

3895

Pages 3895-4125

STATE OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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In the Matter of:

Entergy Nuclear Indian Point 2, LLC,  
and Entergy Nuclear Indian Point 3, LLC

DEC No.:  
3-5522-00011/00004  
SPDES No.:  
NY-0004472

For a State Pollution Discharge  
Elimination System Permit Renewal and Modification

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Entergy Nuclear Indian Point 2, LLC,  
Entergy Nuclear Indian Point 3, LLC, and  
Entergy Nuclear Operations, Inc.

DEC App. Nos.  
3-5522-00011/00030 (IP2)  
3-5522-00105/00031

Joint Application for CWA § 401 Water Quality  
Certification

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ARBITRATION BEFORE:

Daniel P. O'Connell, ALJ  
Maria E. Villa, ALJ

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
625 Broadway, 1st Floor  
Albany, New York 12233

January 23, 2012, 8:21 a.m.

----- Reporter: Alan H. Brock, RDR, CRR -----  
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1     examine and determine whether there's an area that  
2     would be prone to leakage, to your knowledge, would  
3     that be able to be prevented?

4             JUDGE VILLA:  Sorry, I didn't  
5     understand.

6             MS. BRANCATO:  Sorry.  I can rephrase.

7             Q.  You talked about water chemistry.  To your  
8     knowledge, are physical or visual inspections of the  
9     uninspected portion of the pool liner possible, to  
10    your knowledge?

11            A.  I can't say they're impossible.  I know  
12    they haven't been done yet with the technology that  
13    currently exists.

14            Q.  Thank you.  I'd like to ask a few questions  
15    about the Unit 1 spent-fuel pool, and if I could  
16    turn your attention to Entergy Exhibit 33, the GZA  
17    site investigation report.

18            A.  I have that.

19            Q.  In your direct testimony -- I'll take one  
20    step back -- on Page 9, Lines 11 and 12, you  
21    testified that the Indian Point spent-fuel pools are  
22    no longer an active source of radionuclides to the  
23    subsurface.

1           A.    Page 9, what lines again?

2           Q.    Lines 11 through 12.

3           A.    Yes.

4           Q.    In the GZA report, on Page 113 --

5           A.    Of Page 113.

6           Q.    Now, in the first full paragraph -- the  
7 first full paragraph indicates that, quote, "From a  
8 contaminant plume perspective, these historic  
9 releases still represent an ongoing legacy source of  
10 strontium in the groundwater to the south side of  
11 Unit 1. This is because strontium partitions from  
12 the water phase and adsorbs to solid materials,  
13 including subsurface soil and bedrock. The  
14 strontium previously adsorbed to these subsurface  
15 materials then partitions back to and continues to  
16 contaminate the groundwater over time, even after  
17 the storm drain releases have been terminated," end  
18 quote.

19                    To your knowledge, when this paragraph  
20 refers to "these historic releases," are those the  
21 releases from the Unit 1 spent-fuel pool?

22           A.    Yes.

23           Q.    I'd just like to get a better understanding

1 of this concept of partitioning. Based on this  
2 statement in the GZA report, would it be accurate to  
3 say that strontium that's leaked from the Unit 1  
4 spent-fuel pool that's been retained in the  
5 subsurface would continue to be released to the  
6 groundwater in the future?

7 A. Yes.

8 Q. And to your knowledge, is this a phenomenon  
9 that would continue during the proposed period of  
10 extended operation, meaning for a 20-year period?

11 A. We would expect partitioning would, you  
12 know, continue at least into the renewal period.

13 Q. And does GZA or anyone else, to your  
14 knowledge, measure how much contamination is  
15 partitioned into a solid form at any given time?

16 A. We have not done that.

17 Q. And like wise or similarly, do you monitor  
18 when the contamination partitions into liquid and  
19 releases to the groundwater?

20 A. We monitor the groundwater and the  
21 radionuclide activities in the groundwater, and that  
22 gives us an indication that that may be going on.

23 Q. At any given time are you measuring how

1 much contamination is partitioning to the  
2 groundwater?

3 A. We are measuring how much contamination is  
4 in the groundwater.

5 Q. Partitioning, as I understand it from this  
6 report, relates to the radionuclides collecting on  
7 the surface of structures; is that accurate? If  
8 not, can you please explain your understanding of  
9 what that --

10 A. Solid surfaces in general, they can be, you  
11 know, natural or anthropogenic.

12 Q. And can contamination migrate into  
13 subsurface structures, to your knowledge?

14 MR. TRACH: I'm going to object. Can  
15 contamination migrate into subsurface structures?  
16 I'm not sure I understand.

