

OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

EDO

Date Printed: Oct 30, 2000 14:24

PAPER NUMBER: LTR-00-0656

LOGGING DATE: 10/30/2000

ACTION OFFICE: EDO ✓

To: Collins, NRR
Ref. G 20000494

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AFFILIATION:

ADDRESSEE:

SUBJECT: Concerns UK Nuclear Sub "hours from meltdown"

ACTION: Appropriate

DISTRIBUTION:

LETTER DATE: 10/28/2000

ACKNOWLEDGED No

SPECIAL HANDLING:

NOTES:

FILE LOCATION: ADAMS

DATE DUE:

DATE SIGNED:

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From: "Marvin I. Lewis" <marvlewis@juno.com>
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Date: Sat, Oct 28, 2000 10:18 AM
Subject: UK NUCLEAR SUB "HOURS FROM MELTDOWN"

10-16-2000.

Dear Friends;

I recently sent out a critique of the Indian Point 2 Special Report. I have said that the corrosion control on many nuclear power plants appears lacking and my cause steam generator tubing failures. I have included my previous comments after a letter concerning a recent submarine problem that may be related.

This corrosion control problem may extend to submarines which have limited space for a corrosion control laboratory. See story below.
marvlewis@juno.com

Marvin Lewis

From: "Janet Bloomfield" <janet@atomicmirror.org>

Sent: Saturday, October 28, 2000 5:24 AM

Subject: [abolition-caucus] UK Nuclear submarine "hours from meltdown"

- > Nuclear sub was hours from meltdown
- > HMS Tireless: How a 'minor defect' could have caused disaster
- >
- > Richard Norton-Taylor
- > Saturday October 28, 2000
- > The Guardian
- >
- > Only now, more than five months after the Ministry of Defence assured
- > Gibraltarians that it was only a "minor defect", are the full extent
- > and
- > dramatic consequences coming to light. HMS Tireless, which has been
- > moored
- > off the Rock since May, was close to a disaster, its nuclear reactor
- > "at
- > the
- > very point of failure", sources have told the Guardian.
- >
- > The crack, far more serious than first thought, is understood to be at
- > a
- > critical junction of pipes in the pressurised water reactor's cooling
- > system
- > which cannot be isolated. The navy now recognises it is not simply a
- > question of wear and tear: it is a potentially catastrophic design
- > fault.
- > Asked whether it could have foreseen what it is now suspected is a
- > "generic"
- > problem, navy sources sidestep the question. They respond by repeating
- > the
- > mantra that safety is of "first importance".
- >

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- > There is no doubt the navy treats the safety issue extremely seriously.
What
- > worries defence and nuclear sources is not what action was taken after the
- > leak on the Tireless was eventually diagnosed - the recall of Britain's
- > entire fleet of strike submarines - but why the initial leak, a symptom of
- > what has turned out to be a much more devastating problem, was not
- > discovered earlier.
- >
- > "The cracks could not be in a worse position. It is critical to safety,"
- the
- > Guardian has been told. Sources say the Tireless reactor was "at the very
- > point of failure" - in other words a meltdown.
- >
- > The critical junction of pipes where the welding fault was finally
- > discovered had not been inspected since the first Swiftsure class submarines
- > with this reactor design were built in the early 1970s, sources have
- > revealed. They added: "It is a very serious failure of the navy's inspection
- > monitoring system. It's quite remarkable".
- >
- > The problem is compounded because the Ministry of Defence, not the
- > manufacturers, Rolls-Royce, is the submarines' "design authority". That is
- > to say, the MoD monitors the submarines; the makers are not liable for any
- > faults.
- >
- > Naval engineers are said to have been astonished to discover the problem
- on
- > the Tireless turned out to be so serious. Equally alarmingly, navy sources
- > say the splits in the pipes of the reactor's cooling system were discovered
- > only because of new technology of which they had no previous experience.
- >
- > Yet the navy is not short of experience of problems with its submarines'
- > nuclear reactors. Polaris nuclear missile submarines were afflicted by
- > reactor problems which turned out to be the same that crippled the navy's
- > older fleet of hunter-killer submarines: cracked pipework in the primary
- > cooling system.
- >
- > As far back as 1991, Reg Farmer, a member of the MoD's nuclear-powered
- > warships safety committee, revealed that cracks had been found at the base

