

## Conference Call – Containment Liner Corrosion

Friday, July 24, 2009 11:30pm

### Participants

#### FENOC

Cliff Custer

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#### NRC

Maurice Heath

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### Discussion

NRC (MH) The purpose of this phone call is to clarify the language for the proposed letter regarding containment liner sampling and timing.

FENOC (CC) This will be a clarification letter to our RAI response letter L-09-139. The inspection plan is identified in the SER on page 3-110. We intend to do random sampling and have another population that we shall look at separately on those areas most likely to experience similar degradation. Our suggested wording is as follows:

In addition to the inspection plan identified in the SER on page 3-110, the accessible containment liner surface will be divided into sectors. Each sector will contain a cross section of containment. A random sample of 75 locations will then be selected among the identified sectors. Exam locations will then be chosen within the randomly selected sectors.

Each of the exam locations will cover a 1 foot by 1 foot square area. UT thicknesses examination of 100% of the area will be performed recording the lowest thickness and documenting any degradation patterns.

These random inspections will commence in the 2010 refueling outage at unit #1 and the 2011 refueling outage at unit #2. The additional informed sampling of Unit 1 will commence on-line, within the bounds of the current fuel cycle. All inspections will completed by December 31, 2012.

We need to be clear. The random sampling will be 75 locations. The smart sampling number of samples has not yet been identified.

Any degradation discovered will be addressed in the corrective action process.

NRC (MH) Please go over the sector selection process again.

FENOC (CC) Regarding the random sampling selection – the accessible areas of the liner (as defined as accessible in the ASME code) will be divided into sectors from top center point of containment by a certain number of degrees separations, and then further divided by floor elevation. We shall then take a random selection of which sectors to evaluate. Then, within that sector, we shall select an exam location.

NRC (AH) How is the final selection made?

FENOC (CC) We have not defined the number of sectors, but hypothetically, if you divided the containment into 18 vertical sections, and then divided by various elevations you would have close to five additional divisions so you would have 90 sectors. Out of those 90 sectors we would pick 75 sectors that were randomly generated.

NRC (AH) You are adding constraints to the random selection. That is not a true random sample. What you have done is split it up into individual populations and forced your random sample to select one location in each of the 75 sectors. A true random sampling could result in all 75 samples being in one sector.

FENOC (MM) There could be multiple hits in a given sector.

- NRC (AH) The concern is that there are no artificial constraints on the likelihood of any one location being selected. If there are any constraints it would not be a random sample. Even if you do the sectors, you have to ensure that each sector had the same number of 1x1 sections in it. Otherwise you have biased the selection, unless you weight your sector "value." If one sector has 2 square feet and another sector has 5,000 square feet, they are not equivalent.
- FENOC (CC) Agreed, we will weight surface areas in each sector so that the surface areas are equivalent.
- NRC (AH) So, in reality, statistically, you will be able to demonstrate that each square foot has an equally likely chance of being selected (of the accessible parts of the containment).
- FENOC (CC) We believe this method will do that.
- NRC (AH) We are confused by the selection process. Why divide it into sectors? Just do 75 random locations.
- FENOC (MM) From a practical perspective, we are concerned with how to implement. We sought help from several statisticians. We determined that we would divide the containment into sectors, do a random sample of those sectors (to get the confidence level we desired), and then select a 1x1 area in that sector so that we could actually implement what we commit to.
- NRC (AH) Your wording seems to be very precise. You are going to randomly select a sector, and then select one square foot location in that sector. That final selection has to be random within the sector too.
- FENOC (MM) Have to be able to implement this. There are no details yet.
- NRC (AH) Could you describe your intent? You will make a random selection of sector, but how will you pick the one square foot locations?
- FENOC (MM) We have not determined that. We have to be pragmatic and determine a practical way that can be implemented. If we divide the containment into 72,000 locations and draw the numbers out of a hat, how would we find those locations? Laser templating? We don't as yet know.
- NRC (AH) You have to determine that. You can't cherry pick. If the inspector is only five feet tall you can't limit the sample to areas that are easily reached. That biases the sample.
- FENOC (MM) But the sector selection is random, and we include the dome.
- NRC (AH) Final selection must be random.
- NRC (KM) If, for example, you have 100,000 square feet in the containment, you could divide the containment into sectors to facilitate finding the randomly selected locations, but a random number generator should be used to determine the locations.
- NRC (BR) Once you identify sectors, is there some language you could use (in the letter) to describe how the one square foot location determinations were also random? Even with not as yet knowing the process.
- FENOC (MM) We need to discuss this with Pete Sena. We can't commit to something that we don't know how to implement. We discussed this with Westinghouse and Morgan & Lewis statisticians and they thought this (our) solution was definitely workable.
- FENOC (CC) We thought our approach was reasonable and would provide the level of assurance.
- NRC (AH) If I were to write an RAI, the question would be how are you going to make the final location selection so that it is random.
- NRC (BR) How would you pick the one square foot locations?
- FENOC (CC) We would tell the NDE inspector to pick a location(s) within the sector.
- NRC (AH) That is not random.



- NRC (KM) A random selection depends on the population size. You must count each one square foot location. Then use a random number generator to pick the locations.
- FENOC (MM) The containment is not divided into perfect one square foot areas. We have to be pragmatic about how we are going to implement this.
- NRC (BR) Being practical, we are ok with sector selection. Words, however, are needed... once a sector is selected, and a hit is generated within that sector, the sector will be divided up into a one square foot grid and you will randomly select one of those square foot locations. The final selection must be another random process. Does that sound onerous?
- FENOC (CC) Must consider the practicality of containment. There are numerous penetrations, as well as raceways, appurtenances, etc. that have limited stand-off and would prohibit you from doing a UT examination in that area. These are areas that are assessable for visual inspection, but if you need to use a UT probe you need a continuous section to get the one square foot area. If a location is randomly selected and there is interference there I cannot exam it, and you are saying if I don't exam it I have a bias.
- NRC (BR) That is a good point. That does make a difference now that we have gotten down to the practicality. But we have to maximize randomness. Based on what I said above about the wording in the letter, what do you suggest as possible wording to describe how you would do this and maximize the randomness (in terms of gridding off the sector)? Would you get as near to the point as possible?
- FENOC (CC) That makes sense to me.
- FENOC (MM) Let's say we have five hits in a sector. We would do representative cut of that sector.
- NRC (BR) We need other words. How about random sample of the one square foot grid, as close as practical given any interference.
- FENOC (MM) I'm not sure how we would implement this. We need to discuss with Pete Sena.
- FENOC (CC) It appears we have made progress but we are not "there" yet.
- NRC (MH) As long as you understand what we are asking for in this last little piece. We are happy with and understand the timing. We understand that this is going to be a clarification letter. Call me back after you discuss it. I'll brief my management.
- FENOC (CC) As we understand it, the issue is within the sector, you are looking for a definition of how we are going to identify the randomly selected one square foot locations, understanding the practicality, the impact of appurtenances and interferences with that random selection.
- NRC (BR) Let me suggest (part of the) needed wording for the letter.. "this letter is to 'clarify and expand' information addressing the June 4<sup>th</sup> conference call, as discussed in the SER (page 3-110) and also the information contained in our RAI response letter L-09-139." This wording would negate the need to change the SER.
- FENOC (CC) We understand.

End of Call

Action items – None