17 JUDGE VILLA: I think we need to break  
18 it down a little bit. I don't know what you mean by  
19 "subsurface structures" and "contamination." If  
20 you're following the same line, I've lost the trail.

21 MS. BRANCATO: Okay.

22 Q. I think you just indicated that  
23 radionuclides can partition onto anthropogenic

1 and/or geological surfaces in the ground; is that  
2 correct?

3 A. That's correct.

4 Q. So what would be your understanding of  
5 anthropogenic sources?

6 A. No, they'd be anthropogenic structures.

7 Q. Anthropogenic substructures. Could you  
8 describe what those could be?

9 A. Concrete foundations.

10 Q. Would it include pipes?

11 A. Yes, it would adsorb to the surface of  
12 pipes, depending on the type of pipe.

13 Q. What I was trying to gain an understanding  
14 of a few moments ago was whether particular  
15 radionuclides could migrate through the subsurface  
16 structures, like pipes, under the ground. Are those  
17 radionuclides, to your knowledge, capable of moving  
18 into -- inside of a pipe, for example?

19 A. If you have a solid pipe, I don't believe  
20 the radionuclide is going to move through the wall  
21 of that pipe.

22 Q. Thank you. This paragraph I read earlier  
23 from Page 113 of the GZA report talks about

1 strontium. Does partitioning occur with other  
2 radionuclides that have been released from the Unit  
3 1 spent-fuel pool?

4 A. Yes.

5 Q. And which radionuclides?

6 A. Most radionuclides will partition. And the  
7 one that I know has been released to some extent is  
8 cesium, which does partition.

9 Q. Thank you. And does nickel 63 partition,  
10 to your knowledge?

11 A. I believe it does, but I don't know  
12 specifically.

13 Q. On Page 23 of your rebuttal testimony --

14 A. One second.

15 I have it.

16 Q. On this page you discuss the north curtain  
17 drain sump and the sphere foundation drain sumps at  
18 Indian Point. And on Lines 14 through 17 you  
19 indicate that these components still capture  
20 residual contamination. Is that accurate?

21 A. Let me read it.

22 Q. Sure.

23 A. Yes, these drains are still capturing

1 residual radionuclides.

2 Q. So does that mean that the contamination is  
3 adsorbing to the structures?

4 A. No. I mean, it can adsorb to the  
5 structure, but --

6 I think you need to rephrase the  
7 question.

8 Q. Sure. I'm trying to get at whether  
9 partitioning applies to these structures. Does the  
10 contamination partition to or from the north curtain  
11 drain or the sphere foundation drain sump?

12 A. If there are radionuclides in the water,  
13 they can partition to the outside or inside of the  
14 pipe, depending on where that water ends up.

15 Q. And so will residual contamination that's  
16 captured in the north curtain drain and the sphere  
17 foundation drain sump continue to be released into  
18 the environment in the future?

19 A. Water that enters the drains containing  
20 radionuclides will be captured by those drains; and  
21 depending on which drain and which radionuclide,  
22 some of it will be released through a monitored  
23 pathway. Other portions of it are taken out through



1 treatment and disposed of -- I guess I don't know  
2 exactly where it's disposed of, but it's off-site.

3 Q. Would any of that ever have the opportunity  
4 to enter back into the groundwater once it's in the  
5 drain or the sump?

6 A. Once it's in the drain or the sump, it most  
7 likely goes through process, and then it's either  
8 disposed off-site, depending on the process, or it's  
9 released into the discharge canal. From that point  
10 it's not likely to go into the groundwater.

11 Q. Would contamination that you indicated  
12 could partition and adsorb to those structures,  
13 could those radionuclides go back into the  
14 groundwater?

15 A. If it's radionuclides that are partitioning  
16 to the inside of the drain lines, then if it  
17 unpartitions -- i.e., comes back off -- it would  
18 then move into the water in the drain, and then from  
19 there it should move to process and not go to the  
20 groundwater.

21 Q. Thank you. If you could turn to Page 74 of  
22 the GZA report, Exhibit 33.

23 A. I have 74.

1 in the groundwater?

2 A. It reduced it during that time period, yes.

3 Q. Was this well pump test -- to your  
4 knowledge, this was designed to determine the  
5 feasibility of extraction or for some other purpose?

