



## 1 A P P E A R A N C E S :

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ILLINOIS POLLUTION CONTROL BOARD  
100 West Randolph Street  
Suite 11-500  
Chicago, Illinois 60601  
(312) 814-3900

5 BY: Ms. Amy C. Antonioli, Hearing Officer  
Mr. G. Tanner Girard, Ph.D., Board Member  
6 Mr. Thomas E. Johnson, Board Member  
Mr. Anand Rao, Board Staff  
7 Ms. Alisa Liu, Board Staff

8

SONNENSCHNEIN, NATH & ROSENTHAL, LLP,  
9 8000 Sears Tower  
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(312) 876-2380

11 BY: MR. JEFFREY C. FORT

12 Appeared on behalf of Water Remediation  
Technology, LLC;

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15 ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,  
1021 North Grand Avenue East  
16 P.O. Box 19276  
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17 (217) 782-5544

18 BY: MS. DEBORAH J. WILLIAMS  
MS. STEFANIE N. DIERS

19 Appeared on behalf of the Illinois  
Environmental Protection Agency;

20

21 GARDNER, CARTON & DOUGLAS,  
191 North Wacker Drive  
22 Suite 3700  
Chicago, Illinois 60606-1698  
23 (312) 569-1441

BY: MR. ROY M. HARSCH

24

Appeared on behalf of the City of Joliet.

1 A P P E A R A N C E S :

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ALSO PRESENT:

3

Dr. Theodore G. Adams

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Dr. Brian D. Anderson

Mr. Charles Williams

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Mr. Robert G. Mosher

Mr. Jerry Kuhn

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Mr. Blaine Kinsley

Mr. Jeff Hutton

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Ms. Sarah Adams

Mr. Doug Dobmeyer

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Mr. Dennis L. Duffield

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1                   HEARING OFFICER ANTONIOLLI: Good  
2                   afternoon everybody, welcome to the Thompson  
3                   Center. My name is Amy Antoniolli, and I've  
4                   been appointed hearing officer in this  
5                   Illinois Pollution Control Board rulemaking.  
6                   The Board has captioned this proceeding In  
7                   The Matter Of: Revisions to Radium Water  
8                   Quality Standards: Proposed New Illinois  
9                   Administrative Code 302.307 and Amendments to  
10                  35 Illinois Administrative Code 302.207 and  
11                  304.525 which the Board has docketed as  
12                  R04-21.

13                         In this proceeding the Agency is  
14                         seeking to amend the Board's radium water  
15                         quality standards. The rulemaking was filed  
16                         on January 13th, 2004 by the Illinois  
17                         Environmental Protection Agency. The Board  
18                         accepted the proposal for hearing on  
19                         January 22nd, 2004 and today is the fourth  
20                         hearing. The first hearing took place on  
21                         April 1st, 2004 at the Thompson Center, the  
22                         second hearing took place on May 6th at the  
23                         Board's offices in Springfield, the third  
24                         also took place in Springfield on August

1 25th, and then we're here today.

2 To my right is Member Tom Johnson  
3 and seated to the right of Member Johnson is  
4 Member Tanner Girard and seated -- oh, we  
5 don't have Andrea with us yet. Okay. Also  
6 here from the Board today is -- from the  
7 technical unit is Mr. Anand Rao and this is  
8 Alisa Liu.

9 If you would like to testify  
10 today, I've put a sign-up sheet at the back  
11 of the room. Also at the back of the room  
12 are copies of the service list and a notice  
13 list and the Agency's statement of reasons  
14 for the proposal. Today's proceeding is  
15 governed by the Board's procedural rules; all  
16 information that's relevant and not  
17 repetitious or privileged will be admitted  
18 into the record.

19 At the last hearing we heard  
20 testimony from Water Remediation Technology  
21 Environmental's two witnesses, Mr. Adams and  
22 Mr. Williams, which was followed by questions  
23 by the Agency. Mr. Harsch was in the process  
24 of questioning the WRT witnesses when this

1 hearing was adjourned last time and for this  
2 hearing WRT Environmental has pre-filed  
3 testimony for additional testimony from  
4 Mr. Adams and the testimony for two new  
5 witnesses, Dr. Brian Anderson and Ms. Angela  
6 Tin, for today's hearing.

7 For readability purposes and  
8 efficiency, we thought we'd continue where we  
9 left off with questions, if there's no  
10 objections, by Mr. Harsch.

11 MR. HARSCH: We would prefer if you  
12 would let WRT proceed with their additional  
13 testimony, I think some of those points  
14 they're making clarify prior testimony and  
15 eliminates the need for some questions.

16 HEARING OFFICER ANTONIOLLI: Okay.  
17 And you can consolidate your questioning into  
18 one.

19 MR. HARSCH: We'd be more than happy  
20 to and after -- let them -- I would think it  
21 might make more sense if we let them present  
22 their additional detailed testimony since  
23 they're hard at it and see what questions the  
24 Board might have and what questions the

1 Agency might have and then we'll proceed with  
2 our questioning.

3 HEARING OFFICER ANTONIOLLI: Okay. We  
4 can -- if there's no objections, we can do it  
5 that way, continue with WRT Environmental's  
6 witnesses, summaries of their testimony, and  
7 then go back to questioning by Mr. Harsch and  
8 the Agency and then members of the public who  
9 wish to comment.

10 Please note that any questions posed  
11 by Board members and staff are designed to  
12 help develop the complete record for the  
13 Board's decision and do not reflect any bias.  
14 And after the presentation by the witnesses  
15 and questioning, anyone else can testify  
16 regarding the proposal. Like all witnesses,  
17 those who wish to testify will be sworn in  
18 and may be asked questions about their  
19 testimony. We'll conclude today's hearing  
20 with a few procedural items. Member Johnson,  
21 before we begin, would you like to add  
22 anything?

23 MEMBER JOHNSON: Just briefly. I want  
24 to welcome you all here and thank you for

1 coming. I also want you all to understand  
2 that the Board recognizes how important this  
3 rulemaking is and we're going to give it the  
4 attention it deserves in order to develop a  
5 clear and complete record. Thanks.

6 HEARING OFFICER ANTONIOLLI: For the  
7 court reporter who is transcribing today's  
8 proceeding please speak up and don't talk  
9 over one another so that we produce a clear  
10 transcript.

11 With that, are there any questions  
12 about the procedures that we follow today?

13 (No response.)

14 I'd now ask that the court reporter  
15 swear in WRT Environmental's witnesses for  
16 the day.

17 THE COURT REPORTER: Raise your right  
18 hands, please. Do you solemnly swear that  
19 the testimony that you are about to give is  
20 the truth, the whole truth and nothing but  
21 the truth?

22 DR. ADAMS: I do.

23 DR. ANDERSON: I do.

24 MR. WILLIAMS: I do.



1 HEARING OFFICER ANTONIOLLI: Okay.

2 And as you testify, please introduce  
3 yourselves and let us know your position and  
4 title.

5 MR. FORT: Madam Hearing Officer, we'd  
6 like to start with Dr. Anderson. We have  
7 pre-filed testimony from Dr. Anderson. We  
8 realize that -- as we were looking over  
9 things that there are two charts that he  
10 refers to in his testimony that did not get  
11 appended to what was filed so I've got -- I'd  
12 like to mark his testimony, if I may, as the  
13 next exhibit, and I have some extra copies if  
14 anybody wants to have the extra charts. It's  
15 identical except for a typo or two, but ...

16 HEARING OFFICER ANTONIOLLI: Now these  
17 charts are in addition to the charts that are  
18 in?

19 MR. FORT: They are duplicative of two  
20 of the charts but there should have been two  
21 more charts. So if you have this document,  
22 you will have all four, yeah. They're  
23 labeled so I think you can pick out what's  
24 additional.

1 HEARING OFFICER ANTONIOLLI: Okay.

2 MS. WILLIAMS: Do you mind if we just  
3 clarify for the record?

4 MR. FORT: Yes.

5 MS. WILLIAMS: I'm assuming that when  
6 you say the testimony is identical to what  
7 was filed, that you mean identical except for  
8 the references to --

9 MR. FORT: That's right. Thank you  
10 for --

11 MS. WILLIAMS: -- the third witness?

12 MR. FORT: Dr. Anderson is here so  
13 that Dr. Anderson is going to be presenting  
14 the testimony. We weren't sure we were going  
15 to be able to get him back for this hearing  
16 and that's why Ms. Tin was also here who  
17 collaborated part of the pre-filed testimony,  
18 but it will just be Dr. Anderson today.

19 HEARING OFFICER ANTONIOLLI: Okay.  
20 And you're entering this into -- as an  
21 exhibit now?

22 MR. FORT: Yes.

23 HEARING OFFICER ANTONIOLLI: Would you  
24 like to enter that along with the pre-filed

1 testimony?

2 MR. FORT: Sure, that's fine.

3 HEARING OFFICER ANTONIOLLI: Okay. So  
4 we are at Exhibit No. 13 now?

5 MR. FORT: Right. I don't know if you  
6 need the pre-filed testimony if you're  
7 marking this because the substance is  
8 identical except it has two additional charts  
9 and it does not have a reference to Ms. Tin.

10 I'm happy to mark them both if  
11 that's easier for you, I'm trying not to have  
12 too many things that look almost the same.

13 HEARING OFFICER ANTONIOLLI: Are there  
14 any objections to entering this testimony of  
15 Dr. Brian Anderson with the two additional  
16 charts in?

17 MS. WILLIAMS: It just doesn't look  
18 identical to me and I'm not arguing with the  
19 substance it's just I have reviewed it on a  
20 page -- you know, based on the page numbers  
21 or what have you on the original it looks  
22 like -- I mean I'm just looking at the  
23 paragraphs, they don't start the same. None  
24 of the paragraphs seem to start out the same

1 just in skimming it.

2 Could you just clarify, is it just  
3 that what's been --

4 MR. FORT: We removed the reference to  
5 Ms. Tin. We removed the reference that one  
6 of the two of them would be presenting  
7 depending upon schedules. We made it first  
8 person "I" instead of Dr. Anderson. There  
9 are a couple of references that did get  
10 corrected.

11 MS. WILLIAMS: Right. Okay.

12 MR. FORT: And we added two of the  
13 charts at the back.

14 MS. WILLIAMS: Okay. That seems fine.

15 HEARING OFFICER ANTONIOLLI: So what  
16 we do is we have this as your pre-filed  
17 testimony and this is actually what we're  
18 entering in as Exhibit No. 13 for today.

19 MR. FORT: That would be great, thank  
20 you.

21 HEARING OFFICER ANTONIOLLI: If there  
22 are no objections, I'll go ahead and enter  
23 this as Exhibit 13 and seeing none, you can  
24 go ahead with your testimony.

## 1 ORAL TESTIMONY

2 BY DR. ANDERSON

3 Thank you. My name is

4 Dr. Brian D. Anderson, I am currently the  
5 Chairman of the Department of Biology and  
6 Physical Sciences at Lincoln Land Community  
7 College in Springfield, Illinois. I was  
8 formerly the Director of the Office of  
9 Resource Conservation of the Illinois  
10 Department of Natural Resources, the Director  
11 of the Office of Scientific Research and  
12 Analysis of the Illinois Department of  
13 Natural Resources, the Conservation 2000  
14 Coordinator for the Illinois Department of  
15 Natural Resources, Director of the Illinois  
16 Nature Preserves Commission, and Natural  
17 Heritage Database Coordinator for the  
18 Kentucky Nature Preserves Commission.

19 I hold a Ph.D. in Biology from the  
20 University of Louisville, and a master's  
21 degree in Zoology from DePaul University, and  
22 a bachelor's degree in Biology from Kalamazoo  
23 College.

24 This testimony will comment upon

1 the Illinois Environmental Protection  
2 Agency's report that, and I quote, Illinois  
3 EPA conducted a literature search for radium  
4 impacts to aquatic life and found no papers  
5 or other information on this subject (Mosher,  
6 2004), end of quotes. It will also submit --  
7 it will also submit information that is  
8 contrary to the testimony of IEPA, hereafter  
9 Agency, staff that there is -- quote, there  
10 is no data for radium to indicate what the  
11 threshold concentration would be to protect  
12 aquatic life and contradicts the conclusion  
13 that elimination of the general water quality  
14 standard for radium is justified because,  
15 quote, the Agency's proposal to remove the  
16 General Use and Lake Michigan standards and  
17 establish a Public and Food Processing Water  
18 Supply standard at the federal MCL for  
19 radium 226 and 228 is protective of all uses  
20 that may be impacted by radium. Also Mosher,  
21 2004. End of quote.

22 In the first matter, I conducted a  
23 literature search using abstract services  
24 available via the Internet to any resident of

1 the Lincoln Land Community College District,  
2 all or parts of nine counties surrounding and  
3 including Sangamon County. I searched the  
4 FirstSearch and EBSCOhost abstracts,  
5 searching only for the keyword "radium" in  
6 the title of the journal. Five hundred and  
7 fifty-three citations were returned, which  
8 met the search parameters. Of these, 37  
9 dealt with the release to, transport within,  
10 or impacts upon, ecological systems. Of  
11 those, 12 specifically reference the uptake  
12 of radium by non-human organisms in their  
13 titles.

14 I supplemented this information  
15 with Internet searches using search  
16 parameters including the word "radium" which  
17 returned results which included fact sheets  
18 and toxicity profiles from several of the  
19 Agency's sister state and federal agencies.  
20 It would appear that the Agency's literature  
21 search was overly narrow and totally ignored  
22 the literature on the biological effects of  
23 radiation generally from radioisotopes.  
24 Since biological damage is caused by the

1 radiation, rather than the chemical activity  
2 at the molecular level, all such information  
3 is relevant to an assessment of the effects  
4 of radium on biota.

5 Contrary to the Agency's testimony  
6 before the Board, the available scientific  
7 information that was found establishes that:

8 First, radium produces alpha, beta  
9 and gamma radiation like all other  
10 radioisotopes. There are over 40 -- there  
11 are 40 radioisotopes like radium which are  
12 known to occur naturally.

13 There is 50 years of data  
14 identifying the various negative impacts of  
15 radiation upon a broad spectrum of animals  
16 and plants.

17 Also, it isn't necessary to do  
18 species specific studies on whether radium  
19 can harm a particular species inhabiting in  
20 Illinois. All radiation can have harmful  
21 effects upon living cells.

22 Also, risk increases directly with  
23 increases in exposure to radiation, no matter  
24 the source.



1                   Further, no increase in radiation  
2                   above background levels is without risk. In  
3                   other words, there is no "safe" level, only  
4                   levels with minimal increases in risk,  
5                   according to the Illinois Department of  
6                   Public Health, 2004.

