cease all work. Paks NPP issued a press release about the event and notified the HAEA, which also issued a press release with its own evaluation of the situation, and relying on the available information classified the event severity as Level 2 on the International Nuclear Event Scale (INES). HAEA also notified the IAEA, and the Nuclear Safety Directorate of the HAEA established a Special Committee to investigate the circumstances of the event.

*On April 11, Paks maintenance crews attempted to lift the lid of the cleaning tank, but the hoisting rope broke and the lid remained in a partially lifted position on the cleaning tank. The tank was thus partially open so that radioactive, noble gases could come out of the tank, travel up through the pool water and out into the reactor hall where they were carried by the plant ventilation system and out the stack into the outside environment.*

On April 11, Paks NPP Ltd reported: "The gases escaped into the environment in a controlled way through the ventilation system of the power plant, but the amount and the activity of the discharged gases were insufficient to cause any change in the normal readings of the environment monitoring system within and outside the plant area. No emergency response action was required either within or outside the power plant. The airborne contamination is primarily present within a well confined small area of the Unit 2. The other three Units of the power plant are operating as normal.

The event was communicated to the mayors of settlement within a 30 km range of the power plant, via a special SMS system provided for the purpose. The results of the going on