6 A. To determine the feasibility and gather  
7 other parameters so that we could better evaluate  
8 it.

9 Q. And would you agree that as of the time of  
10 the status report in 2006, based on this status  
11 report, that at this time extraction had been  
12 determined to be feasible?

13 JUDGE VILLA: I'm sorry, when you say  
14 "at this time," do you mean at the time that  
15 exhibit --

16 MS. BRANCATO: At the time of the status  
17 report, which was December 2006.

18 A. It's feasible, but it has pros and cons.

19 Q. I'm just trying to get a sense of when GZA  
20 determined that it could be done. Would you agree  
21 that it was around this time frame?

22 A. At this point -- by this point in time, we  
23 would be able to say that extraction of some type is

1 feasible.

2 Q. Thank you. And would extraction of the  
3 radiological contamination at Indian Point, would  
4 that result in less contamination existing in the  
5 groundwater?

6 A. Yes.

7 Q. And would extraction of the radiological  
8 contamination result in less contamination going  
9 into the Hudson River?

10 A. Not necessarily.

11 Q. Could extraction prevent contamination from  
12 reaching the river?

13 A. It could prevent it from reaching the river  
14 through the groundwater pathway.

15 Q. You testify on Page 38 of the rebuttal,  
16 Lines 8 to 9, that MNA is a correct strategy.

17 MR. TRACH: What page?

18 MS. BRANCATO: Page 38 of the rebuttal.

19 A. Page 38?

20 Q. Lines 8 to 9. And here you testify that  
21 MNA is the correct strategy because active and  
22 identified sources of groundwater contamination have  
23 been eliminated or controlled.

1 rapid or not. Obviously, some things are much more  
2 difficult and take longer, and, you know....

3 Q. Thank you. I'd like to turn to a few  
4 questions about extraction at Indian Point.

5 A. Which document are we going to?

6 Q. I think right now it's to your testimony,  
7 on Page 41 of your rebuttal testimony.

8 A. Okay, I have it.

9 Q. As we discussed earlier, you would agree  
10 that pump tests were performed around the time  
11 period of 2006 to determine whether extraction would  
12 be feasible; is that correct?

13 A. A pump test, yes.

14 Q. Were there not tiered pump tests that  
15 occurred?

16 A. There were multiple phases to the single  
17 overall pump test.

18 Q. And you may have already testified to this,  
19 and if you did, you don't have to answer. But you  
20 agree that extraction is feasible at Indian Point?

21 A. Some level of extraction in certain  
22 locations is feasible.

23 Q. To your knowledge, was there a particular

1 reason why extraction was not chosen as the remedial  
2 technology to apply to the site?

3 A. There are lots of reasons. We looked at  
4 multiple, you know, potential remedial technologies,  
5 and we balanced, you know, the advantages of the  
6 technology against the disadvantages. And  
7 effectively we did that in this case, and we then,  
8 you know -- we presented the advantages and  
9 disadvantages as we saw them from a geohydrologic  
10 standpoint. We presented that to Entergy as well as  
11 NRC, DEC. And then those parties came to the  
12 conclusion of what was the appropriate remedial  
13 response.

14 Q. But there was no technical reason why  
15 extraction could not have been implemented at Indian  
16 Point?

17 A. It could have been implemented in that  
18 particular well; but in fact, there were some  
19 significant disadvantages, like it would move  
20 strontium from Unit 1 to Unit 2, which we did not  
21 think was something that we wanted to do.

22 Q. And in your rebuttal testimony you indicate  
23 that a certain number of groundwater extraction

1 wells could be installed. Would those be at  
2 different locations to account for that potential  
3 issue that you just identified about commingling?

4 A. I'm not sure we specified in here how many  
5 wells. But there are other -- in here we looked at  
6 different places where you could put in wells, wells  
7 could be put in. And again, there would be a set of  
8 advantages and disadvantages that may be different  
9 depending on where these wells were put in.

10 So we did not have a formal proposal  
11 here. We were just looking at is it feasible to put  
12 in wells and, you know, what are the pros and cons  
13 of those. You know, we did not get as far, you  
14 know, in this location. And here we're talking  
15 actually farther downgradient. So we didn't get as  
16 far in that analysis. But wells could be put in.

17 Q. And you indicated there were concerns about  
18 drawing the contamination plumes together. Did the  
19 plumes as they exist now commingle anyway?