7                   Radium is also a known carcinogen,  
8                   Illinois Department of Public Health, 2004.  
9                   It is bioaccumulative and bioconcentrating  
10                  according to the Agency for Toxic Substances  
11                  and Disease Registry, 1990.

12                  Radium is also closely related  
13                  chemically to calcium, it moves easily  
14                  through the environment and it can become  
15                  very concentrated in calcium-rich tissues  
16                  like bones and mollusk shells.

17                  Radium also concentrates in  
18                  sediments and sewage sludge, potentially  
19                  creating hot spots in the stream sediments  
20                  below discharges and contaminating sewage  
21                  treatment facilities.

22                  In Florida, according to a  
23                  Technical Report to the Southwest Florida  
24                  Water Management District, 2000, in lakes

1           that are recharged with groundwater  
2           containing low levels of radium 226, levels  
3           less than five picoCuries per liter, it was  
4           found that the sediments, which contain 20.4  
5           picoCuries per gram of radium 226, are over  
6           3.5 times the EPA cleanup standard of five  
7           picoCuries per gram over background.  
8           Typically the increase of radium in the  
9           sediments is ten times over background.

10                         They also found that freshwater  
11           mussel flesh contained as much as 200  
12           picoCuries per gram radium 226. A level that  
13           would require the flesh of those mussels to  
14           be sent to a low level radioactive waste  
15           site.

16                         It was also found that elevated  
17           levels of radium have been found in fish bone  
18           and fish flesh.

19                         The concentration of radium in  
20           newly deposited sediment is increasing  
21           dramatically as new sediments are being  
22           deposited. And please refer to the charts  
23           that we just discussed earlier done by the  
24           University of Florida in 2004.

1                   At Elliot Lake, Canada, in a lake  
2                   that has only two picoCuries per liter radium  
3                   226 below a Uranium Mine, elevated radium has  
4                   been found in cattails and in the muskrats  
5                   that eat the cattails. Clulow, 1996.

6                   Clearly it has been shown that the  
7                   biological mechanisms and pathways of  
8                   exposure exist to allow radium to present a  
9                   risk to aquatic life if discharged at  
10                  concentrated levels into the environment. It  
11                  is particularly problematic when  
12                  bioaccumulation of radium in mussels occurs.  
13                  The Illinois mussel fauna is already under  
14                  severe pressure with 27 species of mussels  
15                  listed as endangered or threatened species in  
16                  the state, Endangered Species Protection  
17                  Board, 1999.

18                  The Illinois Department of Natural  
19                  Resources possesses site specific information  
20                  for all known occurrences of listed species  
21                  and the IEPA has a statutory obligation under  
22                  the Illinois Endangered Species Protection  
23                  Act to consult with IDNR on potential impacts  
24                  to listed species associated with any

1 proposed action. Further, predation on  
2 mussels by fish, waterfowl, otters, raccoons,  
3 and muskrats is well documented. Some  
4 species like raccoon, common red horses, and  
5 many species of diving ducks, including  
6 commercially valuable, hunted species like  
7 the ring-necked duck or, quote, bluebill,  
8 selectively feed on mussels and could both be  
9 in danger of receiving concentrated exposures  
10 and subsequently, serving as pathways to  
11 other predators and scavengers, like bald  
12 eagles or other raptors.

13 On another front, the land application  
14 of waste treatment sludge that exhibits high  
15 concentrations of radium opens up the  
16 possibility of many terrestrial pathways for  
17 exposure, including bioaccumulation in  
18 indigenous vegetation or in planted crops, or  
19 uptake by birds, snakes, turtles, or shrews  
20 when they eat earthworms.

21 With regard to the levels of  
22 radium that would pose a threat to aquatic  
23 life, considerable scientific consideration  
24 has also been given this question. The U.S.

1 Department of Energy, Biota-Dose Assessment  
2 Committee has developed a standardized  
3 methodology that calculates that radium  
4 levels over 3.75 picoCuries per liter in  
5 water of combined radium 226 and radium 228  
6 is above the threshold to protect aquatic and  
7 riparian wildlife populations, from the  
8 Biota-Dose Advisory Committee, 2000. This is  
9 in DOE Standard 1153-2002, it's called A  
10 Graded Approach for Evaluating Radiation  
11 Doses to Aquatic and Terrestrial Biota. It  
12 was specifically developed to identify  
13 threshold levels for specific radioisotopes  
14 below which impacts to biota have not been  
15 observed.

16 In conclusion, contrary to earlier  
17 IEPA testimony, this scientific literature  
18 clearly documents the risk that radium  
19 presents to aquatic biota. We, therefore,  
20 recommend that the current general standard  
21 for radium 226 of one picoCurie per liter  
22 remain in place (recognizing, of course, that  
23 there is a concomitant contribution of  
24 radiation from radium 228), until such

1           time -- they should be left in place until  
2           such time that the Agency familiarizes  
3           themselves with the environmental risks posed  
4           by radium and DOE Standard 1153-2002, and  
5           formulates a more defensible proposal. In my  
6           opinion, if there is an affordable technology  
7           available that avoids the need to reintroduce  
8           radium to the environment, it should be  
9           employed.

10                           I thank you for your attention,  
11           and I'll be glad to answer any questions that  
12           you may have.

13                           HEARING OFFICER ANTONIOLLI: Thank  
14           you, Dr. Anderson.

15                           MR. FORT: Would you like us to go to  
16           our next witness?

17                           HEARING OFFICER ANTONIOLLI: Why don't  
18           you go ahead with Dr. Adams.

19                           MR. FORT: That would be fine. Let me  
20           tender as an exhibit here. We realized after  
21           we filed this that some of the attachments to  
22           Ted Adams' testimony were in the wrong order  
23           and had a couple phone calls with people  
24           saying I don't follow this so my apologies;

1           that was our fault in terms of making  
2           photocopies.

3                         We have -- would like to have  
4           entered as an exhibit, and I have extra  
5           copies, of the amended attachments, it's A --  
6           one of the maps in A and E were transposed  
7           and Attachment B has the pages in order and I  
8           think we had them numbered too so we should  
9           not have the problem. My apologies again for  
10          that pagination issue.

11                        So if we could mark -- so what  
12          I've got here, Madam Hearing Officer, to mark  
13          as an exhibit is Mr. Adams' pre-filed  
14          testimony with Attachments C, D -- with all  
15          the attachments as filed except for A, B and  
16          E which have now been put in the correct  
17          pagination order.

18                        HEARING OFFICER ANTONIOLLI: Would you  
19          like to take -- let the Agency take a look at  
20          it?

21                        MR. FORT: Sure.

22                        MS. WILLIAMS: We don't have any  
23          objection.

24                        HEARING OFFICER ANTONIOLLI: Okay. If

1           there are no objections, I'll enter this  
2           pre-filed testimony of Ted Adams along with  
3           the corrected exhibits as Exhibit 14.

4                       MR. FORT: Thank you. Okay,  
5           Mr. Adams.

6                               ORAL TESTIMONY

7                               BY DR. ADAMS

8                       I, Theodore G. Adams, President of  
9           T.G. Adams and Associates, hereby  
10          respectfully submit supplemental testimony to  
11          address questions raised by the Illinois  
12          Pollution Control Board, here known as the  
13          Board, and the Illinois Environmental  
14          Protection Agency (the "IEPA" or the  
15          "Agency") during the prior hearing in this  
16          matter held on August the 11th, 2004.

17                       I previously submitted testimony  
18          to the Board. Certain areas of my prior  
19          testimony were the subject of questioning,  
20          and the purpose of this supplemental  
21          testimony is to address any ambiguities for  
22          the record.

23                       The first question: What would be  
24          a safe level of radium in general use waters



1 of Illinois? The existing standard of  
2 one picoCurie per liter of radium 226  
3 generally is recognized as a background  
4 condition in surface waters of Illinois.  
5 Given that radium is a recognized carcinogen,  
6 and a degradation or decay product of uranium  
7 and thorium, it is not surprising that the  
8 Board would set such a level. By doing so,  
9 any variations from that standard would  
10 require careful consideration.

11 From the analyses I have  
12 performed, it appears that any increase over  
13 the existing standard could result in an  
14 excessive radium exposure. Clearly, the  
15 Biota-Dose Assessment Committee approach  
16 would not allow for a general increase over  
17 these background levels without a careful  
18 data collection and site by site analysis and  
19 justification.

20 But the effect of the Agency's  
21 proposal is to eliminate any water quality  
22 standard for this carcinogen from most  
23 Illinois waters. Attachment A hereto is a  
24 map compiled from the Agency's Exhibits 1 and

1           2; the public water supply wells with known  
2           radium levels over five picoCuries per liter  
3           and they are shown in red, and the downstream  
4           receiving waters are shown in yellow.

5           Clearly, the effect of the proposal is to  
6           wipe out any radium limits for Illinois  
7           waters, even those receiving levels over  
8           background.

9                               The Biota-Dose Assessment  
10          Committee or BDAC approach demonstrates that  
11          adverse effects from radium in waters may  
12          occur at levels slightly above background.  
13          Using the BDAC approach, I have calculated  
14          that beginning at levels in the range of 1.4  
15          to 1.88 picoCuries per liter for radium 226,  
16          the water quality would exceed the general  
17          biota dose limit. Attachment B to my  
18          supplemental testimony is a summary of the  
19          approach used and the calculations I have  
20          performed. These show that even if there is  
21          no radium contamination in the sediment, the  
22          general biota dose limits would be exceeded  
23          at 1.88 picoCuries per liter of radium 226,  
24          in the presence of 1.88 picoCuries per liter

1 of radium 228.

2 Using the combined radium limit  
3 approach put forth by the Agency for drinking  
4 water standards, the safe limit could be 3.75  
5 picoCuries per liter, and I ask you to refer  
6 to Attachment B, Page 2. But if the sediment  
7 levels are 12.2 picoCuries per gram (as was  
8 documented by the Florida studies that are  
9 included in Attachment D), then the safe  
10 level would fall to 1.4 picoCuries per liter  
11 for each. Clearly, there's very little room  
12 to relax the existing water quality standard  
13 without further data and specific analysis.  
14 And clearly, the expected effluent of five to  
15 ten picoCuries per liter, from several of the  
16 example POTWs contained in Mr. Williams'  
17 testimony Table 5, would fail the BDAC  
18 criteria. I refer you to Attachment B, cases  
19 three through six.

20 I believe that the approach taken  
21 by the BDAC merits considerable weight. The  
22 Department of Energy is responsible for  
23 managing and controlling, at its facilities,  
24 a large portion of the country's radioactive

1 materials, subject to oversight by the EPA,  
2 the Nuclear Regulatory Commission and the  
3 states, and has devoted substantial resources  
4 to protecting the environment from radiation.  
5 The BDAC approach is based on the DOE order  
6 to its contractors, which has been recognized  
7 by EPA and other states, an important  
8 criteria for avoiding impact to human health  
9 and the environment. I refer you to  
10 Attachment C. And if the Board wants to have  
11 water quality standards to protect aquatic  
12 life and the environment, it would appear  
13 that the existing standard may be  
14 appropriate.

15 Moreover, new information arising  
16 out of sampling and investigations done in  
17 Florida, and including data just published in  
18 August of this year, would indicate that  
19 radium levels in the very range that meet the  
20 BDAC dose -- biota dose limit may adversely  
21 affect mussels, including mussels such as  
22 those listed as endangered or threatened in  
23 Illinois. Attachment D hereto is a letter  
24 from one of the Florida researchers who has

1           evaluated the bioconcentration in sediments  
2           and mussels from the various lakes in  
3           Florida. These lakes must be replenished by  
4           pumping groundwater, which has radium at  
5           levels I consider background; in other words,  
6           one to two picoCuries per liter. The  
7           recently published data shows that the  
8           mussels in these lakes bioaccumulate radium  
9           to levels over 200 picoCuries per gram.

10                       Illinois has many endangered  
11           mussels which inhabit the waters threatened  
12           to be deregulated by the proposed rule.  
13           Attachment E hereto are maps taken from the  
14           IDNR website showing river basins where these  
15           endangered species may be found. I do not  
16           know if there's a relationship between the  
17           background radium and these endangered  
18           species, but clearly the effect of this  
19           proposed rule has not been adequately  
20           considered.

21                       In conclusion, radium can cause  
22           adverse effects on aquatic life and riparian  
23           animals. It is a carcinogen to humans and it  
24           bioaccumulates in mussels and up the aquatic

1 food chain. Though the current standard may  
2 be virtually the same as background, I would  
3 urge that a compelling case is required  
4 before relaxing the general water quality  
5 standard for such a material.

6 Question No. 2: Are there other  
7 sources of radium discharging? The explicit  
8 assumption made by the IEPA was that an  
9 exceedance of the existing standard would  
10 occur only as a result of the presence of  
11 elevated radium in drinking water or the  
12 treatment of drinking water. I would note  
13 that the goal of the EPA drinking water  
14 standard is zero; the five picoCuries per  
15 liter reflects a risk of one in 10,000. But  
16 left unaddressed in this proceeding is the  
17 question, "who else could be a source?"

18 My prior testimony showed that  
19 radium is a degradation or breakdown product  
20 of other nuclear radioactive materials.  
21 These include thorium and uranium. But there  
22 is no evidence presented in this proceeding  
23 of who or where those potential or actual  
24 sources are, whether they be industrial,

1 commercial or municipal. It seems to me that  
2 there are likely other dischargers of radium  
3 that exist.

4 At least one of the participating  
5 facilities in the AMSA study was a publicly  
6 owned treatment works in the northeastern  
7 Illinois area. This POTW is in an area that  
8 has a high concentration of radium in  
9 groundwater withdrawals. Because of the  
10 confidentiality of the terms in the AMSA and  
11 ISCORS study, I am not at liberty to divulge  
12 the name of the plant. But I can testify  
13 that, given the groundwater levels known to  
14 exist in that locale, the sludge levels  
15 reported for that POTW are consistent with  
16 the predicted sludge levels and worker  
17 exposure levels presented in my prior  
18 testimony.

19 This observation led me to seek  
20 additional information about other documented  
21 dischargers of radium. However, time did not  
22 permit a review of radium dischargers in  
23 Illinois, but we did find that at least one  
24 nuclear plant reported radium discharge

1 levels exceeding the current standard. For  
2 the LaSalle plant, radium 226 was reported  
3 for two outfalls at 2.6 picoCuries per liter,  
4 and total radium values were 4.1 and 9.0  
5 picoCuries per liter. In a couple of  
6 instances it appeared that the amount of  
7 radium increased across specific wastewater  
8 processes. I refer you to Attachment I.

