

Repair/Replacement Activities Utilizing IWA-4340

Background: 10CFR50.55a(b)(2)(xxv) prohibits licensees from using IWA-4340, "Mitigation of Defects by Modification," for those programs using the ASME Code, Section XI, 2001 Edition through the 2004 Edition. The following questions are for those licensees using the 2001 Edition through the 2004 Edition.

Question 1: What repair methods are your plants using to address defects caused by general or pitting corrosion in buried piping?

Question 2: If the defective area is physically removed from the buried piping, do you consider the installation of a branch connection (encapsulating the affected area) to be a repair method that utilizes IWA-4340?

Mike Blew:

Sorry, I am on the 95 w/ 96 addenda until 2/2012 so the 10CFR change does not impact us.

George Fechter:

Question 1 Response: To date, Plant Hatch has not had to repair any buried piping within the Section XI Boundary, regardless of the degradation mechanism. We have performed limited G-scan of some PSW piping within the Section XI Boundary, but results have been pretty good with only minimal wall thickness losses noted. But, I would assume that if we performed any kind of testing which indicated below min wall required thickness in buried piping, we would excavate and replace the piping. I realize that there's a code case for utilization of HDPE piping, but not sure how SNC would approach that at this time or if that would be considered as an alternative.

Question 2 Response: In my opinion, if you remove the defective area, you would be outside the scope of IWA-4340. Therefore, you could perform such a replacement, and it would be permissible. The addition of the branch would be a modification, and acceptable materials would have to be utilized with applicable welding requirements. Basically, I would see the size of the resultant hole in the piping after removal of the defect being approximately the same size as the branch being one factor that would facilitate its acceptance. If you had an odd shaped 1" hole with a 4" branch connection, then that could potentially be viewed as being within the confines of IWA-4340. Not sure how it would go, but this would make an interesting inquiry. I'm assuming NRC representation on the committee may have a different opinion than I have.

Ed Gerlach:

For question 1, we have not experienced any through wall defects (that we know of) in buried Class 3 piping.

For question 2, we have not used a branch connection installation to correct through wall leakage, but we always consider it. We are working to the 1998 Edition with 2000 addenda, so we are able to use IWA-4340 (and we have not used those provisions yet). In the cases where we had Class 3 leaks, the condition of the pipe away from the leak was such that we decided to replace the pipe section. And to date, we have been able to isolate the leaking portion of the system to affect a standard IWA-4000 repair/replacement (just lucky I guess). If we ran into a case where a shutdown was required, or extensive system out of service time was required, I think we would not hesitate to use the branch connection method. Regarding the question on IWA-4340, it is my personal opinion (standard caveat - I can't speak for the ASME committee) that the repair/replacement activity described in Question 2 does not fall under IWA-4340. That is because you are removing the defective area. If you were to install the branch connection over a leaking pinhole, without drilling the branch connection hole in the run pipe, that would be a repair under IWA-4340.

Richard Gimple:

We use the 2000 Addenda of Section XI for our ISI and R/R Programs and the 2003 Addenda for our Containment ISI and Containment R/R Programs. So the questions are not applicable to our plant programs. However, I have entered our input and my opinion on these questions:

Question 1 Response: We have not repaired corrosion in buried piping. We are considering use of Case N-589 for cured-in-place non-metallic pipe but will need a relief request. Welded repair from the ID is the only option available that does not need a relief request.

Question 2 Response: Addition of a branch connection to encapsulate a degraded area would be a modification covered by IWA-4340.

Alex McNeil:

The latest code we operate with at this time is the 2000 addenda. As such, we have no experience. We are updating Millstone and North Anna to the 2004 edition within four months and would appreciate anything you do come up with. IWA-4340 is in the 2000 addenda, however I am not aware of us using it. Our service water repairs would most likely be base metal and weld repairs with and without welding. Using a branch over a defect area

would most likely fall under a modification, and we would eliminate the defect prior to applying the branch, drilling it out (bigger hole).

Gary Park:

We perform a walkdown of the yard above the buried piping for our ISI Program. We have not yet found any leaks from the buried piping.

Glenn Perkins:

Question 1 Response: Had no experience at CEG with buried piping issues, YET! If one was found, NRC denial of use of IWA-4340 limits the utility to performing a code repair, or in case of Class 3 – it could be encapsulated (Fermanite, for example) until the required repair could be done. Look at criteria for Temp Code repairs that provides guidance for Class 3.

Question 2 Response: No, as long as the defect is removed. Drill/cut it out and install a branch connection and weld a cap on it, etc. That process has been used on Class 3 SW Piping at NMP previously and is considered a Code Repair (outside of IWA – 4340).

Rick Swayne:

I don't think that there are any standard repair methods. Methods that have been used include full or partial penetration repair welds, branch connections, weld overlays, and internal linings. AmerenUE just replaced all of their service water piping at Callaway with PE pipe. Duke is planning to do the same (at Oconee, I believe).

Branch connections meeting the Construction Code are permitted without using IWA-4340. See Interpretation XI-1-92-31(written and submitted by yours truly).

By the way, pitting corrosion is not necessarily a defect, as defined by Section XI. A defect is constituted by a failure to comply with an acceptance criteria specified by Section XI. See IWA-9000.