20 A. The plumes commingle in a specific area  
21 down near the river, but the previous questions were  
22 with respect to the pumping test that we ran, which  
23 was farther up, and there the plumes are not

1 commingled.

2 Q. If the plumes toward the source of the  
3 contamination did commingle, how does that affect  
4 how extraction could be conducted? Does it make it  
5 more dangerous? Are there limitations? I'm just  
6 trying to understand what the concern was.

7 A. The major concern was you're going to move  
8 strontium to a place where it doesn't currently  
9 exist, and that means it's going to partition to  
10 those natural materials, and now you have it  
11 someplace where it otherwise wouldn't exist. And  
12 that's certainly not one of the things you want to  
13 do.

14 Q. But would you be withdrawing it from the  
15 environment at the same time?

16 A. You would withdraw some of it, but other  
17 parts of it, large parts, would partition to the  
18 environment. You have the solid materials where it  
19 wasn't before.

20 Q. And would you be drawing it away from areas  
21 where it was and now it would not exist if you --

22 A. It's unlikely that you would be able to  
23 move it from one place and then put it here. What

1 would happen is, you would still have it in the  
2 original place, Unit 1, and you would pull it toward  
3 Unit 2, and then you would smear strontium through  
4 partitioning on all the geologic materials between  
5 Unit 1 and Unit 2. And now you have a bigger area  
6 that's contaminated with strontium adsorbed to the  
7 solid materials -- which, again, is a disadvantage.

8 Q. And if and when a full remediation of the  
9 Indian Point site ever occurs at the time of  
10 decommissioning the plant, if the strontium was  
11 drawn into different locations, as you've indicated,  
12 does that affect the way the cleanup is conducted?  
13 I'm just trying to understand the disadvantages of  
14 drawing the contamination such that you could  
15 extract it, when, as you've indicated, the  
16 groundwater is not used for any purpose anyway.

17 MR. TRACH: I'm going to object to  
18 questions about what is going to happen at  
19 decommissioning of the site.

20 JUDGE VILLA: What's the relevance of  
21 that, Ms. Brancato?

22 MS. BRANCATO: I'm just trying to  
23 understand the implications of employing an



1 extraction well where the pilot test took place, to  
2 get an understanding of how the strontium exists at  
3 the site and just how -- it just goes to the  
4 efficacy of extraction and feasibility.

5 JUDGE VILLA: Let's move on.

6 Q. And if extraction were to be implemented at  
7 Indian Point, do you have a position on where those  
8 wells would be sited?

9 A. There are lots of different positions. We  
10 have not investigated to come up with the optimal  
11 positions. It depends on what the objectives are.

12 Q. And could extraction wells be sited  
13 directly over the strontium plume such that it  
14 wouldn't have to shift and move and partition to  
15 other subsurface structures?

16 A. That's potential. We'd have to look at it.  
17 But, you know, there may be structures in the way,  
18 et cetera.

19 Q. And would you agree that siting extraction  
20 wells as close to a source of contamination is more  
21 effective than siting wells further away to a  
22 source?

23 MR. TRACH: I'm going to object.

1 Effective at what?

2 MS. BRANCATO: Effective at extracting  
3 contamination.

4 A. I have trouble with the word "effective."  
5 It depends what the objective is. It absolutely may  
6 not be the right place.

7 Q. And to your knowledge, would siting  
8 extraction wells -- do you have a sense of where the  
9 optimal location would be in order to prevent  
10 migration to the Hudson River? Would it be closest  
11 to the source of the contamination or closer to the  
12 river?

13 A. With the specific objective of preventing  
14 radionuclides from getting to the river, it would be  
15 closer to the river.

16 Q. And if extraction wells were sited closer  
17 to the river, that wouldn't draw the contamination  
18 closer to the river?

19 A. In fact, that could be a downside, a  
20 disadvantage.

21 Q. When you say "disadvantage," does that mean  
22 that that location could result in radionuclides  
23 still reaching the river?

1           A.   No, no.  You could put extraction wells in  
2   near the river to stop them from reaching the river;  
3   but that means you will still then potentially pull  
4   radionuclides that are farther upgradient down  
5   towards that area, depending on where the wells  
6   are -- which I think is what your question was.

7           Q.   Thank you.  As we've discussed and as  
8   you've testified to in your written testimony, the  
9   leaks -- the plumes were investigated in 2005; is  
10   that correct?