9 The record in this proceeding does  
10 not identify other sources beside municipal  
11 drinking water treatment plants might be the  
12 beneficiary of this deregulation. There may  
13 be others. Indeed, even among the group that  
14 was identified as needing regulatory  
15 relief -- communities that need to treat  
16 their groundwater supply to meet the new  
17 drinking water standard -- some already have  
18 decided that they do not need to flush their  
19 treatment water filtrate down the sewer and  
20 still can save hundreds of thousands of  
21 dollars.

22 Question No. 3 asked: Are there  
23 other impacts on publicly owned treatment  
24 works beyond those in Agency Exhibit 11? The



1 IEPA suggests in its Exhibit 11 that the  
2 POTWs will benefit by avoiding certain costs  
3 if this proposed rule were adopted. But  
4 there are other costs that will result from  
5 the adoption of the proposed rule. The  
6 overall costs appear actually to be much  
7 greater when one considers all the  
8 implications of the Agency's proposal.

9 The IEPA has not provided this  
10 proceeding with evidence concerning testing  
11 or monitoring of sewage slush levels for  
12 radium. Yet, the economic and operational  
13 impacts of radiologically contaminated  
14 influent/sludge on POTWs are well documented.  
15 For example, in Cleveland, Ohio, Advanced  
16 Medical Systems, an NRC licensee, discharged  
17 minute amounts of non-soluble radioactive  
18 particles of Cobalt 60 over a period of 20  
19 years into the sewer system. These minute  
20 radioactive particles contaminated the POTW  
21 and the resulting sludge. And the aggregate  
22 radioactivity disposed of into the sewer  
23 system over the 20-year period was less than  
24 a half of Curie. I refer you to Attachment

1 F.

2 But nevertheless, the NEORS  
3 incurred more than \$2 million in cleanup  
4 costs when these elevated radiation levels  
5 were discovered by chance. An enormous  
6 amount of radioactive contaminated material  
7 which occurred as a result of a miniscule  
8 amount of radioactivity is still present at  
9 the Northeast Ohio Region District. Cobalt  
10 60 has a half-life of approximately five to  
11 six years, and Cobalt 60 does not produce  
12 radon as a by-product. In contrast, radium  
13 226 has a half-life of approximately  
14 1600 years, and does produce radon as a  
15 by-product.

16 In comparison, a moderately-sized  
17 city with elevated radium levels may exceed  
18 this quantity in its sludge. I've completed  
19 a review of the IEPA calculation for the  
20 amount of radium contamination found in sewer  
21 sludge from the City of Joliet's sewer system  
22 for a period of one year. The amount of  
23 radium contamination found in Joliet's sewer  
24 sludge over the course of just a single year

1 was .293 Curie. Refer you to Attachment G,  
2 Page 12 of the Agency's Exhibit 12. The  
3 amount of radium contamination found in  
4 Joliet's sewer sludge over a period of one  
5 year was more than half the amount of  
6 radioactive contamination for a 20-year  
7 period found in the sewer system in  
8 Cleveland, Ohio. And thus, over a similar  
9 20-year period, the Joliet POTWs would appear  
10 to generate more than ten times the quantity  
11 of radiation that caused substantial injury  
12 to the sewer system in Cleveland, Ohio. And  
13 the radium 226 will take longer to decay or  
14 degrade than the Cobalt.

15 On the other hand, if the  
16 radium-laden residuals, i.e., Technically  
17 Enhanced Naturally Occurring Radioactive  
18 Material commonly known as TENORM,  
19 T-E-N-O-R-M, are disposed of into the sewer,  
20 then the public water systems, the POTWs, and  
21 the state of Illinois can expect to have the  
22 following increased costs: One, the  
23 uncontrolled discharge of radium residuals  
24 would or could be a liability issue to

1 municipalities and POTWs (as cited in  
2 Cleveland, Ohio); two, POTW workers will  
3 require training, personnel exposure  
4 monitoring and medical monitoring as  
5 occupational radiation workers; three, sewer  
6 sludge and handling areas will require  
7 ongoing testing; four, the POTW may be  
8 required to obtain a radioactive materials  
9 license; five, application of sewer sludge to  
10 farmland will require ongoing monitoring; and  
11 last, sewer pipes and lines and the POTW  
12 itself (or parts thereof) may require  
13 decontamination. These costs are the  
14 practical result of the Agency's proposal.

15 And there's another environmental  
16 cost to the proposal. The Agency expects the  
17 water treatment plants will flush filtrate  
18 materials down the sewer. This activity  
19 requires the pumping of additional  
20 groundwater to carry out the backflushing  
21 operation. The amount of groundwater may be  
22 on the order of five to 25 percent of the  
23 quantity of water being pumped for human  
24 consumption. Areas already relying on deep

1 aquifers for portable water supply are in the  
2 same areas where the groundwater resource is  
3 being depleted. As an example, although  
4 Joliet was already extracting the largest  
5 quantity of well water from deep aquifers in  
6 1995, there continues to be a further  
7 drawdown in the groundwater level by over 25  
8 feet. This is among the largest drawdowns  
9 since 1995 in the northeastern Illinois area.  
10 And I refer you to a quote of the Comparison  
11 of Potentiometric Surfaces for the  
12 Cambrian-Ordovician Aquifers of Northeastern  
13 Illinois, 1995 and 2000, Table 2, Figure 9  
14 attached hereto as Attachment H.

15 For Joliet, backflushing would  
16 therefore increase the groundwater drawdown  
17 by .5 to 2 and a half million gallons per  
18 day. And, moreover, Kane County shows the  
19 largest growth in deep well pumping of any  
20 county in the area. See Table 1. And this  
21 is not surprising in light of its growth. At  
22 the same time, Kane County communities have  
23 some of the highest radium levels in  
24 groundwater. And thus, the amount of water

1 containing elevated levels of radium being  
2 extracted from the deep aquifers seems likely  
3 to continue to increase. Allowing the use of  
4 backflushing in these areas would only  
5 increase the demand on the deep aquifer  
6 resources. And the discharge to surface  
7 waters will carry increased amounts of  
8 radium.

9 In conclusion, the existing  
10 standard represents background conditions.  
11 And interestingly, the BDAC approach,  
12 required of all DOE facilities, would require  
13 site specific data and further analysis on  
14 any water quality condition over this general  
15 background level. There's clearly no basis  
16 to remove radium as a general aquatic quality  
17 criterion without more data.

18 Removing the radium standard,  
19 without first imposing a control on storm and  
20 sewer discharges of radium comparable to  
21 those required of facilities regulated by the  
22 IEMA allows TENORM, T-E-N-O-R-M, radium to be  
23 backwashed down sewers. This not only  
24 reintroduces a carcinogen back into the

1 environment, it potentially exposes POTW  
2 workers to radium levels above that allowed  
3 even for workers in a nuclear power plant and  
4 it results in radium being applied to crop  
5 soils as part of the municipal sludge. From  
6 an environmental viewpoint, all radium  
7 TENORM, especially radioactive solids, should  
8 not be permitted down sewers, regardless if  
9 one is a licensee of IEMA or not. Thank you.

10 HEARING OFFICER ANTONIOLLI: Thank  
11 you, Mr. Adams. At this point we'll return  
12 to Mr. Harsch, return to his questions.

13 MR. HARSCH: I believe that -- I think  
14 it might be more appropriate if the Agency  
15 has the proponent to proceed.

16 HEARING OFFICER ANTONIOLLI: Are you  
17 ready to proceed at this point?

18 MS. WILLIAMS: I can. I mean my only  
19 issue is I have quite a few questions again  
20 on the new stuff so I did sort of monopolize  
21 the last hearing so I want to make sure  
22 that --

23 MR. HARSCH: We have two days.

24 MS. WILLIAMS: -- the Board and

1           everybody else gets a chance, but I'm ready  
2           to go any time, so whenever you want.

3                       HEARING OFFICER ANTONIOLLI: That's  
4           understandable, but you can go ahead and ask  
5           questions.

6                       MS. WILLIAMS: Okay. I'm going to  
7           come around if that's okay so I can see.

8                       HEARING OFFICER ANTONIOLLI: Also let  
9           me know if any of your witnesses need to be  
10          sworn in.

11                      MS. WILLIAMS: Okay. Yeah, I guess  
12          just for the record maybe I can introduce the  
13          folks that I brought with me today. I'm  
14          Deborah Williams, assistant counsel of the  
15          Illinois EPA, and with me also I have  
16          Stefanie Diers also assistant counsel in our  
17          legal department. Maybe the technical staff  
18          can introduce themselves and what they do.

19                      MR. MOSHER: Okay. I'm Bob Mosher,  
20          and I'm the manager of the Water Quality  
21          Standards Unit.

22                      MR. KUHN: I'm Jerry Kuhn, I'm manager  
23          of the Permit Section of the Division of  
24          Public Water Supplies.



1                   MR. KINSLEY: Blaine Kinsley, acting  
2 manager of the Industrial Unit, Permit  
3 Section, Bureau of Water.

4                   MR. HUTTON: Jeff Hutton, I'm an  
5 environmental protection specialist, and I  
6 deal with the sludge application program.

7                   MS. WILLIAMS: And I don't see any  
8 reason to swear in our folks at this time.  
9 I'm assuming at some point the Board might  
10 want to ask some more questions and we can do  
11 it then.

12                   HEARING OFFICER ANTONIOLLI: We can do  
13 that at that time.

14                   MS. WILLIAMS: Good afternoon. I  
15 guess I'll start with Dr. Anderson first.  
16 Thanks for joining us today. I'm going to  
17 apologize a little bit ahead of time, I kind  
18 of -- Mr. Adams knows last time I sort of  
19 went through the testimony and organized my  
20 questions by going page by page through the  
21 testimony so my page numbers might be a  
22 little off, it might take me a second to  
23 adjust to the new version.

24                   MR. FORT: Excuse me. If you have the

1 other version, he can refer from that.

2 MS. WILLIAMS: Is that okay?

3 MR. FORT: That's fine, yeah. He'll  
4 find it.

5 WHEREUPON:

6 DR. BRIAN D. ANDERSON,  
7 called as a witness herein, having been previously  
8 duly sworn, deposes and saith as follows:

9 D I R E C T E X A M I N A T I O N

10 By Ms. Williams

11 Q. Okay. Why don't we start out,  
12 Dr. Anderson, could you tell us a little bit about  
13 your prior experience before this matter dealing  
14 with radium or other radiological elements?

15 A. Well, general training, physical  
16 chemistry, those kinds of things in the university.  
17 The last several weeks I have intensively studied  
18 the issue, conferred with chemists, conferred with  
19 other radiologic experts, reviewed the literature so  
20 I've done --

21 Q. But prior to this case that wasn't a  
22 particular function of your work at the Department  
23 of Natural Resources in the past really?

24 A. No, not necessarily except that in my

1 capacity as director of the office of scientific  
2 research and analysis, I did oversee the state water  
3 survey and the issue of radium in drinking water of  
4 course has been an ongoing concern there for 25,  
5 30 years or so.

6 Q. Right, the drinking water.

7 A. In that capacity, there was a lot of  
8 discussion about radium in the drinking water.

9 Q. And have you participated in, I'm  
10 assuming, in water quality standards rulemaking  
11 before the Board in the past?

12 A. Yes, I have. I was involved in the  
13 arsenic rulemaking. In the capacity that I served  
14 at with the Department of Natural Resources there  
15 have been occasions when the Agency did, in fact,  
16 consult with DNR on rulemaking and because of my  
17 capacity as more or less chief scientist there, I  
18 was involved with discussions with the division of  
19 resource review in coordination with some primary  
20 point of contact with the IEPA.

21 Q. And in the arsenic rule that you talk  
22 about, was that a drinking water rulemaking or a  
23 water quality standard rulemaking?

24 A. I don't recall actually. I'd have to

1 review the paperwork.

2 Q. If I were to tell you that I believe  
3 it was the drinking water rulemaking, would you  
4 think --

5 A. No, I would not contradict that.

6 Q. Then are you familiar with the  
7 national guidelines for deriving water quality  
8 standards published by USEPA I think in 1986?

9 A. Well, in the context of general  
10 discussions about Clean Water Act and my  
11 understanding was that the concept was that the  
12 national standards were established and that state  
13 standards were only to be modified in the presence  
14 of existing data and then usually only to establish  
15 a stricter standard than the national standards but  
16 that appears not to have been a procedure we were  
17 generally following in this case.

18 Q. Excuse me? You said it's not the  
19 procedure we're following in this case?

20 A. Well, given that the Agency is  
21 testifying in the absence of information on impacts  
22 of radium on aquatic biota, that we should eliminate  
23 the standard that would seem contrary to that  
24 general concept.

1 Q. Are you aware of whether there is one  
2 of those federal criteria for rating?

3 A. There is not.

4 Q. And are you familiar with the kind of  
5 studies that USEPA guidance requires the states to  
6 look at when developing water quality standards?

7 A. Well, I need to be educated.

8 Q. Okay. Well, we'll do that for you  
9 later if you want to hang around. Let's talk a  
10 little bit about you describe in your testimony the  
11 Internet research that you did --

12 A. Uh-hum.

13 Q. -- and can you just describe I guess  
14 for me about how long it took?

15 A. Oh, couple of days.

16 Q. And did you review -- I think you said  
17 you came up with like 500 and some hits, correct?

18 A. True.

19 Q. And then of those, about 12 looked at  
20 uptake and --

21 A. Uptake and organisms.

22 Q. -- organisms? Did you review those 12  
23 studies?

24 A. Well, with these search engines, some

1 of -- some of those articles are abstracts so you  
2 have abstracts of the content. Some of them in the  
3 title it's obvious so I only looked at things that  
4 are specifically referenced in the testimony frankly  
5 because there were only two weeks to prepare  
6 material to present.

7 Q. So you didn't -- so just to be clear,  
8 you didn't look at those 12 studies that you're  
9 saying are relevant to this particular case?

10 A. Not all of them. The ones that are  
11 referenced are here.

12 Q. There are two studies in particular  
13 that I believe are referenced in your testimony.  
14 Were those two studies -- did you get them as hits  
15 on your -- is that where you found them, were they  
16 hits on your --

17 A. Which ones?

18 Q. -- in your Internet research? I  
19 believe there's a study from Florida that you  
20 discussed in some detail and then I got --

21 A. No, actually I was made aware of  
22 that --

23 Q. By whom?

24 A. -- in discussions with WRT.

1 Q. Okay.

2 A. And I think they actually shared that  
3 with -- in their testimony with the Agency.

4 Q. So you would not be testifying today  
5 that you found that study in your Internet search?

6 A. No. I actually found it on the  
7 website as PCP and is part of the record.

8 Q. Thank you. So you couldn't tell us  
9 today that any of the articles that are out there on  
10 the Internet would tell the Agency or the Board what  
11 the proper water quality standard for radium should  
12 be?