Ken Thomas:

Question 1 Response: We currently plan to use repair (weld build up), or replacement.

Question 2 Response: Installation of a new branch connection or cap would be a modification under our program. However, if the defect were

removed, it is not clear if IWA-4340 would still apply. Fortunately, this has not come up here.

Russell Turner:

My copy of Section XI had a yellow sticky saying that use of that subsubarticle was not allowed, so went back to 2000 addenda. Surprise, it had the exact same wording. The 1999 addenda did not have this subsubarticle. So I guess if you are committed to 2000 addenda, it can be used. Not a fair thing.

This is a complicated issue. See below for my thoughts. Hope I got it right.

Question 1 Response: I assume that Class 3 low or moderate energy carbon steel piping is being discussed (SW or CCW). Class 1 and 2 are pretty much automatic Code repairs. If there is a leak on a Class 3 system, we start with RIS 2005-20, which replaces GL 91-18. This allows us to use N-513-2 to evaluate the area of the leak. If the leak is acceptable, then we restore the pipe using Code Case N-661. Note there are limitations on N-661. We may have to perform a temporary non-code repair in accordance with GL 90-05 if a Code repair is not feasible. A relief request is required if using 90-05. There is a lot more to this, so read the RIS. My plant recently got in trouble as we did not follow the RIS, but rather 91-18 and a poorly worded procedure. I worked through this for the plant after the fact, but had to do some research as I had no experience on this particular situation (proven leaker at fillet weld but not dripping anymore, leave as-is till the next outage).

If it is not leaking, we perform a stress evaluation. If it passes, then it would be placed on the list for eventual repair or monitoring. If not, then we perform a Code repair. Depending on the code, you can perform an external or internal weld overlay. I was told by our FAC manager that our Section III plant did a Code internal overlay on a Class 2 elbow. Would have to look to see how Section III allows it. Section XI discusses Defect Removal Requirements. See IWA-4422.2.2, Defect Removal Followed by Welding or Brazing, so there must be something in Section III allowing it. You may also use 90-05 to justify doing no repairs, and that would be good until the next outage.

Question 2 Response: If the defective area is removed from the pipe, there is no longer a flaw to be evaluated or repaired, rather the area of the flaw is being replaced. Our plant uses window patches which are full strength pipe wall replacements butt welded flush with the pipe surface. It is then a Code repair. The pipe must be restored in accordance with the construction code and owner's requirements. A design change to the piping that incorporates a branch connection is allowed as long as it

follows the construction code. Of course, Owner's requirements, reconciliation, and all that other stuff applies. This would not be invoking IWA-4340, but is a design change with new owner's requirements. Nothing says we cannot modify the plant except the costs involved.

Rick Wehry:

We are working to the 1998 Edition through 2000 Addenda at Susquehanna.

Joseph Weicks (Steve Brown)

I am not aware of any specific instances where we performed a repair to buried piping. While I vaguely recall one case, we were able to perform the repair and comply with all applicable Section XI code rules. This repair may have involved digging up the buried pipe.

Regarding IWA-4340 and mitigation of defects by modification, the NRC is opposed to giving generic authorization to this provision because they are concerned about repairs that involve encapsulation or isolation of a defect or defective area by a plant modification because the Owner's may either lose their ability to appropriately monitor the growth of the defect or will not perform inadequate monitoring. That said, they will approve repairs that mitigate defects by modification on a case-by-case basis via relief requests such as weld overlays per N-740 and half-nozzle repairs. Since the NRC has conditionally endorsed Code Case N-504-3 in RG 1.147, I'm hoping that they will eventually endorse N-740-2 or some future revision.

Ray West:

To add to Alex's comments above, the NRC provided an extensive discussion of why they did not approve the use of IWA-4340 in the Final Rule for 10 CFR 50.55a in the Federal Register/Vol. 69, No.190/Friday, October 1, 2004/Rules and Regulations. There were so many different ways that the requirements in IWA-4340 could be used that the NRC was not comfortable to say that Licensees could have such a broad way to address defects. It was obvious that the NRC wanted control on how a Licensees would use these requirements. Many relief requests have been approved that have allowed defects to remain in place with modifications.

This has included half nozzle repairs on PWR instrument nozzles, MNSA Clamps, encapsulations, and even weld overlays that were classified as a modification in some instances in the past, but the bottom line is that the regulator will still not let IWA-4340 be used without details and controls that do not exist in these requirements. Now with that said and what Alex sent you above I still think I can provide the answers to your questions

from my own experience even though none of our Dominion plants have been working with the 2001 Edition through the 2004 Edition at this time.

Question 1 Response: I would say by replacement in the future and hopefully with polyethylene pipe, but we have not had to deal with this issue as of yet.

Question 2 Response: No

Kevin Whitney:

We are still using the 1995 Edition through 1996 Addenda.

Garry Young:

Response from Bob Dolansky for IP2:

IPEC does not have any experience with mitigation of defects caused by general or pitting corrosion in buried ASME Code piping.

For the future, procedures for mitigation of defects caused by general or pitting corrosion in buried ASME Code piping are being developed by the Entergy fleet. Mitigation of ASME piping will be performed in accordance with ASME requirements.

Response from Arthur Giverson for JAF:

No code repairs have been conducted on buried ASME Code piping at JAF.