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Dissent About Nuclear Safety

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Description

Today Alison finds herself in a difficult situation. PNSRC is meeting to decide what to do about a heat exchanger problem. Alison is a single voice in a company meeting held to finalize an important decision. Should she speak up?

Abstract

This case is one of thirty-two cases which address a wide range of ethical issues that can arise in engineering practice provided by the Center For the Study of Ethics in Society, Western Michigan University.

Body

I

Alison Turner is a department manager at a large commercial nuclear generating plant. She is also a member of the Plant Nuclear Safety Review Committee (PNSRC). The committee's responsibilities include reviewing and approving design changes, procedural changes, and submittals to the Nuclear Regulatory Commission (NRC).

Today Alison finds herself in a difficult situation. PNSRC is meeting to decide what to do about a heat exchanger problem. Routine testing on the previous morning revealed degraded cooling water flow and high differential pressure in one of the containment spray heat exchangers of one of the two generating units. This unit has just returned to service after two months of repairs. Test results on the second heat exchanger were similar.

Although the other generating unit has been in continuous service, testing reveals that its two heat exchangers are operating at less than full capacity. The most likely cause of the problem is sand blockage on the lake water side of the four heat exchangers. After extensive analysis by engineers in the Mechanical Engineering and Nuclear Safety & Licensing Departments, it has been concluded that the cooling water flow falls slightly below the minimum requirement set by the technical specifications under which the plant is licensed. Nevertheless, based on Mechanical Engineering's analysis, Nuclear Safety & Licensing has prepared a Justification for Continued Operation (JCO) for submission to NRC. PNSRC is now meeting to decide whether to approve the JCO and forward it to NRC.

As Alison reviews the JCO she is uncomfortable with one assumption made in the analysis. The analysis assumes that the heat exchangers still have 95% of their original heat transfer capability. It is concluded that this would be satisfactory. However, in anticipating possible accidents, Single Failure Criteria require the plant to assume the loss of one heat exchanger. Alison wonders if, under those conditions, the heat transfer problem would be manageable. The JCO does not discuss what might happen under that contingency. Seven members of PNSRC are present, enough for a quorum. Alison is the least senior member present. From the outset of the meeting, committee chair Rich Robinson has made it clear that it is important to act quickly, since any shutdown will cost the company, and ultimately the rate payers, a lot of money in additional fuel costs. "Repairs," he says, "might take a couple of weeks. If we don't approve this, we may be facing a multi-million dollar proposition. Fortunately, the JCO seems fine. What do you think?" Brad Louks and Joe Carpello immediately concur. Rich then says, "Well, if no one sees any problems here, let's go with it." There is a moment of silence. Should Alison express her reservations?

Alison Turner expresses her reservations. Brad Louks replies, "We're talking about containment heat exchangers. It's an Accident Mitigation System, and it's never had to be used here--or at any other commercial nuclear plant that we know of, for that matter. In fact, lots of plants don't even have containment spray systems." "Right," adds Joe Carpello, "we're ahead of the game on this one. I don't see any problem here. Nothing's totally risk free, but we've always been leaders in safety. Let's not get carried away with 'possibilities'." "I don't think Alison meant to have us get carried away with anything," Mark Reynolds interjects. "She's just wondering if the JCO should address the question of how things would look if we lost one of the heat exchangers. How much time would it take the Nuclear Safety and Licensing Department to make a calculation for us--another 3 hours? It's only 1:30pm, you know." "What's the point, Mark?" asks Joe. "Our track record is excellent, and the system is optional. It's not as though we're taking any extraordinary risks."

Nothing further is said, and Rich Robinson calls for the vote. Though not a committee requirement, PNSRC has always acted unanimously. It often rejects, sometimes approves, but always unanimously. As the call goes around the room, each member approves. The last member called on to vote is Alison. She still has serious reservations about approving the JCO without the Nuclear Safety and Licensing Department making further calculations. How should she vote?



Suppose Alison casts a negative vote and subsequent calculations show that her worries were unfounded -- in the event of an accident, a single heat exchanger would be adequate to manage any likely heat transfer problems. Would it follow that it was wrong for her to cast a dissenting vote? [Recall that a single dissenting vote would not defeat approval. It would only set a precedent of proceeding without unanimity.]

Notes

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