13 A. I would not presume to. I mean,  
14 that's a jurisdiction of the Board and the Agency.  
15 Are you, in fact, asking whether there is a  
16 threshold that has consensus within the scientific  
17 community for protection of aquatic life?

18 Q. I'm actually not asking that question.

19 A. Am I hearing you right?

20 Q. But I will ask that question.

21 A. Good.

22 Q. And I think I'll ask that question,  
23 I'd like to phrase it maybe a little differently.  
24 On what I have as -- let's see. Okay. On Page 4, I

1 believe it's about -- of the original testimony, I'm  
2 not sure, it will be the last page probably still of  
3 the new version.

4 A. Okay.

5 Q. There is a paragraph, I guess it's  
6 three from the bottom if you count the last sentence  
7 where that word threshold comes up.

8 A. Beginning with regard to the levels?

9 Q. Beginning with regard to the levels.  
10 I'd like to talk about the second sentence.

11 A. Okay.

12 Q. And I'll just repeat it --

13 A. Okay.

14 Q. -- for the rest of us to be focused.  
15 It says, the U.S. Department of Energy Biota Dose  
16 Advisory Committee has developed a standardized  
17 methodology that calculates that radium levels over  
18 3.75 picoCuries per liter in water of combined  
19 radium 226 and 228 is above the threshold to protect  
20 aquatic and riparian wildlife populations.

21 I'd like to ask you a couple  
22 questions about that. I guess the first question I  
23 have is did you find this figure 3.75 picoCuries per  
24 liter in that document?



1           A.       No.  It provides the formula and it  
2  also provides what they call the BCGs, they are  
3  factors that can be used to differentiate between  
4  the relative power of a radioactive decay for  
5  different isotopes so they have a table with all the  
6  radioactive isotopes, they provide the formula and  
7  you plug in --

8           Q.       And does it just have one table or  
9  does it have multiple tables?

10                   MR. FORT:  Excuse me, can he finish  
11                   his answer?

12  BY THE WITNESS:

13           A.       I mean, it's actually presented in  
14  several places, the formula.  So you take --  
15  basically it's the picoCuries of all the  
16  radioisotopes over the conversion factors added  
17  together.

18                   Now I've presented this in the  
19  context of radium 226 and 228.  This standard is  
20  actually a standard which is for all radiation.  So  
21  the assumption here in calculating it's 3.75  
22  picoCuries for all radiation but it's protective of  
23  aquatic and riparian life.

24

1 BY MS. WILLIAMS:

2 Q. Really?

3 A. Yes.

4 Q. So it would be 3.75 for uranium or  
5 other --

6 A. No.

7 Q. Okay.

8 A. No, and this is something that --  
9 there seems to be a confusion throughout the entire  
10 record. Radiation is the agent that causes  
11 biological damage. Radium is not the only potential  
12 source of radiation, there is uranium in water in  
13 many cases in Illinois. There may be other sources  
14 of -- and in this case radium is primarily an alpha  
15 emitter.

16 So in order that the standard that  
17 is protective is 3.75 picoCuries of radiation, no  
18 matter what the source is. And you have to add all  
19 the sources together to determine if it goes over  
20 that threshold.

21 Q. Let's talk about what you mean by  
22 threshold. The second part of this sentence you say  
23 is above the threshold to protect aquatic and  
24 riparian life populations. The first question I

1 have is isn't it true that this calculation, using  
2 the DOE screening tool, was done -- well, first of  
3 all, was it done by you or done by Mr. Adams?

4 A. I may have seen his calculations in  
5 the testimony. Again, I reviewed the entire record  
6 that was on the website so I'm sure that I've seen  
7 it there, but I re-read the entire Graded Approach  
8 for Evaluating Radiation Doses to Aquatic and  
9 Terrestrial Biota.

10 HEARING OFFICER ANTONIOLLI: If I can  
11 interrupt you there. We have several  
12 references in the pre-filed testimony and  
13 today to this document that you're referring  
14 to. We have in the pre-filed testimony  
15 Module 1 entered, and I think that the  
16 equation you're also referring to is found in  
17 another section of that document.

18 MR. FORT: It's possible.

19 HEARING OFFICER ANTONIOLLI: And so if  
20 there's no objection, I'd like to enter into  
21 the record the entire document.

22 MR. FORT: Fine.

23 HEARING OFFICER ANTONIOLLI: So we all  
24 have -- I have an extra copy or two if anyone

1 needs to take a look at it, but I think that  
2 all of us that have been involved have taken  
3 a look at the document already and have you  
4 had a chance to look at it yet?

5 MS. WILLIAMS: I have all of Module 1  
6 which -- I believe they did provide all of  
7 Module 1, but I wouldn't say that I have the  
8 whole thing. I believe it's available on the  
9 Internet.

10 HEARING OFFICER ANTONIOLLI: It is and  
11 we have a copy here for you too if you'd like  
12 to take a look but it includes where he found  
13 the equation which --

14 MR. HARSCH: Does that include the  
15 preliminary module as well?

16 HEARING OFFICER ANTONIOLLI: Yes.

17 MR. HARSCH: I guess sort of a  
18 foreword to the document?

19 HEARING OFFICER ANTONIOLLI: Yes.  
20 It's the entire thing and you can take a look  
21 at it here too, but...

22 MS. WILLIAMS: I certainly have no  
23 objections to entering that document.

24 HEARING OFFICER ANTONIOLLI: If

1           there's no objection, I'll go ahead and enter  
2           that as --

3                     MR. HARSCH: I would like to look at  
4           it first.

5                     HEARING OFFICER ANTONIOLLI: Yes.

6                     MEMBER JOHNSON: Give you maybe  
7           40 seconds to read that.

8                     MR. FORT: Can I make a suggestion on  
9           this? Maybe if we -- if the question is is  
10          that the complete document or not --

11                    MR. HARSCH: We have no objection.

12                    MR. FORT: -- 14, whatever the  
13          complete document is, will be I think it's  
14          15.

15                    HEARING OFFICER ANTONIOLLI: Exhibit  
16          15. Okay. Now you can go ahead.

17 BY MS. WILLIAMS:

18                    Q.        Okay. The first question I want to  
19          get back to is isn't it true that the calculation  
20          used was focused on riparian mammals, correct?

21                    A.        The limiting organisms are riparian  
22          mammals.

23                    Q.        But had they looked at aquatic life or  
24          humans, we would have gotten a different answer?

1 A. Well, no.

2 Q. Or aquatic life or plants let's say.

3 A. The threshold for aquatic life,  
4 fishes, you know, things that are in the water all  
5 the time, is one rad per day. The limiting factors  
6 actually on riparian organisms, higher organisms,  
7 mammals primarily, and that's .1 rads per day.

8 Q. And .1 rads per day, what was used?

9 A. We used the basis for the calculation  
10 that derives the 3.75 picoCuries per liter.

11 Q. You keep using this word threshold.  
12 Can you tell us what this tool, which I'm going to  
13 call screening tool, I believe that's what the  
14 document calls itself, what the screening tool is  
15 intended to be used for?

16 A. Well, I'm not sure. I'm not sure. I  
17 thought I heard two questions, could you read that  
18 back?

19 (Whereupon, the requested  
20 portion of the record  
21 was read accordingly.)

22 BY THE WITNESS:

23 A. Okay. As described by BDAC in this  
24 document, the threshold, that figure, is the level

1 of radiation exposure below which no population  
2 level effects on the biota has been documented.

3 BY MS. WILLIAMS:

4 Q. Isn't it --

5 A. That's what it is.

6 Q. Isn't it true, Dr. Anderson, that this  
7 tool was designed for the Department of Energy to  
8 look at sites to evaluate whether additional study  
9 was needed or not to say if you're below this, no  
10 additional study is needed; if you're above this,  
11 well, maybe we should take a look and see what's  
12 going on?

13 A. If it's above this, there may be  
14 potential biotic impact and we should take a look.  
15 It's almost identical to TACO which the Agency is a  
16 proponent of. In fact, the graded approach and the  
17 tear approach are virtually the same crossed  
18 process.

19 Q. And those are both used primarily in  
20 the cleanup process, right, where something has  
21 already been polluted by --

22 MR. FORT: Objection. You know, if  
23 you've got the document, instead of you  
24 trying to characterize the document, let's

1           let the document be used as opposed to a  
2           general, you know, lawyer's gloss on it.  
3           Because I don't think the document, if you  
4           read it, it will not be as limiting as you're  
5           trying to make it out to be.

6                         HEARING OFFICER ANTONIOLLI: Well, she  
7           can go ahead and ask questions as long as  
8           it's --

9                         MS. WILLIAMS: I don't agree.

10          BY MS. WILLIAMS:

11                 Q.       Did you consult the author of the  
12          document as part of your research?

13                 A.       It was multiple authors.

14                 Q.       Did you consult any of the authors as  
15          part --

16                 A.       It's an available public document.

17                 Q.       You read it, you did in part?

18                 A.       Yeah, it's monstrous.

19                 Q.       Are there any studies that you were  
20          aware of that document a no effect level for radium?

21                 A.       That's what this number does.

22                 Q.       This is based on an observed --

23                 A.       No population level effects. That  
24          means that even at these levels, there could be



1 effects to individuals like threatened endangered  
2 species.

3 Q. Is this model based on any papers and  
4 studies that document no effects?

5 A. It's not a model. What do you mean by  
6 model?

7 Q. Are there any controlled observational  
8 experiments that were the basis for this study?

9 A. That do what? I mean, yeah. I mean,  
10 there's a huge literature on the impacts of  
11 radiation on biota, these guys are the experts in  
12 the world.

13 Q. That's your testimony?

14 A. Pardon?

15 Q. Your testimony there's -- Go ahead,  
16 repeat it. There's a huge ...

17 A. There is a huge body of literature --

18 Q. Yes.

19 A. -- on the impacts of radiation on  
20 biological species whether --

21 Q. Controlled experiments?

22 THE COURT REPORTER: I'm sorry?

23 BY MS. WILLIAMS:

24 Q. Are there controlled experiments?

1           A.       Absolutely.  In fact, there's a  
2 wonderful reference done by a guy in Patuxent, it's  
3 a synoptic guide to the impacts of radiation on  
4 wildlife, fish and in birds, 147 pages.  Lists all  
5 the species that have been tested, the various  
6 isotopes that were used as the sources and the  
7 effects, huge body.  This is one of the most  
8 intensively studied phenomenon in science, the  
9 impacts of radiation on organisms.

10                   MS. WILLIAMS:  I'd like to go off the  
11 record and talk to my client for just a  
12 second if you don't mind.

13                   HEARING OFFICER ANTONIOLLI:  Okay.  
14 Why don't we take a break right now.  We can  
15 go off the record.  We'll take a ten-minute  
16 break and come back at 2:45.

17   (Whereupon, after a short  
18 break was had, the  
19 following proceedings  
20 were held accordingly.)

21                   HEARING OFFICER ANTONIOLLI:  Okay.  
22 We're back on the record, and we will  
23 continue with questions by the Agency.  
24

1 BY MS. WILLIAMS:

2 Q. I guess, Dr. Anderson, maybe I  
3 apologize for some confusion because I felt that at  
4 the last hearing we were all in agreement that the  
5 graded approach for evaluating radiation doses to  
6 aquatic and terrestrial biota was a model rather  
7 than an observational or experimental study?

8 A. I mean it's a standard methodology.  
9 Everything is a model, your entire regulatory  
10 framework is a model because you don't go out and  
11 look at the actual impacts, you set standards based  
12 on toxicological studies and then assume it's going  
13 to be protected.

14 Q. And toxi- -- by that, toxicological  
15 studies, you mean studies in a laboratory that look  
16 at impact --

17 A. They look at three things: One, the  
18 species -- a particular species, a dose and the  
19 impact of that species. And the reason there is no  
20 work done with radium like that is A, you're  
21 interested in the impacts of radiation and B, radium  
22 is too dangerous to work with.

23 Q. But you agree there's no work like  
24 that that's been done with radium?

1                   MR. FORT: I would like you to let him  
2 finish his sentence. I mean he says  
3 something and then you say but you agree.

4                   MS. WILLIAMS: I thought he was  
5 finished. Were you not finished?

6                   THE WITNESS: No. What I'm saying  
7 is --

8                   MS. WILLIAMS: I thought he answered  
9 the question I should say actually. I asked  
10 the question and I think he answered it,  
11 but ...

12                   THE WITNESS: Okay. What I'm -- all  
13 I'm saying is is that it would not be prudent  
14 to look at impacts of radiation on biological  
15 species in the laboratory using radium as the  
16 source of radiation. There are much safer  
17 things, much more available things. Things  
18 that don't degrade radon and cause problems  
19 because it's a gas so that so ...

20 BY MS. WILLIAMS:

21                   Q.       But you agree, right --

22                   A.       I agree --

23                   Q.       -- that there are none -- there  
24 have -- there are no lab studies done?

1           A.       I would not say definitively there are  
2 none. There are none on the ecotype database which  
3 is probably what IEPA consulted.

4           Q.       Okay. And that would be normal in  
5 setting water quality standards to consult that  
6 database, right?

7           A.       Well, if it's a radionucleotide, it  
8 would also be normal to look at the radiological  
9 literature to determine if radiation harms plants  
10 and animals, and it does.

11          Q.       And I'm getting the assumption from  
12 what you're telling me then that your criticism is  
13 that we should have looked at radiation generally  
14 rather than focusing in, narrowing in on radium in  
15 particular, correct?

16          A.       Not really because in terms of  
17 fate/transport where it bioaccumulates, that is a  
18 function of the chemical reactivity of the  
19 radionucleotide. In terms of the damage it does,  
20 that's purely a function of the radiation.

21          Q.       So if we are to set a standard of  
22 water quality standard for radiation generally,  
23 would that address the concerns that you're  
24 expressing?

1 A. As a general water quality standard?

2 Q. Right, if we had a general water  
3 quality standard of X number of picoCuries per liter  
4 of radiation?

5 A. Absolutely.

6 Q. Are you aware if we have any such  
7 standards in Illinois right now?

8 A. For general water quality standards?

9 Q. Uh-hum.

10 A. My understanding is you do not.

11 Q. You're not aware that -- Well, there  
12 are no general water use -- general use water  
13 quality standards for radiation is what you're  
14 saying to the best of your knowledge?

