**From:** Alex Murray
**To:** Amy Cubbage; Donald Carlson; Howard Faulkner; Stuart Rubin; Undine Shoop
**Date:** Tue, Aug 21, 2001 12:55 PM
**Subject:** Comments on Trip Report

FYI,

The last version of the trip report I have is from Friday afternoon. I don't know if this is the current version but I will assume it is close enough. The comments from Friday did not make it in so I have attached them at the bottom of this E-mail. Major comments are:

1. Need a discussion of the "Catastrophe-free nuclear power" by Kugeler et al.
2. Present the containment versus confinement vs reactor preservation system discussion
3. Add a comment about SNF quantities and volumes
4. Needs a disclaimer upfront (I've already added one to the findings).

Thanx,

Alex.

>>> Alex Murray 08/17/01 11:39AM >>>
FYI,

Many earlier comments were not addressed - they are repeated at the end of the message.

Major Comment 1: parts of the report seem overly optimistic - the pragmatic comments and insights from the researchers and presenters need to be included.

Major Comment 2: we tend to repeat and take the statements from the researchers at face value without a closing sentence or two from the NRC/U.S. perspective.

Major Comment 3: we need a disclaimer or similar statement(s) that the NRC has not reviewed this work in detail and neither agrees/disagrees with the results of the work and inferences made by the German organizations.

Major Comment 4: a major theme of many presentations (including Kugeler's presentations, which are not well presented in the draft - see previous comment 4) is the reactor preservation system. This is not well discussed in the draft.

Major Comment 5: the findings need to be at the beginning or also summarized in the cover letter.

Major Comment 6: some of the findings are too trite - additional findings may be needed. I will try to forward some suggestions soon.

Alex.

Original Message from 6/14/01 with comments:

FYI,

I have taken a quick look at today's version of the trip report. I realize it is still under development and the findings may change. I have some comments and suggestions:

1. General Comment 1 - It's a bit weak on conclusions - we tend to repeat the statements/comments of the researchers without a closing sentence or two from the NRC/U.S. perspective.

2. General Comment 2 - the front half of the report is overly optimistic - the pragmatic comments and other factors from the researchers and presenters need to be included.

3. General Comment 3 - it needs page numbers, maybe section numbers, and maybe a Table of Contents. Also, minor typos and syntax errors in the document - these can be caught on a more final draft.

4. For the enclosures/references, the following need to be added and referenced in the text: After page 27 now
- Kugeler's writeup on "Concept of inherently safe ..." and "Large Test Facilities"
- Schroeder et al on "Ceramic Coatings ..."
- one or two of the papers on D&D of the AVR/THTR.
- Kalinowski's handwritten ones on pebble flow
- Kugeler's writeup on waste management
- There may be another one on AVR SNF management

**These appear to be included.**

5. The syntax needs correcting on the last sentence of the transmittal memo. **Done**

6. In the Introduction to the Summary, we may want to add a short paragraph on a chronological basis and then lead into the topic based part of the main trip report. **Not Done**

7. Under the section "High Temperature Reactor Research at Julich ..." we need to add statements regarding the effect of helium upon materials, fusing of the metals, bearings etc. The Nacok facility should be listed here as well (referring to another section for the discussion). The last paragraph should also reference the presentation by Kugeler, the use of prestressed concrete (not steel), the potential for uneven expansion of coatings on the macroscopic fuel pebble, and the steel bands that could open for pressure relief during an event. Kuguler also brought up the functioning reactor preservation system, which should be mentioned here and leading to the isolation with sand or other granular materials. **It's not clear why this section has disappeared in the 8/17 draft - recommend its addition**

8. Under "High Temperature Reactor Design ..." -
- the second paragraph mentions the double steel reactor vessel. This should be clarified and put in context - for R&D work, accident testing, different fuels, TRISO was developed at the start of AVR ops etc.
- there should also be a discussion about confinement vs containment vs stout confinement in here.
- check the 80 MWe power rating in the last paragraph - 100 MWe was also mentioned.
- in the last paragraph, it is incorrect to state that the HTR-M is an entirely passive design. The reactor preservation system should be mentioned, and that the HTR-M has passive safety features that function after active safety systems function. **Page 3 now - mostly not addressed**

9. Under "Safety Assessment ..." the fourth paragraph needs improvement. Again, several of the key statements from the enclosures and the presentations should be included - the reactor preservation system functions, reactor shutdown, isolation valves, containment vs strong confinement, release via filters, emergency power etc. The text should also mention the passive coolers in the reactor building that use natural circulation of cooling water via three independent trains - these protect the concrete although overtemperatures may result.
**On page 4 now - mostly unaddressed**

10. Under "Pebble Fuel Element Research ..." - suggest referring to the attachment upfront or directly incorporating the attachment in this section.
pages 4-5 now

11. Under "Pebble Fuel Element Irradiation ..."
- the particle fuel failure range from manufacture was consistently mentioned as 1E-4 to 1E-5 - this should be mentioned in the second paragraph.
- in addition, several of the presenters mentioned 1E-3 after irradiation at temperature - perhaps we

should just say that the rate increases with reactor irradiation/use.
- suggest leaving in the 1,600 C impact sentence on cesium release in paragraph 3.
- note potential differences in release mechanisms, silver and cesium by diffusion through "changed SiC" while fission gas release appears to be due to failure of the SiC (paragraphs 3-5).
**Pages 5-6 now - mostly unaddressed**

12. The graphite and pebble/heat xfer sections look fine.

13. Under "AVR operating experience ....", we should clarify if the LOCA test in paragraph 2 also represented the conditions after the actuation of the reactor preservation system. **On page 9 - mostly unaddressed**

14. The THTR sections look OK.

15. Under "THTR Licensing ..." the first paragraph should note the higher cost share/burden that the utility would have incurred with continued THTR operation. Also, it started with a shutdown, with a program to decommission the THTR (many components are still onsite due to the SAFESTOR approach). **On page 13 - partially addressed**

16. Under "... Facility Tours" paragraph 4 should be incorporated into paragraph 3 (there is an overlap). Also, paragraph 7, first sentence should have "horizontal" replaced with "vertical" for the Nacok cross-section. **On page 13 - partially addressed - change horizontal to vertical**

17. Under SNF, include the original paragraph or a suitable modification that explains the difficulties of decommissioning to SAFESTOR a reactor that could have fuel pebbles stuck in the system. Also, perhaps mention the graphite dust again. **On page 16 - not addressed**

18. In the pebble fuel attachment, last paragraph, 2nd page - check if that is 200 mm or 200 microns. **On page 23 - partially addressed - 200 microns now - that may be a 100 micron outer coating - check**

19. The last attachment on "Safety Assessment ..." should include disclaimer like language from the NRC - "specific details of the analysis were not provided" - "The delegation did not review the calculations." Also, there should be an acknowledgement that some of these systems would potentially have safety significance in the NRC's regulatory approach. **not addressed**

Alex.

**CC:** Bill Gleaves; Sharon Steele

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**Subject:** Comments on Trip Report
**Creation Date:** Tue, Aug 21, 2001 12:55 PM
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