- > of steam generators in the nuclear reactors. He spoke to Thames Television
- > after the MoD had persistently refused to answer questions from MPs on the
- > grounds that they covered "sensitive military areas".
- >
- > This week, the MoD said it could not disclose what is wrong with the
- > Tireless reactor "without consulting the Americans first" - the reactor is
- > based on an American design. In July, John Spellar, armed forces minister,
- > told MPs: "The repair work on HMS Tireless is a standard repair following
- a
- > contained leak of coolant water in her reactor compartment." The work, he
- > added, would be completed "in the autumn."
- >
- > Given the sensitivity of Gibraltar opinion, it is likely that repairs
- on
- > Tireless will not begin until work is completed on one of its sister boats
- > in Britain. Gibraltarians face the prospect of an immobile Tireless sitting
- > off the Rock for a year.
- >
- > "The mood in Spain, in the towns near Gibraltar, is that it should be towed
- > back to Britain," Michael Castiel, the lawyer representing opposition groups
- > in Gibraltar, said yesterday.
- >
- > For the MoD that may be a little local problem compared with the navy being
- > deprived of its entire submarine strike force for at least five months. It
- > would be crass not to admit the "pain and grief" involved, a navy source
- > said.
- >
- > The recall coincides with the sale of Britain's remaining conventionally
- > powered submarines to Canada, a decision taken by the Tory government.
- >
- >
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> <http://www.cnn.com/2000/ASIANOW/east/10/27/taiwan.nuclear.ap/index.html>

Marvin I. Lewis
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United States Nuclear Regulatory Commission
Washington, D. C. 20555
Dear Commissioners;

Please accept this letter as a comment and a plea for action on the problems of steam generator tubing cracks in nuclear power plants. I am specifically pointing out deficiencies in the investigation of tube failures, connections between said tube deficiencies and probabilistic risk assessment and inaccurate conclusions regarding root causes of the tube failures. The sum of these comments is my conclusion that these deficiencies endanger the public in direct contradiction to the requirements of the Atomic Energy Act and the the Charter of the NRC to protect the health and safety of the public.

The action that I seek is a cessation of operations at nuclear power plants affected by steam generator tubing cracks. A cessation of operations at affected plants is the only course that would protect the health and safety of the public.

Comment and Critique of the NRC Special Inspection Report IP2 SGTF 05000247/2000-010.

This letter critiques and comments upon the NRC Special Inspection Report IP2 STGF 05000247/2000-010 dated August 31, 2000. My reading of the report produced the following points:

1. Tube cracks were missed because the sensitivity of the probe was reduced: a possibility not specifically mentioned in the Specail Report. There are several reasons that the sensitivity may have been reduced. This method is often used to try to reduce interference such as 'noise' which was present during the testing. Another possibility was to avoid indications which the client would not like.
2. The Special Report concludes that the cause of the tube failure was that crack indications were not detected and pursued. This was a cause of the tube failure , but not a root cause or first cause (prima causa). A tube crack had to exist for the tube to fail. An etiology of what caused that tube crack is the root cause (prima causa.) Tube crack indications must be detected and pursued to protect the health and safety of the public. The root cause of the crack needs to be addressed. The root cause is important as the steam generator cracking at IP2 is 80 times greater than predicted in the design documents!
3. The report gives the root cause of the tube failures as PWSCC, primary water stress corrosion cracking. The PWSCC is the result of hour glassing at the TSP, tube support plate. The hour glassing is caused by deposition of a corrosion product, magnetite, from the carbon steel of the TSP. The water chemistry had to be such that the corrosion proceeded to cause enough deposition of magnetite to produce PWSCC to give 80 times more tube cracking than used in design documents!
4. The Special Report admits that tube cracking is 80 times more likely

than used in design documents. Page 16.