15 A. The one picoCurie per liter radium 226  
16 is the only one that I'm aware of.

17 Q. Are you aware if they have a gross  
18 beta standard?

19 A. I am not aware of that.

20 Q. If there was a gross beta standard,  
21 would that address some of your concerns about there  
22 being no --

23 A. Well, radium is primarily an alpha  
24 emitter so not necessarily.

1 Q. Are you familiar with part 302 of 35  
2 Illinois Administrative Code where the Agency has  
3 its water quality standards?

4 A. No.

5 Q. Are you aware of what assumptions were  
6 used in developing the DOE screening tool?

7 MR. FORT: I'm sorry, what was the  
8 question?

9 BY MS. WILLIAMS:

10 Q. What type of assumptions were used  
11 about exposure, time, method, concentration, whether  
12 there was dilution?

13 A. It's all discussed in the material in  
14 the standard --

15 THE COURT REPORTER: I'm sorry, in the  
16 standard what?

17 BY THE WITNESS:

18 A. It's all discussed in the standard. I  
19 mean, I'm aware of what's in that document.

20 BY MS. WILLIAMS:

21 Q. The assumptions are all discussed,  
22 okay.

23 A. Did I memorize it? No.

24 Q. But it's true, correct, that the

1 document assumes no dilution, it assumes a constant  
2 concentration?

3 A. No, I don't think that that's true  
4 because these are contaminated sites, contaminated  
5 with uranium -- with some radionucleotide, and there  
6 are -- they don't deal with assumptions, for  
7 example, about organisms coming and going from the  
8 site and those exposures so it isn't necessarily an  
9 assumed that there's a constant exposure.

10 On the other hand, what you're  
11 proposing, if you're sampling quarterly for these  
12 things, it sounds like you're making the same  
13 assumption anyway. Otherwise, why would you sample  
14 periodically?

15 Q. Are you asking me a question now?

16 A. No, I'm not. Sorry.

17 Q. Isn't it true that the DOE screening  
18 tool assumes, for example, that a riparian mammal  
19 would get all his food, all his water from that  
20 particular source?

21 A. It could. I mean, I think that's  
22 reasonable and that's not necessarily an illogical  
23 assumption if you're talking about something like a  
24 raccoon living in the riparian corridor next to a



1 stream --

2 Q. Twenty-four hours a day, seven days a  
3 week?

4 A. How long is a riparian corridor?

5 Q. Three hundred sixty-five days?

6 A. How far is the level of contamination?

7 Q. In the middle of the stream?

8 A. In the middle of the stream?

9 Q. And assumes that there's --

10 A. Outside of --

11 THE COURT REPORTER: I'm sorry.

12 HEARING OFFICER ANTONIOLLI: Okay.

13 For the court reporter, let's not talk over  
14 each other.

15 BY MS. WILLIAMS:

16 Q. Isn't it true that it assumes that a  
17 riparian mammal would be in the middle of the  
18 stream, 24 hours a day, seven days a week, 365 days  
19 a year?

20 A. Not a riparian mammal, we don't have  
21 dolphins. Well, it assumes that it's eating and  
22 drinking from the stream predominantly.

23 Q. Isn't riparian mammal the term that is  
24 used in this document?

1           A.       Riparian refers to the area next to  
2 the stream, vegetations only.

3                   MS. WILLIAMS:   Could you read back for  
4 me what he said it assumes?

5                                   (Whereupon, the requested  
6                                   portion of the record  
7                                   was read accordingly.)

8 BY THE WITNESS:

9           A.       The riparian area is the vegetative  
10 zone next to the stream, it's next to the stream. I  
11 think what I said previously was that it is not  
12 unreasonable to believe that a riparian mammal would  
13 drink and eat from the stream.

14 BY MS. WILLIAMS:

15           Q.       My question really wasn't was it  
16 reasonable to believe, my question was that an  
17 assumption that this model was based on in order to  
18 achieve the calculations that are in your testimony?

19           A.       The latter one I do agree with.

20           Q.       The answer is yes?

21           A.       Yes.

22           Q.       I'd like to go over a few of the  
23 bullet points in your testimony, if that's okay.  
24 The second bullet point on Page 2 of the version

1 that was originally filed states: There is 50 years  
2 of data identifying the various negative impacts of  
3 radiation upon a spectrum of animals and plants.

4 Can you tell us what the dose  
5 rates are that are associated with specific negative  
6 impacts?

7 A. You -- I would --

8 MR. FORT: Object to the --

9 THE WITNESS: -- refer --

10 MS. WILLIAMS: Or one negative impact.

11 BY THE WITNESS:

12 A. I would refer you to the Patuxent  
13 study, the citation is Ronald Eisler --

14 BY MS. WILLIAMS:

15 Q. Uh-hum.

16 A. (Continued.) -- synoptic -- or impacts  
17 of radiation on wildlife and fish and invertebrates  
18 a synoptic guide.

19 Q. Okay.

20 A. And that, again, 147-page document and  
21 he presents table after table of species, the  
22 isotope that was used to assess the radiation  
23 impacts, the level of -- the dosage of radiation and  
24 the various observable impacts.

1 Q. Was that the type of information that  
2 was used in developing this DOE?

3 A. Oh, sure.

4 Q. Do they cite in the Patuxent study?

5 A. I don't remember. Eisler might have  
6 even been on the BDAC, I didn't --

7 THE COURT REPORTER: I'm sorry, I  
8 can't hear you.

9 THE WITNESS: I'm sorry. Eisler might  
10 have even been on BDAC, I didn't review the  
11 membership.

12 BY MS. WILLIAMS:

13 Q. What's BDAC?

14 A. The Biota --

15 Q. Oh, BDAC.

16 A. -- Dose Assessment.

17 Q. In your second --

18 MR. FORT: Excuse me, just a second.  
19 Just for the record, the reference study is  
20 listed on the references in the document  
21 we've marked as Exhibit 15, the Biota Dose  
22 Assessment Committee document.

23 MS. WILLIAMS: Which module or portion  
24 of the study have the sites in it?

1                   MR. FORT: Well, it's in the first  
2                   part, it's for Module 1 so it's the  
3                   reference --

4                   MS. WILLIAMS: Okay. The preliminary.

5                   MR. FORT: -- at the beginning. It's  
6                   really the outline and the list of  
7                   references, it's at the very beginning.

8                   MS. WILLIAMS: Okay.

9                   MR. FORT: And that's all part of it.

10                  MS. WILLIAMS: Thank you.

11                  HEARING OFFICER ANTONIOLLI: Okay.

12 BY MS. WILLIAMS:

13                  Q.        In bullet point No. 3 you state that  
14                  it isn't necessary to do species specific studies on  
15                  whether radium can harm a particular species  
16                  inhabiting in Illinois.

17                                Are you aware of what species  
18                  would be the most sensitive?

19                  A.        The limiting factors used by BDAC for  
20                  one rad per day aquatic wildlife, that what they  
21                  cited was gametogenesis -- interruption of  
22                  gametogenesis in fish, and I actually believe for  
23                  the .1 they didn't specifically reference it beyond  
24                  riparian wildlife, what the actual mechanism is,

1 it's probably the same mechanism that causes cancers  
2 and fatality in humans. I mean, they're mammals.

3 Q. Right. And they -- so they didn't  
4 reference this particular species for the .1 rad?

5 A. I don't have any recollection of any  
6 specific reference than -- other than saying that it  
7 was terrestrial mammals because they're higher on  
8 the --

9 Q. Right.

10 A. -- biogenetic.

11 Q. And had they used the species that  
12 were referenced, which I'm not going to try and  
13 pronounce, gametos --

14 A. Gametogenesis in fishes? Again,  
15 that's for the aquatic.

16 Q. Okay. And that would have resulted in  
17 a much higher number than this 3.75 picoCuries per  
18 liter?

19 A. If you used -- if you ignored the  
20 wildlife and the riparian zone that feeds and is  
21 supported, drinks and eats --

22 Q. Well, I'm not saying that but if  
23 you --

24 MR. FORT: Excuse me.

1 MS. WILLIAMS: He's not answering my  
2 question, that's why I'm clarifying.

3 MR. FORT: Well, but let him finish  
4 his question, maybe he'll get to the rest of  
5 your question, you know, if you give him a  
6 chance.

7 HEARING OFFICER ANTONIOLLI: Okay.  
8 You can go ahead and finish answering and  
9 then you can continue.

10 BY THE WITNESS:

11 A. Yeah. If you do not consider riparian  
12 wildlife at all, the potential impact to them, then  
13 the -- it would lead to a higher number than 3.75,  
14 that's correct.

15 BY MS. WILLIAMS:

16 Q. In your fifth bullet point you state  
17 that no increase in radiation above background  
18 levels is without risk.

19 Wouldn't drinking levels above  
20 background then involve a risk?

21 A. Absolutely, that's why the MCL is  
22 promulgated. And if it went from five to zero,  
23 there would be even less risk.

24 Q. Less risk, that's my question. Are

1 you recommending that we ban drinking water with  
2 levels above zero?

3 A. This has been a 20-year debate  
4 extensively -- intensively studied, intensively  
5 debated. I'm comfortable with the federal MCL at  
6 five picoCuries per liter for drinking water.

7 Q. Then can you explain for the Board why  
8 you're comfortable with five picoCuries per liter  
9 for human consumption but you're recommending in  
10 your testimony retention of one picoCuries per liter  
11 for water that's discharged today from a sewage  
12 treatment plant to a low-flow stream?

13 A. Okay. Yeah, I can do that. Well,  
14 first of all, you have to remember that one -- that  
15 this current standard is one picoCurie per liter  
16 radium 226.

17 Q. Okay.

18 A. There will be a concomitant  
19 contribution from 228, it runs -- could run 40 to  
20 60 percent either way so really one is two so we're  
21 already at two. If -- Do you understand that?

22 Q. Well ...

23 A. That's really key because there is  
24 some confusion in the record before the Board.



1 Q. Uh-hum.

2 A. It over and over states that we're  
3 moving the standard from one picoCurie to four or to  
4 five, it's one picoCurie radium 226, it's five  
5 picoCuries combined --

6 Q. Correct.

7 A. -- 226, 228 so that's an important  
8 consideration. If you have a situation where you're  
9 delivering water -- drinking water at five  
10 picoCuries, and let's say the water where -- that  
11 you don't concentrate the radium and you send it to  
12 a sewage treatment plant at five picoCuries, you're  
13 going to lose part of it to the sediment, roughly  
14 half, depending on the proportion of radium 226,  
15 228, depending on the absorption levels of the  
16 sludge in the treatment plant but 50 percent is a  
17 reasonable calculation, so you've got 2.5 going out  
18 into the stream which is pretty close to the two.

19 So -- and what I -- and I'm  
20 recommending one be put in place because the  
21 proposal is to eliminate it completely and have no  
22 standard.

23 Q. So if there was a different number in  
24 place, you might recommend a different combined

1 standard rather than the existing one picoCurie per  
2 liter of radium 226?

3 A. I think now that you've clearly  
4 reviewed the graded approach and started to look at  
5 the numbers, there may be a reasonable way to  
6 address the concerns of POTWs that might have  
7 trouble meeting the one picoCurie per liter  
8 standard. But it's sure not a rational approach to  
9 do away with the standard for everybody to address  
10 the needs for a few POTWs as per the IEPA testimony.

11 Q. I understand. In general, would you  
12 say it's better to have -- in general, would you say  
13 a combined standard of radium 226 and radium 228  
14 would be preferable to just a radium 226 standard?

15 A. Yeah, probably. And you could even go  
16 to alpha emitters, a combined -- a standard that  
17 dealt with all alpha emitters.

18 Q. Are you aware of what the drinking  
19 water standard is for alpha emitters?

20 A. Fifteen? Fifteen or 20.

21 Q. I think 15 is correct. Are you aware  
22 of what the drinking water is for beta?

23 A. No.

24 Q. Are you aware of what the Department

1 of Energy effluent limit is for radium for -- Well,  
2 I don't think it's the Department of Energy -- what  
3 nuclear power plants' effluent is regulated by?

4 A. I don't think I do. I don't think  
5 I've seen that.

6 Q. You spend a significant portion of  
7 your bullet points referring to a study out of  
8 Florida?

9 A. Uh-hum.

10 Q. I believe you call it Technical Report  
11 to the Southwest Florida Management District 2000.

12 A. Uh-hum.

13 Q. In your what is the first bullet point  
14 on my Page 3 --

15 A. Okay.

16 Q. -- it starts radium is closely related  
17 chemically to calcium?

18 A. Yes.

19 Q. You state in there that it moves  
20 easily through the environment?

21 A. Right.

22 Q. Isn't that statement contradictory to  
23 the Florida study on Page 7?

24 A. Which says?

1 Q. If you would like to take a look at  
2 it.

3 MR. FORT: You're referring to one of  
4 the attachments to Mr. Adam's testimony?

5 MS. WILLIAMS: Exhibit H.

6 HEARING OFFICER ANTONIOLLI: It would  
7 be D.

8 MS. WILLIAMS: Exhibit D? Did I get  
9 it wrong?

10 HEARING OFFICER ANTONIOLLI: Uh-hum.  
11 Attachment D.

12 BY MS. WILLIAMS:

13 Q. Sorry. Yeah, Page 7, Paragraph 2 of  
14 Exhibit D. It says the last sentence referring to  
15 radium, consequently it is usually not a mobile  
16 constituent in the environment?

17 A. Well, you have to read the sentence --  
18 the rest of the sentence.

19 Q. Okay. Go ahead, read the rest of the  
20 sentence.

21 A. Radium does not degrade in water by  
22 means other than radioactive decay, and it may be  
23 readily absorbed by soils.

24 Q. Soils.

1           A.       Absolutely.  Consequently, it's  
2 usually not a mobile constituent in the environment.  
3 That's specifically referring to its affinity to  
4 build up in things like sewer sludge and sediments.

5           Q.       Well, what is your --

6           A.       But the components that don't are  
7 biologically mobile.  I mean, that's how human  
8 cancers develop, it's absorbed into the bones and it  
9 irradiates the bone marrow.

10          Q.       Do you know what those percentages  
11 are?

12          A.       Well, I've seen numbers in absorption  
13 in sediments and sewer sludge range from 20 to  
14 80 percent.

15          Q.       It's very variable, the data that's  
16 out there?

17          A.       Yes, absolutely.  That's why I  
18 testified previously that often they use 50 percent  
19 when it ends up in the sewage treatment plant but  
20 it's highly variable.

21          Q.       Would some of that variation be based  
22 on solubility?

23          A.       Well, solubility is a consideration  
24 and if radium is in a soluble state, it's probably

1 less problematic, for example, than radium that's  
2 precipitated out using HMO. A precipitant that  
3 forms it as a particle, if you then take it and land  
4 apply it, that's problematic; you get an earthworm  
5 picks up a particulate form of radium rather than it  
6 being evenly spread across the land, so it's just  
7 another way that it's concentrated.