11          A.   That's when we started the investigation.

12          Q.   And it's now 2012.  Do you have an opinion  
13   about whether, given the fact that seven years have  
14   passed, would that affect the ability at all of  
15   extraction wells to completely prevent migration of  
16   contamination to the Hudson River?

17          A.   No.

18          Q.   And is it your position that extraction  
19   wells could completely prevent the migration of  
20   radionuclides to the Hudson River?

21          A.   Through the groundwater pathway, yes.

22          Q.   And could multiple extraction wells at  
23   different locations be effective at extracting the

1 radioactive elements from the groundwater?

2 A. They could be effective.

3 Q. And how much volume could an extraction  
4 well actually extract?

5 A. It totally depends on the formation it's  
6 in, how the well's designed, how deep it is. It  
7 could be any number -- there are too many variables.

8 Q. On Pages 35 and 36 of your prefiled  
9 rebuttal --

10 A. I have Page 35.

11 Q. And here, on Pages 35 and 36, you testify  
12 about the adequacy of Entergy's aging management  
13 program for buried and underground piping and tanks  
14 for detecting and preventing future leaks at Indian  
15 Point. Both you and Dr. Esselman are attributed to  
16 the testimony that's provided on these pages. I  
17 would just like to understand the extent to which  
18 you informed this particular testimony.

19 A. I think I've already addressed that,  
20 haven't I?

21 Q. I'm trying to get a sense of it in  
22 particular relation to this testimony.

23 A. Basically, Dr. Esselman and I do work

1 don't. So it's an added line of protection.

2 Q. That's all I have. Thank you, Mr.  
3 Barvenik.

4 JUDGE VILLA: Redirect?

5 MR. TRACH: If we could have a brief  
6 moment with the witness.

7 JUDGE VILLA: How about until 10 after.

8 MR. TRACH: Thank you.

9 (Recess taken.)

10 JUDGE VILLA: Let's go back on the  
11 record. Before you start any redirect, Mr. Trach, I  
12 apologize: Ms. Rotini, I always forget, any cross  
13 for this witness?

14 MS. ROTINI: No, Your Honor.

15 JUDGE VILLA: Judge O'Connell, any  
16 questions?

17 JUDGE O'CONNELL: No, thank you.

18 JUDGE VILLA: Mr. Trach.

19 MR. TRACH: Thank you.

20 REDIRECT EXAMINATION

21 BY MR. TRACH:

22 Q. Mr. Barvenik, you were asked some questions  
23 about the north curtain drain associated with Unit

1 1.

2 A. Correct.

3 Q. Can you just describe for the ALJ's what  
4 exactly the north curtain drain is?

5 A. Certainly. If I can maybe use this  
6 exhibit.

7 Q. That's Entergy Exhibit 124?

8 A. It's not on here. Is it 124?

9 Q. Yes.

10 A. Okay. Effectively, this is Unit 1 here.  
11 This is the containment building, pool here, and  
12 then the chemical systems building is here.

13 Q. Can you just -- sorry, we have to keep  
14 indicating here, because we won't be able to see you  
15 point in the transcript.

16 A. I can actually draw a line where the north  
17 curtain drain goes. I can draw it on the figure.  
18 It's around the nuclear service building to the  
19 north and east. Then it runs east along the north  
20 side of the vapor -- or the containment building,  
21 until it gets to the fuel pools. And then it runs  
22 along the north side of the fuel pools proceeding  
23 east, until it gets to the east side of the chemical

1 systems building, and then runs along the east side  
2 of the chemical systems building, proceeding south,  
3 until it gets about to the middle of that building.

4 And then the south curtain drain does  
5 exactly the same thing, except on the other side.

6 JUDGE VILLA: Can you just mark it with  
7 NCD?

8 THE WITNESS: Yes. Done.

9 Q. Thank you.

10 A. So that is the location of the north  
11 curtain drain. And the north curtain drain is  
12 termed a foundation drain. It has corrugated --  
13 perforated pipe with crushed stone around it. It's  
14 laid at the very bottom of the foundation. It's  
15 meant to collect water that comes in from, you know,  
16 outside the foundation. And if water leaks through  
17 the foundation, it can also collect that.

18 And then it basically picks that water  
19 up, transports it to the nuclear service building,  
20 where it then moves inside, proceeding east. And  
21 then it gets into the containment building at that  
22 point by pipe. Then it goes to a treatment system  
23 that is located inside the containment building,

1 where that water is treated. And then from there it  
2 goes to discharge in the discharge canal.