5. The primary and secondary coolant may be involved due to "presence of chlorides and sulfates." Page 4.

6. Primary and secondary coolant contamination by microbial contamination which introduced corrosion potentials was not mentioned. (Engineering News Record 8/28/00 Page 58.)

7. Detection methods have provided inadequate and misleading results, or the licensee "did not have a procedure, a method or criteria" to determine hour glassing Page 8 or "specific review" of "crack significance." Page 7. Cracks were not detected or pursued (Letter NRC to Blind EA#00179.)

8. The Special Report exposes immediate dangers that extend to all NPPs using Steam generators. Tube cracking has occurred at IP2 at a rate 80 times greater than used in design documents. A miscalculation of 8000% shows the entire notion of PRA, probabilistic risk analysis, defense in depth, and the new inspection programs as inadequate to protect the health and safety of the public. (See attachment 2 of the Special Report re SGTF "600 gallon per minute leak.")

9. The NRC cites, "Con Ed did not recognize and take appropriate actions." The NRC did not recognize and take appropriate actions. The motivation for not taking appropriate actions is limited to "training" in this Special Report Page 3 and 4. The real motivation to take inappropriate action remains, and can cause inappropriate action to resume in the next tube failure.

Inappropriate action has endangered the public at IPA2 and at other NPPs. We are doomed to repeat our mistakes unless we learn from them. The Special Report does not purport to have learned adequately.

10. The Special Report cites SCC as the "Applicable Steam Generator Degradation Mechanism". PWSCC requires "applicable steam generator degradation mechanisms." PWSCC or SCC requires "a tensile stress, a specific corrosive medium, and a susceptible material." The "susceptible material" is "mill annealed Inconel Alloy 600."

Inconel 600 has notable resistance to stress corrosion cracking and provides an excellent choice for steam generator service as evidenced by its history in this application for decades. When Inconel 600 fails in steam generator service from SCC, the history of that particular lot of Inconel 600 needs investigation:

A. How have coupons of this heat treatment lot of Inconel 600 done in service and laboratory testing?

B. Is the original design proper or does the design overstress, not provide stress relief, or subject the tubing to conditions beyond the Inconel 600 capability?

C. What is the specific work hardening history? Was the tubing annealed properly after work hardening? Please provide certifications with appropriate lot numbers for annealing, work hardening for the Inconel 600 lot in question.

11. The Special Report gives the area of "a specific corrosive medium" as the coolant on the secondary side due to the "presence of chlorides and sulfates." Page 4. This leads to many questions unanswered in the Special Report:

A. Why were the chlorides and sulfates allowed into the secondary coolant in sufficient concentration and time to cause tube cracking? Many clean up mechanisms are in place to assure a non-corrosive medium in the coolants. Why were they deficient? How is this being addressed now? Where

are the laboratory reports on the coolants showing the corrosion potential?

B. The Specail Report cites the corrosion of the TSP producing "magnetite" which "grows". Why was the coolant allowed to be corrosive despite the clean up mechanisms in place? Where are the laboratory reports on the Ph, sulfates, chlorides in the coolants? Why wasn't corrosion potential measured by Langlier?

Request for Action:

In the short term an 8000% overoptimistic estimate results in an unexpected risk to the health and safety of the public, increases operating costs, reduces availability, and puts the probabilistic risk assessment in doubt. This overoptimistic estimate puts all NPPs in the category of endangering the health and safety of the public. The design of NPPs rests on engineering estimates. The engineering design at IP2 rests on an engineering assessment that is 8000% overoptimistic, which reflects a tube failure rate of 80 times more than the engineering assessment of one tube failure in the lifetime of IP2.

I request that the NRC cease all operations of all nuclear power plants using steam generator tubing until all the above questions are answered for all NPPs involved.

Respectfully submitted,