8                                 So yes, the form that it exists in  
9 can affect its mobility and the potential pathways  
10 for exposure for biomagnification through the  
11 ecosystems.

12                 Q.         Do you think it would need to be  
13 soluble to be -- for there to be an uptake by  
14 mollusks for example?

15                 A.         No. You know, in the Florida study  
16 they actually -- I think, I don't know, I'm  
17 trying -- I was trying to read between the lines  
18 frankly.

19                 Q.         Right.

20                 A.         And this is purely a judgment, you  
21 know, they don't say this, but they seem surprised  
22 at the levels of concentration. It might be because  
23 it's a siphon feeder and it's taking in  
24 particulates, it could also be because for some

1 reason the muscle -- I mean, the muscle in the  
2 mussel -- has a particular affinity for the soluble  
3 form, it's -- that's very speculative. I don't  
4 know.

5 Q. I believe you said that like calcium  
6 if it is taken in by the organism, it would  
7 primarily concentrate in the bones or like mollusk  
8 shells?

9 A. Those are places where there is a lot  
10 of calcium. I mean, typically in vertebrates it's  
11 skeletal system, nerves and muscles.

12 Q. And I would assume for humans and for  
13 larger mammals it's safer that it be there than in  
14 the flesh, correct?

15 A. No. No, the bone is the most  
16 dangerous place because it's a carcinogen.

17 Q. Right, but if it's in -- I'm sorry,  
18 being in the mussel shell or the fish bone --

19 A. Oh, we're talking -- I'm sorry.

20 Q. -- if you're to -- as a predator.

21 A. Yes. Yes, because they would be  
22 eating the flesh.

23 Q. Okay. With regard to the Florida  
24 study, that was a study of Round Lake; is that

1 correct?

2 A. That was one of the lakes studied.

3 Actually, I remember there were several.

4 Q. There was only one lake from which

5 they took water samples I believe, correct?

6 A. Yeah.

7 Q. And that was Round Lake?

8 A. I believe so.

9 Q. Do you know -- are you aware of what

10 the loading of radium was to that lake? I believe

11 the study talks about the concentration. Do you

12 know if it talked about the loading? And do you

13 know what I mean by loading when I say that?

14 A. Yeah, you're talking about the

15 concentration of radium in picoCuries per liter.

16 Q. But I mean are -- no, I know it talked

17 about the concentration but it didn't talk about the

18 quantity. So in that study I guess for folks that

19 probably didn't read it, water was being pumped from

20 the groundwater into the lake, correct?

21 A. Yeah, it was being supplemented.

22 Q. Do you know how much groundwater was

23 pumped into the lake?

24 A. I'd have to -- I would have to refer



1 to the document. Sorry.

2 Q. Do you know why they needed to pump  
3 groundwater into the lake?

4 A. Well, actually, it was drawn down  
5 associated with the -- I think they were just  
6 supplementing it to keep the water level high for  
7 the benefit of wildlife and the fish.

8 MR. FORT: Mr. Adams has further  
9 information on that.

10 MS. WILLIAMS: Well, we can talk about  
11 it when we get to his testimony then.

12 MR. FORT: I didn't know if you wanted  
13 the answers here or someplace else.

14 MS. WILLIAMS: No, that answer can  
15 wait.

16 BY MS. WILLIAMS:

17 Q. Do you know if that study was ever  
18 peer-reviewed or published?

19 A. Technical reports are not typically  
20 peer-reviewed.

21 Q. Can you think of any real world  
22 examples in Illinois that would be comparable to the  
23 facts in the Florida study where groundwater was  
24 being used to recharge a lake for example?

1           A.       You know, we get 60 inches of rainfall  
2 per year. We have severe strains on our drinking  
3 water supplies, I would not be surprised if it's not  
4 atypical. I mean, I can't think of a situation.

5           Q.       Right.

6           A.       It's not impossible. Some homeowners  
7 association who lost their lake and has the money  
8 might be happening, but I can't -- I wouldn't do it  
9 in northeastern Illinois.

10          Q.       And isn't really that the conclusion  
11 of the Florida study that that's probably not the  
12 best idea to take high rating groundwater and  
13 recharge your lake with it?

14          A.       That's one of the conclusions. I  
15 would also conclude that you shouldn't discharge  
16 radium into aquatic systems at all if you can help  
17 it, if there's any economically feasible  
18 alternatives.

19          Q.       But you're not -- again, you're not  
20 recommending that we don't use this water for  
21 drinking?

22          A.       This water?

23          Q.       That we -- you don't recommend that we  
24 ban using high radium groundwater for drinking if it

1 can meet the MCL?

2 A. If it can meet the MCL for drinking  
3 water, no, I agree with that.

4 Q. Are you aware of whether the Florida  
5 study -- Strike that.

6 Isn't it true that the Florida  
7 study didn't conclude a specific adverse impact on  
8 the mussels in Round Lake?

9 A. No, I think their concerns were the  
10 things that would be eating the mussels and the  
11 biomagnification process that would move it up in  
12 the food chain.

13 Q. And they also concluded they didn't  
14 have enough information to determine whether any  
15 specific animals that might be eating these mussels  
16 would be in danger, correct?

17 A. And that is not uncommon with any  
18 pollutant. It's very difficult to demonstrate that  
19 the pollutant itself was the cause of any lethality,  
20 mortality or loss, that's very difficult and  
21 expensive work and it's not typically done; that's  
22 why the regulatory framework is a model.

23 Q. Do you know anything about the  
24 geologic formation at the bottom of Round Lake and

1 what it's composed of?

2 A. Gosh, I don't recall. I don't recall  
3 a discussion of that. I'm sorry.

4 Q. Do you recall if they took any pH  
5 samples in that study of the lake?

6 A. Oh, I'm sure they did, but I don't  
7 remember them. I mean, that's typical when they're  
8 doing a water quality study.

9 Q. It would be typical to take a pH  
10 sample when you're doing a water quality study?

11 A. Yes. Right.

12 Q. Do you know if the state of Florida  
13 took any action in response to this Round Lake  
14 study?

15 A. No, but Ted may. Do you know?

16 DR. ADAMS: I don't believe they did  
17 at the time.

18 BY MS. WILLIAMS:

19 Q. In the very last paragraph -- full  
20 paragraph I guess of your testimony you state that  
21 in your opinion if there is affordable technology  
22 available that avoids the need to reintroduce radium  
23 to the environment, it should be employed.

24 Is it your testimony that the

1 Board should set new best available technology for  
2 drinking water beyond that established by USEPA?

3 A. I would not presume to tell the Board  
4 what it --

5 HEARING OFFICER ANTONIOLLI: Could I  
6 have you both speak up a little bit more just  
7 for the public too?

8 THE WITNESS: I would not presume to  
9 tell the Board what it should -- should or  
10 should not be doing in that regard.

11 MEMBER RAO: Just as a matter of  
12 clarification about that particular  
13 statement. Were you talking about this  
14 affordable technology for treating -- for  
15 drinking water, or ...

16 THE WITNESS: Once you concentrate the  
17 radium to reduce the radium level in their  
18 delivered drinking water, I mean the best and  
19 most logical thing is to remove the radium  
20 from the system, it avoids what are likely  
21 detrimental which -- what will be detrimental  
22 impacts on the biota, but it also just takes  
23 it out of the system. You don't have to deal  
24 with any of these issues of exposure to

1           sewage treatment workers, you don't have to  
2           deal with potential exposure pathways with  
3           land application; you get it out of the  
4           system, you put it in a storage facility, you  
5           don't have to deal with it. You don't have  
6           to deal with potential costs building up in  
7           the sediments.

8                         What if you've got to dredge those  
9           sediments some day? Now they're hot and it's  
10          incredibly expensive. It's just the logical  
11          approach in my opinion, but I do not presume  
12          to testify that there is an economically  
13          feasible way. There are other folks who are  
14          more informed in that regard, that is not my  
15          expertise.

16                        MEMBER RAO: And this technology that  
17          you're referring to is more towards  
18          getting -- you know, dealing with radium post  
19          drinking water --

20                        THE WITNESS: Yes.

21                        MEMBER RAO: -- treatment?

22                        THE WITNESS: Yes.

23                        MEMBER RAO: So because when  
24          Ms. Williams mentioned best available

1 technology, that's USEPA --

2 THE WITNESS: Terminology.

3 MEMBER RAO: -- yeah, terminology  
4 which applies to drinking water.

5 THE WITNESS: And I have no expertise  
6 in that.

7 MEMBER RAO: Thank you very much.

8 MEMBER GIRARD: Could I just --

9 MS. WILLIAMS: Yeah.

10 MEMBER GIRARD: So just to clarify the  
11 clarification. You think it should be a  
12 public policy goal for the state of Illinois  
13 to remove radium from the environment when  
14 possible.

15 THE WITNESS: Absolutely. Because as  
16 a radiation source wherever you put it, if  
17 it -- if any organism can come into contact  
18 with it, even for small periods of time, it  
19 increases risks of detrimental biological  
20 effects, it's just the nature of radiation.

21 MEMBER GIRARD: Thank you.

22 BY MS. WILLIAMS:

23 Q. Do you have an opinion on what the  
24 background level of radium is in the northern part

1 of Illinois that we're discussing?

2 A. No, I don't.

3 Q. There were some exhibits attached to  
4 Mr. Adam's testimony that were maps --

5 A. Yes.

6 Q. -- about endangered species? Have you  
7 reviewed those?

8 A. Yes, I have.

9 Q. I'd like to direct you to one in  
10 particular, this is not our area of expertise, it's  
11 the Department of Natural Resources as you  
12 indicated. This map is -- I believe it was Exhibit  
13 E, is that --

14 HEARING OFFICER ANTONIOLLI: I think  
15 there were two maps, so ...

16 MS. WILLIAMS: There was one in --  
17 Exhibit A had one map, Exhibit E had several.

18 HEARING OFFICER ANTONIOLLI: This is  
19 Exhibit E.

20 MS. WILLIAMS: Right.

21 HEARING OFFICER ANTONIOLLI: Okay.

22 MS. WILLIAMS: And I think it's the  
23 sixth one though they're not numbered. I  
24 believe it's titled Distribution Area



1           Lampsilis higginsii.

2                         THE WITNESS: Higginsii mussel I

3           believe, yes.

4 BY MS. WILLIAMS:

5           Q.       Is that it?

6           A.       Uh-huh.

7           Q.       Is it your testimony that that's an  
8 accurate reflection of the range of that species?

9           A.       Well, first of all, this isn't part of  
10 my testimony, but ...

11          Q.       No.

12          A.       But I do have some expertise in this  
13 regard. These -- my understanding is these are  
14 historic ranges for these threatened endangered  
15 species. They do not imply that the shaded area is  
16 a place where that threatened endangered species is  
17 currently found. If it was, it wouldn't probably be  
18 endangered because there would be a lot of them but  
19 that's what this is.

20          Q.       And would you agree that's true of all  
21 the maps they provided?

22          A.       Yes. So what this is trying to -- I  
23 think the point that they're trying to make, you  
24 know, and I don't mean to speak for you, but is that

1 you could impair the recovery of the threatened or  
2 endangered species if it meets these habitats within  
3 its specific range and they're no longer potentially  
4 available because of the impacts of radium  
5 discharge.

6 Q. Is that how the department looks at  
7 whether potential impacts will result in taking of a  
8 threatened or endangered species?

9 A. It is a consideration. The impact on  
10 potential habitat is something that is considered  
11 but frankly you need to consult with the department.

12 Q. Okay. And are you aware of that  
13 particular endangered species where it's found?

14 A. I'm personally not familiar with that  
15 particular organism. I'm a bird guy and lots of  
16 other things but not a mussel guy.

17 Q. I could ask lots of things about  
18 birds, but I'll stick to this subject here.

19 A. I'd love to answer.

20 MS. WILLIAMS: I think I'm almost done  
21 with Dr. Anderson, but I'd like to talk with  
22 my folks real quick.

23 (Whereupon, a discussion  
24 was had off the record.)

1 MS. WILLIAMS: I think that's all I  
2 have for Dr. Anderson. It's up to the Board  
3 whether you'd like folks to finish asking him  
4 questions and then move on to Dr. Adams?

5 HEARING OFFICER ANTONIOLLI: You can  
6 go ahead and ask Dr. Adams as well unless  
7 you'd like to take a break.

8 MS. WILLIAMS: That's fine. A break  
9 is always good, but I can keep going. Hi,  
10 Mr. Adams, how are you?

11 THE WITNESS: Good, thanks.

12 HEARING OFFICER ANTONIOLLI: At this  
13 point you may have questions that may answer  
14 other peoples' questions and we'll let you  
15 ask them. You're lucky.

16 MS. WILLIAMS: Yeah, I'm so lucky.

17 HEARING OFFICER ANTONIOLLI: And we  
18 can also take another break shortly, so ...

19 MS. WILLIAMS: Find Dr. Adams'  
20 testimony first.

21 D I R E C T E X A M I N A T I O N

22 By Ms. Williams

23 Q. Okay. On the first page of your  
24 testimony, Dr. Adams, you state something that I

1 think is new to me anyway. You state that the  
2 existing standard of one picoCuries per liter for  
3 radium 226 generally is recognized as a background  
4 condition in surface waters of Illinois and then you  
5 provide a citation.

6                                Could you explain that to us a  
7 little bit more?

8           A.        Explain?

9           Q.        Well, I have not read this attached  
10 publication. So are you saying it's -- what do you  
11 mean by generally recognized I guess?

12           A.        Oh, okay. Yeah, I think if you look  
13 at typical literature that documents the background  
14 levels of radium 226 or other radionuclide for that  
15 matter, that in Illinois you would see in surface  
16 waters background ranges that would be less than one  
17 picoCurie --

18           Q.        Less than one?

19           A.        -- per liter and up to one, it varies,  
20 it varies. So I was trying to give an idea, an  
21 average background concentration that we could start  
22 from.

23           Q.        Do you recall Mr. Mosher talked about  
24 data from the Fox River that we had that found the

1 concentration at 0.1 picoCuries per liter? Would  
2 you find that to be a common background that might  
3 be found?

4 A. I think it would be within the range.  
5 I don't remember it specifically, but I would say  
6 that it can be less than one and up to one up to  
7 two.