3 JUDGE VILLA: So it's a French drain,  
4 essentially, on the outside?

5 THE WITNESS: I wouldn't use the word  
6 "French drain," but you could use that. It's really  
7 a foundation drain. It's built a little  
8 differently, but effectively does the same thing.  
9 It collects all the water around here at that  
10 elevation or above, and then it directs it towards  
11 treatment and then discharges as a monitored  
12 discharge.

13 JUDGE VILLA: Thanks.

14 MR. SANZA: Your Honor, could we be  
15 furnished with a copy of that?

16 JUDGE VILLA: I'm going to make color  
17 copies for everybody and send them out.

18 MR. SANZA: Thank you.

19 Q. So is it safe to say that the water that's  
20 collected in the north curtain drain and then sent  
21 to processing, that's not water that's discharged to  
22 groundwater?

23 A. No. That water is taken from groundwater



1 and discharged through process to the discharge  
2 canal.

3 Q. A couple of the exhibits that you were  
4 shown earlier, including the exhibit referencing the  
5 levels of tritium found in Storm Drain A 2 from  
6 wash-out, referred to elevated levels of tritium.  
7 When you see reference to an elevated level of  
8 tritium, either in your report or in an Entergy  
9 document, what does that term "elevated levels" mean  
10 to you?

11 A. "Elevated" primarily means levels that are  
12 bigger than we expect, and typically that would then  
13 be bigger than trigger levels that we've set based  
14 on past experience with the site. So that we look  
15 at those trigger levels -- we have a very good  
16 understanding of the site, and when we see a level  
17 above those trigger levels set based on that  
18 understanding, then it causes us to take a look and  
19 see why that is, quote-unquote, "elevated."

20 Q. And there was a lot of discussion about  
21 those elevated levels of tritium in storm drains.  
22 Now, do the storm drains release to groundwater?

23 A. Generally no, the storm drains release to

1 the discharge canal in general.

2 Q. And those are monitored releases?

3 A. And those are monitored releases.

4 Q. You were asked some questions at the  
5 beginning of your testimony about some of the  
6 quality control on the radionuclide testing.

7 A. Yes.

8 Q. Do you recall that?

9 A. Yes, I do.

10 Q. Are there any processes in place that give  
11 you -- other than the QA/QC that GZA does that you  
12 described earlier, that give you confidence in the  
13 accuracy of the testing results?

14 A. Absolutely. The most important one is that  
15 there are split samples taken by both the New York  
16 DEC and the NRC, and those samples are tested in  
17 different labs, and then we compare the results of  
18 the lab that we use versus the lab that DEC uses  
19 versus the lab that NRC uses, and we find that those  
20 levels all match. And that gives us an extremely  
21 high degree of confidence that the levels are  
22 correct.

23 Q. Now, you were asked some questions about

1           Q.    You indicate in addition the water that's  
2 collected in the north curtain drain is sent for  
3 treatment, or goes to be treated?

4           A.    Yes, it does.

5           Q.    So does that mean that strontium is removed  
6 from it?

7           A.    It removes some of the strontium, yeah.

8           Q.    But not all of the strontium?

9           A.    No treatment technologies typically remove  
10 all of the material that you're trying to take out.  
11 There are various levels of efficiency that you can  
12 achieve.

13          Q.    And does the water that's collected in the  
14 north curtain drain contain tritium?

15          A.    It has some tritium -- not very much, but  
16 it has some.

17          Q.    And is it your understanding that tritium  
18 can't be removed from water?

19          A.    It's not typically removed. It's very  
20 difficult.

21          Q.    And you indicated that after treatment, the  
22 water is then discharged to the discharge canal?

23          A.    As a monitored discharge, yes.

1 Q. So the radionuclides that collected and  
2 were not able to be removed through treatment go to  
3 the discharge canal and then to the Hudson River?

5 Q. Thank you. Nothing further. Thank you.

8 JUDGE O'CONNELL: No, thank you.

11                   We need to take up a couple of exhibits.  
12   And also, Mr. Little kindly pointed out there's an  
13   issue --

16 Looking at Page 17 of the direct,  
17 there's a reference to Exhibit 46 that's on Line 22.  
18 Mr. Little pointed out that either the date is wrong  
19 or the correct reference would be to Exhibit 8.  
20 Exhibit 46 is a document that's dated May 9th of  
21 2008. I don't know if you need a minute, Mr. Trach,  
22 to take a look.