8 Q. Would you mind providing this article  
9 to the Board that you cite?

10 MR. FORT: We'll get the reference.

11 We'll get it.

12 MS. WILLIAMS: Okay. Thank you.

13 BY MS. WILLIAMS:

14 Q. Is it your testimony that the Board  
15 was intending to set the water quality standard at  
16 background?

17 A. No.

18 Q. No. Your testimony is that it's a  
19 coincidence the water quality standard is the same  
20 as what you consider background?

21 A. I think what I was communicating and  
22 testifying is that one picoCurie per liter current  
23 standard is at or near Illinois surface water  
24 background and that that being the case and there

1 was no -- the Agency hasn't provided any further  
2 justification to change that particular standard,  
3 that I would support leaving the standard at one.

4 Q. Okay. But you're not aware if the  
5 Board considered what background levels were when  
6 they adopted this standard?

7 A. No, I'm not.

8 Q. Also on that page you said it appears  
9 that any increase over the existing standard could  
10 result in an excessive radium exposure.

11 Would you tell us what you mean by  
12 excessive? Do you see where I'm reading from?

13 A. Right. Okay. I think we need to go  
14 back to the sentence just before that so that we can  
15 pick up: By doing so, any variations from that  
16 standard would require careful consideration. From  
17 the analyses I have performed, and those analyses  
18 would be based on the bio dose assessment  
19 calculations, which would indicate that anything  
20 over, depending on the calculation, 1.36, 1.88 which  
21 is clearly above one, then there could be the  
22 potential of an adverse effect on the aquatic  
23 organisms and it clearly would exceed or does exceed  
24 the limiting requirement that's established by the

1 BDAC.

2 Q. What exceeds the BDAC?

3 A. If there was an increase in the  
4 picoCurie per liter concentration in the range of  
5 1.36 and 1.88.

6 Q. So by could result in excessive radium  
7 exposure you're saying it could result in some  
8 impact?

9 A. Correct.

10 Q. Because it would be?

11 A. That's correct.

12 Q. You don't know what impact that would  
13 be?

14 A. (No audible response.)

15 THE COURT REPORTER: Is that a no?

16 THE WITNESS: Yes -- I'm sorry -- we  
17 do not know, correct. I'm sorry.

18 BY MS. WILLIAMS:

19 Q. When we were talking about the biota  
20 dose committee approach, that's this report, right,  
21 that's been entered as an exhibit?

22 A. That's correct.

23 Q. And we discussed that briefly at the  
24 last hearing too, correct, or no?

1           A.       We introduced it, I don't think we did  
2 discuss any details.

3           Q.       Is this a regulatory requirement, this  
4 approach?

5           A.       It is a standard that is used by the  
6 DOE, it is established on the DOE contractors.

7           Q.       And how do they use that standard as  
8 you put it?

9           A.       As part of their environmental  
10 monitoring program DOE requires all of its  
11 contractors as part of reporting the environmental  
12 monitoring results post human, the public, the  
13 worker and the environment, it is part of the annual  
14 environmental market that the DOE contractors put  
15 out every year.

16          Q.       And if the contractor finds values  
17 that exceed the screening tool, isn't it correct  
18 that the next step is then to do further tests?

19          A.       That is correct, the next step is to  
20 do specific -- gather information, specific -- site  
21 specific information gathering activities.

22          Q.       Have you consulted with any of the  
23 authors of this study --

24          A.       Yes, I have.



1 Q. -- in preparation for this hearing?

2 A. Mr. Steve Domotor, he is the DOE  
3 chairman of the BDAC.

4 Q. And isn't it true that Mr. Domotor  
5 cautioned you against the use of this approach in  
6 setting water quality standards?

7 A. Not to my knowledge. Not to my  
8 recollection.

9 Q. He didn't suggest that this was overly  
10 conservative for this purpose?

11 A. We talked about its use and the fact  
12 that there were conservative assumptions put into  
13 that approach, but that's part of the methodology.  
14 It's part of the screening and then from the  
15 screening one goes into more detailed site specific  
16 information.

17 Q. Okay. Great. Thanks. Would you mind  
18 maybe explaining for us in a little bit more detail  
19 about some of these conservative assumptions, what  
20 they are based on?

21 A. Well, there are a number of default  
22 values, what you're calling input or conservative  
23 values, they range anywhere from distribution  
24 coefficient values that would be looking at how much

1 radium or radionuclide might be in the sediment as a  
2 result of a certain concentration of radioactive  
3 material in the water. It may also look -- or one  
4 assumption would be how much time a particular  
5 organism spends in the impacted area.

6 Q. And how much time is that?

7 A. It all depends on the individual.

8 There are default --

9 Q. What is the default value for that?

10 I'm sorry.

11 A. That is an approach. It's a limit, a  
12 value and there's several of them so there's  
13 probably 40 or 50 of them that are used to develop  
14 the methodology or to exercise the methodology and  
15 that depends on whether it's an animal or an aquatic  
16 organism. So one can go to the default value table,  
17 look at what that default value is and identify  
18 that.

19 Q. Do you agree that the default value  
20 for the riparian mammal was 24 hours a day exposure?

21 A. That was what the default value was,  
22 that's correct.

23 Q. And it also -- the default value also  
24 would assume that the mammal got all of its food,

1 all of its water --

2 A. That's also correct.

3 Q. -- from that? Is it also correct that  
4 the default assumption is that there is a constant  
5 concentration, no dilution coming in when it rains?

6 A. It is the concentration of the water  
7 or the sediment set for that particular scenario so  
8 it is --

9 Q. So it --

10 A. -- it is what it is being investigated  
11 but the bottom line is that we're still measuring  
12 against a limiting value of either one rad per day  
13 or in the case of the riparian .1. So there's no --  
14 there's no confusion that there are certain default  
15 values that are being used and from that, one needs  
16 to take the next step when you exceed the BCGs, the  
17 Biota Concentration Guides, to gather more  
18 information. That's what's required.

19 Q. Site specific information?

20 A. That's the way it's set up, there's no  
21 surprises there.

22 Q. All right. That's helpful, thank you.

23 A. Okay. And I don't see the Agency  
24 doing that.

1 Q. Right. And by what you mean you don't  
2 see the Agency doing it, you mean you don't see us  
3 gathering site specific data that could then be  
4 plugged in to this model to determine what an  
5 appropriate water quality standard would be for the  
6 state of Illinois; is that correct?

7 A. That's correct.

8 Q. We have entered in now the entire DOE  
9 document, correct?

10 A. That is my understanding.

11 Q. I believe. In your -- in exhibit to  
12 your testimony, Exhibit C, you provided portions of  
13 that document, correct?

14 A. Correct.

15 Q. And there is a table I believe at the  
16 end of that. It's page M1-38. This -- is this --  
17 this is one of the tables, right?

18 A. That's one of the tables, that's  
19 correct.

20 Q. About how many tables are there, do  
21 you know?

22 A. There are a number.

23 Q. And just explain -- I mean, I think I  
24 understand but why don't you explain for everybody

1 why you put this one and not all the other ones?

2 A. Right. Well, the other tables --  
3 there are different purposes for the other tables.

4 Q. Uh-hum.

5 A. This particular table, Table 6.2, is  
6 entitled Biota Concentration Guides, BCGs, for Water  
7 and Sediment. This particular table is in special  
8 units as opposed to other units, special units being  
9 our picoCuries per gram, picoCuries per liter, and  
10 it's for use in aquatic system --

11 Q. Okay.

12 A. -- evaluations. And so what we have  
13 here is a table that lists the radionuclides, it has  
14 the established BCG for water and for sediment,  
15 water being picoCuries per liter, sediment being  
16 picoCuries per gram, and then the organism  
17 responsible for limiting the dose in water or the  
18 limiting dose in sediment. There are other tables  
19 that provide other information like tables on the  
20 default values, for example.

21 Q. Okay. And there would be a different  
22 table, say, for aquatic life, this table?

23 A. There would be a different table for  
24 terrestrial life.

1 Q. Okay.

2 A. There is another table in the -- for  
3 aquatic systems in the other units.

4 Q. Okay. This is for an aquatic system  
5 but it's looking at a riparian animal, right? So  
6 there's also a table that would say aquatic systems  
7 and aquatic animal, right, for radium? Here under  
8 radium 226 and radium 228 it says riparian animal or  
9 it only lists -- are you saying it only lists -- Go  
10 ahead, maybe explain it.

11 A. No, go ahead.

12 Q. I've got to tell you I'm not sure,  
13 this stuff is over my head I think, and I think it's  
14 over the head of most of the folks that I usually  
15 rely on to explain all this stuff. So do I look at  
16 this table for aquatic systems and you're saying  
17 another one for terrestrial systems?

18 A. That's correct.

19 Q. Can you tell me which table that would  
20 be?

21 A. I can. If you give me the document, I  
22 probably could identify it. Well, that's 6.2 but  
23 I'm thinking it's either 6.1 or wait a minute. On  
24 table -- excuse me -- Table 6.4.

1 Q. Okay.

2 A. Which is page M1-40, that is the  
3 bioconcentration guide to water and soil in  
4 terrestrial systems.

5 Q. Now I looked over this stuff this  
6 morning and I think I understand now, best I'm ever  
7 going to, how you did these calculations. Could you  
8 maybe walk through them a little bit for the Board?

9 A. May I refer to my calculations in  
10 my --

11 Q. Of course.

12 A. -- testimony?

13 Q. Sure.

14 A. I think it would be easier. You may  
15 want to keep your finger or thumb on page M-38. I'm  
16 going to use my amended version because the pages  
17 are in the proper order. If we could go to Page B-5  
18 in my testimony. And also hold --

19 Q. You mean Exhibit B, Page 5, is that  
20 what you mean, or ...

21 A. Exhibit B, Page 5, correct.

22 Q. Okay.

23 A. I'll wait for everybody to get there  
24 and we'll proceed.

1 Q. Okay. Was this page on the original?

2 MR. FORT: Yeah, it was in there, it  
3 wasn't at the front of all the calculations.

4 HEARING OFFICER ANTONIOLLI: And  
5 that's the reason for the amended pre-filed  
6 testimony because now the pages --

7 MR. FORT: This is actually what they  
8 called it, the Hearing Officer gave me, was  
9 concerning about where it says Page B-5.

10 MS. WILLIAMS: Okay.

11 HEARING OFFICER ANTONIOLLI: Now, do  
12 you want to take a break now before we go on?

13 MS. WILLIAMS: Fine.

14 HEARING OFFICER ANTONIOLLI: Why don't  
15 we do that. Let's take a break, ten minutes.  
16 It's about ten to now, we'll be back at  
17 4:00 o'clock.

18 (Whereupon, after a short  
19 break was had, the  
20 following proceedings  
21 were held accordingly.)

22 HEARING OFFICER ANTONIOLLI: We are  
23 back on the record and it is about five after  
24 4:00 now and --



1                   MR. DOBMEYER: The EPA lawyer isn't  
2 here yet.

3                   HEARING OFFICER ANTONIOLLI: We'll  
4 note for the record that she hasn't joined us  
5 yet, but we will go ahead with a public  
6 comment I believe.

7                   MEMBER JOHNSON: There is an EPA  
8 lawyer present.

9                   HEARING OFFICER ANTONIOLLI: Deb  
10 Williams is not in the room but we would like  
11 to -- Are you prepared to go ahead with that  
12 now?

13                  MS. ADAMS: Yes.

14                  HEARING OFFICER ANTONIOLLI: Okay.

15                  MS. ADAMS: I'm Sarah Adams and I live  
16 in Chicago but I have family in southern  
17 Illinois, and they have a farm and they have  
18 many creeks and little streams that go  
19 through their farm as well as ponds that they  
20 fish in and they also use well water and I  
21 was very concerned about the water systems in  
22 southern Illinois and my question for the EPA  
23 would be why, if it's been the same for  
24 however many years, why do you even want to

1 change it? So that's my question.

2 MR. MOSHER: Yeah, I think I can  
3 answer that.

4 HEARING OFFICER ANTONIOLLI: Okay.

5 And --

6 MR. DOBMEYER: Sir, would you talk  
7 louder, please.

8 HEARING OFFICER ANTONIOLLI: Would you  
9 like to be sworn in? Can you swear him in  
10 first?

11 THE COURT REPORTER: Do you solemnly  
12 swear that the testimony that you are about  
13 to give is the truth, the whole truth and  
14 nothing but the truth?

15 MR. MOSHER: I do.

16 (Witness sworn.)

17 WHEREUPON:

18 ROBERT G. MOSHER,  
19 called as a witness herein, having been first duly  
20 sworn, deposeth and saith as follows:

21 MR. MOSHER: Okay. There is a radium  
22 built in northern Illinois, there are a few  
23 cases of radium being found in groundwater  
24 elsewhere in the state, in southern Illinois,

1           Sparta area has some radium in the  
2           groundwater. This water quality standard has  
3           been on the books since 1972, and we have, I  
4           believe, gone on record to say that we have  
5           not enforced this water quality standard as  
6           far as regulating sewage effluence to this  
7           point.

8                         We realize that the communities  
9           that are using this groundwater in these  
10          areas of the state don't have another source  
11          and that the common methods of treating that  
12          water or not treating that water result in  
13          compliance problems with the drinking water  
14          standard of five picoCuries per liter.

15                        When we looked at the dilemma that  
16          these communities were in as far as having no  
17          other source of water and yet being forced to  
18          discharge to the waters of the state sewage,  
19          we said well, let's go and look at that  
20          radium standard to see if it's justified,  
21          does it have to be one picoCurie per liter in  
22          all waters of the state and that's what  
23          really brought this rulemaking forth. If the  
24          radium standard was not in question of being

1 met in its existing form, we wouldn't be here  
2 today but it's these hundred plus communities  
3 in the state that we felt we needed to do  
4 something, we needed to look at the existing  
5 standard, is it appropriate, is it overly  
6 protective; we decided yes, it was, that's  
7 why we're here.

8 To not address this standard,  
9 which we are doing today, would -- and to  
10 then begin to enforce it as permanent limits  
11 for these sewage treatment plants would cause  
12 widespread non-attainment no matter what  
13 method people use to treat for radium in that  
14 drinking water source.

15 So the Agency feels that we're  
16 trying to set the water quality standards  
17 right, just trying to get to look at what  
18 science is available, set it right and we  
19 believe doing that would take the problem of  
20 discharge of the radium from the sewage  
21 treatment plants and remove that as one of  
22 the problems that these communities face.

23 MR. DOBMEYER: I have follow up.

24 HEARING OFFICER ANTONIOLLI: Would you

1           like to continue?

2                   MS. WILLIAMS: Uh-hum. Hang on or can  
3 you -- I'm sorry I was late, can you fill me  
4 in on what we're -- are we opening up? I'm a  
5 little confused.

6                   HEARING OFFICER ANTONIOLLI: No, this  
7 is a -- it was a comment by Clean Water and  
8 they have a scheduling conflict and can't be  
9 at the hearing tomorrow should it continue  
10 and would you like to repeat your question  
11 briefly?

12                  MS. ADAMS: I was just wondering --

13                  HEARING OFFICER ANTONIOLLI: Please  
14 identify yourself too again.

15                  MS. ADAMS: Oh, I'm sorry.

16                  HEARING OFFICER ANTONIOLLI: Thank  
17 you.

18                  MS. ADAMS: I'm Sarah Adams, and I  
19 said that I live in Chicago but I have family  
20 in southern Illinois and they have a farm  
21 that has creeks and rivers and stuff going  
22 through there, and I was concerned about the  
23 water systems in southern Illinois and I was  
24 wondering why -- why even change the standard

1 if it's been the same way for so long so that  
2 was my question.

3 MR. DOBMEYER: And I would like to  
4 follow up on that, my name is Doug Dobbmeyer.  
5 I guess the -- what I've heard today from  
6 science and from what I heard in Springfield  
7 in April -- or on August 25th was the  
8 sciences said this is either a dangerous  
9 situation or we don't know what the hell it  
10 is because we don't have enough science to  
11 know what it is. And what I heard from the  
12 EPA lawyer was well, don't worry about it,  
13 we're going to do what we're going to do.

14 My question is if this is so  
15 dangerous or if there's no science available,  
16 why are -- why is the EPA even pushing this  
17 standard? It sounds to me like there's a lot  
18 of politics going on as opposed to science,  
19 and I think this is a scientific issue.

20 MS. WILLIAMS: Can you -- I'm not sure  
21 what you mean by politics, maybe could you  
22 clarify that?

23 MR. DOBMEYER: Well, if you want to go  
24 to Politics 101, we can do that over a beer

1 afterwards but I'm not going to sit here and  
2 explain Politics 101. Politics is the give  
3 and take in government, in society over  
4 whether or not one standard or another  
5 standard. If you really want to pursue that,  
6 we can, but I think you know what I'm talking  
7 about.

8 MEMBER JOHNSON: Let me, Bob -- and  
9 because I think there's been some general  
10 confusion and there's been some specific  
11 confusion I think when I read the public  
12 comments submitted by Clean Water.

13 Just as a follow-up to you and to  
14 try and eliminate some confusion that might  
15 be out there, there is the EPA or nobody for  
16 that matter is proposing any change in  
17 drinking water quality standards and -- water  
18 quality standards for drinking water,  
19 correct?

20 MR. MOSHER: Correct.

21 MEMBER JOHNSON: This is only, and I  
22 think the confusion is there because we  
23 continue to talk about the role of water  
24 drinking and the removal of radium from the

1 drinking water has in the general water  
2 quality standards which is what this proposed  
3 change is regarding, correct?

4 MR. MOSHER: Correct.

5 MEMBER JOHNSON: Okay.

6 MR. DOBMEYER: Well, nonetheless,  
7 there is a problem with the wastewater that's  
8 left from the treatment of the drinking  
9 water. I mean --

10 MEMBER JOHNSON: I was just trying to  
11 clear up whatever conclusion --

12 THE COURT REPORTER: I'm sorry, I  
13 didn't hear the rest of your statement.

14 MR. DOBMEYER: I said there's a --  
15 nonetheless, there's a problem with the  
16 wastewater from the treatment of the drinking  
17 water that puts, under the current  
18 mechanisms, puts the water right back into  
19 the environment thus, I think, increasing the  
20 danger and I'm sorry, Mr. Johnson, you  
21 started to say something?

22 MEMBER JOHNSON: No, and I was just  
23 trying to clear up what I thought was a  
24 specific misunderstanding in one paragraph in



1           your public comment and so -- and that's what  
2           we're here to do, we're here to listen to  
3           both sides of the issue and to come out with  
4           a proposed rule for public comment sometime  
5           in the future.

6                         MR. DOBMEYER: I am really concerned  
7           as well as other people that signed that  
8           letter that Illinois is going to get  
9           railroaded again through the system and  
10          that's going to hurt the environment and  
11          going to hurt the people and going to hurt  
12          the wildlife.

13                        MR. HARSCH: Madam Hearing Officer, I  
14          would like to place this witness under oath  
15          so he can testify --

16                        MR. DOBMEYER: I would be glad to.

17                        HEARING OFFICER ANTONIOLLI: And if  
18          you -- Would you be willing to be sworn in  
19          and testify?

20                        MR. DOBMEYER: Absolutely.

21                        HEARING OFFICER ANTONIOLLI: All  
22          right. Can you go ahead and do that. I just  
23          want to clarify also for the record before we  
24          go ahead with any swearing in that it was a

1 public comment that we're referring to, it  
2 was one that was filed on the 19th of October  
3 and it was filed by Clean Water and it's on  
4 the Board's website as well, so ...

5 MR. DOBMEYER: And I have copies if  
6 anyone wants to see them.

7 HEARING OFFICER ANTONIOLLI: Uh-hum.

8 MR. HARSCH: I made that statement  
9 because he signed in as a witness today.

10 HEARING OFFICER ANTONIOLLI: Right.

11 MR. DOBMEYER: I signed in because I  
12 saw another person, I didn't know that we  
13 weren't supposed to sign in.

14 HEARING OFFICER ANTONIOLLI: And if  
15 you have --

16 MR. DOBMEYER: But that's the only  
17 reason. But if you want to swear me in,  
18 that's fine, I have no problem with that.

19 HEARING OFFICER ANTONIOLLI: We can  
20 swear you in if you feel that you would like  
21 to testify any further, but at this point --

22 MR. DOBMEYER: Well, I would like to  
23 be equal with everyone else.

24 HEARING OFFICER ANTONIOLLI: Do you

1 have any further questions for the Agency?

2 Okay. Go ahead and swear him in.

3 THE COURT REPORTER: Do you solemnly  
4 swear that the testimony that you are about  
5 to give is the truth, the whole truth and  
6 nothing but the truth?

7 MR. DOBMEYER: Absolutely.

8 (Witness sworn.)

9 HEARING OFFICER ANTONIOLLI: Does  
10 anyone at this point have questions for  
11 Mr. Dobmeyer?

12 MR. HARSCH: Or does he have anything  
13 else to say?

14 MR. DOBMEYER: I have nothing else to  
15 say, both Sarah and I have asked the  
16 questions we wanted to ask.

17 HEARING OFFICER ANTONIOLLI: Okay.  
18 And realizing this is an information  
19 gathering hearing at this point and some of  
20 the questions that you raised or at least  
21 most of the questions that you raised may be  
22 answered by the Board's opinion and order in  
23 the rulemaking but if the Agency can answer  
24 at this point, you can go ahead.

1 MS. WILLIAMS: If we can answer what?  
2 I think there was a comment made, I don't  
3 believe there was a question.

4 MR. DOBMEYER: The question that was  
5 asked, Ms. Williams, why is the EPA doing  
6 this that will hurt the people in the state,  
7 hurt the environment. Mr. Mosher gave some  
8 answers on it which I don't think addressed  
9 the issue.

10 MS. WILLIAMS: I think he answered the  
11 question.

12 MR. DOBMEYER: Well you were out of  
13 the room, how would you know?

14 HEARING OFFICER ANTONIOLLI: Well, she  
15 was here for much of what he said and I think  
16 also that the question that you do raise is  
17 one that will be addressed by the Board in  
18 its opinion and order.

19 MR. DOBMEYER: Good.

20 HEARING OFFICER ANTONIOLLI: And  
21 whether something is harmful to the  
22 environment or to humans will be something  
23 that the Board makes in its determination.

24 MR. DOBMEYER: Thank you.

1 MR. HARSCH: I have some questions of  
2 the witness.

3 HEARING OFFICER ANTONIOLLI: Okay. Go  
4 ahead.

5 WHEREUPON:

6 DOUG DOBMEYER,  
7 called as a witness herein, having been first duly  
8 sworn, deposeth and saith as follows:

9 D I R E C T E X A M I N A T I O N

10 By Mr. Harsch

11 Q. Who is Clean Water Illinois?

12 A. It's a new organization that got  
13 started specifically around this issue to address  
14 water issues, this is the first point we've taken  
15 up.

16 Q. Are you a registered lobbyist in the  
17 state of Illinois?

18 A. No, I'm not. I have been registered  
19 in the past, I'm not registered right now.

20 Q. Is Clean Water Illinois a  
21 not-for-profit corporation?

22 A. It's not been incorporated yet.

23 Q. Do you have any business relationships  
24 with WRT or any of the owners/operators --

1 A. No, but I have talked to them.

2 Q. You have no financial position with  
3 respect to those areas?

4 A. No.

5 MS. WILLIAMS: Can you explain what  
6 you mean when you say you talked to them?

7 MR. DOBMEYER: I've had conversations  
8 with them just like I've had conversations  
9 with Albert Ettinger, just like I've had  
10 conversations with other people in this room.

11 MS. WILLIAMS: Have you contacted the  
12 Agency up till now about your concerns?

13 MR. DOBMEYER: I sent a letter on the  
14 19th electronically, it's posted on the  
15 website.

16 MS. WILLIAMS: To the Board, right,  
17 but to the Illinois EPA have you contacted  
18 us?

19 MR. DOBMEYER: Well, I thought it was  
20 inappropriate to do that since this is being  
21 put before the Control Board and the  
22 correspondence going to them.

23 MS. WILLIAMS: That's fine. Thank  
24 you.



1 A. That's part of my testimony, correct.

2 Q. Isn't it true that at the last hearing  
3 Mr. Williams from WRT testified that the existing  
4 standard was too low?

5 MR. FORT: I object, I think that's a  
6 mischaracterization of the testimony. If you  
7 want to point him to a particular transcript  
8 and see the context of any question and  
9 answer.

10 MS. WILLIAMS: I would like him to  
11 answer the question.

12 HEARING OFFICER ANTONIOLLI: You can  
13 answer the question if you can answer.

14 THE WITNESS: I don't recall. I  
15 simply don't recall.

16 MR. FORT: Do you want him to answer  
17 it?

18 MS. WILLIAMS: Are you aware of any  
19 other --

20 MR. FORT: Would you like Mr. Williams  
21 to answer since he's sitting here?

22 MS. WILLIAMS: Has he been sworn in?  
23 It's fine with me.

24 HEARING OFFICER ANTONIOLLI: Yes,



1 together they have been.

2 MR. WILLIAMS: What I had stated if I  
3 remember correctly, and I just read it again  
4 last night, was that it is a low standard.

5 MS. WILLIAMS: Okay.

6 MR. WILLIAMS: I didn't say it was too  
7 low?

8 MS. WILLIAMS: You didn't say too low,  
9 you just said that it was low.

10 MR. WILLIAMS: I said it was a low  
11 standard.

12 MS. WILLIAMS: Okay. I'm sorry for  
13 mischaracterizing by saying too low.

14 BY MS. WILLIAMS:

15 Q. Are you aware of any other states with  
16 standards as low as one picoCurie per liter of  
17 radium 226?

18 A. No.

19 Q. But it's your recommendation that the  
20 Board should retain the existing standard?

21 A. Well, my recommendation is the Board  
22 has an existing standard that's one picoCurie per  
23 liter, my question is on what basis are you using to  
24 increase it? I think that's lacking in your bases.

1 Q. Okay. Well, and I think that's a  
2 reasonable question but what I want to know is what  
3 basis would you use to keep it at one?

4 A. I would use the BDAC which would  
5 indicate part of the calculations in my testimony  
6 that a water concentration in the range of 1.36,  
7 1.88 without taking into consideration sediment does  
8 not exceed the biota dose limits established by the  
9 Biota Dose Committee.

10 Q. Do you know in Illinois what -- if  
11 there's a number higher than that that would cause  
12 no observed affect to aquatic life in Illinois?

13 A. I'm not sure I understand your  
14 question. Is there -- please repeat it.

15 Q. I'm trying to get at how conservative  
16 or not conservative your conclusion is. Are you  
17 aware of a -- if we set it at two, would there be an  
18 observed affect to aquatic life to your knowledge?

19 A. Once again if it's greater than 1.88  
20 based on the BDAC, it exceeds their criteria and  
21 that's --

22 Q. Right, and their criteria asks you to  
23 look at more specific --

24 A. Absolutely it does include that.

1           Q.       Okay. That's fine. I think I  
2 understand. I asked Mr. -- or Dr. -- sorry --  
3 Dr. Anderson some questions about the Florida study  
4 of Round Lake and he was not aware of the amounts of  
5 radium in lake and groundwater that were pumped into  
6 that lake, do you know the answer to that question?

7           A.       I don't recall the loading, I do  
8 recall the concentrations of sediment and water,  
9 groundwater.

10          Q.       Okay. Do you recall how often the  
11 lake would be completely empty?

12          A.       I don't. No, I don't.

13          Q.       Would you agree that the amount of  
14 loading would have an impact on the sediment levels  
15 of radiation?

16          A.       Help me to understand your terminology  
17 of loading.

18          Q.       No, okay. No, I understand, you're  
19 right, and I'm not sure I'm using that in a  
20 technically scientific way. But if, for example,  
21 they needed to add -- I'll use easy numbers -- a  
22 hundred gallons in order to keep the level of the  
23 lake at the level they were adding it and that  
24 hundred gallons was at a concentration of two

1 picoCuries versus if they had to add a million  
2 gallons at the same concentration, would you expect  
3 to see different levels of radium in the sediment?  
4 That's how I'm thinking of loading, does that make  
5 sense to you? It's very basic.

6 A. Well, let me try it differently.

7 Okay. What I do know is take the study, take the  
8 information.

9 Q. Uh-hum.

10 A. What you had in the groundwater coming  
11 in was in the order of a couple picoCuries per  
12 liter.

13 Q. Uh-hum. That was my example, two.

14 A. One or two. And the lake water was  
15 slightly the same, it wasn't significantly  
16 different, one or two or three. But what we saw or  
17 what the study showed was that when you look into  
18 the aquatic organisms such as the mussels, there was  
19 an incredible increase in the concentration, there  
20 was a bioaccumulation --

21 Q. Right.

22 A. -- a biofactor phenomena going on and  
23 the sediment itself was around 12, 12.2 I think was  
24 the average picoCuries per gram, so we're going from

1 one to two in the groundwater, approximately the  
2 same two or three in the lake water -- and I have  
3 that backwards, excuse me, the other way around and  
4 yet we're seeing 12 in the sediment, we see an  
5 increase, a significant increase in the tissue of  
6 the mussels. That's what the bio dose is trying  
7 to -- that's exactly what the DOE model is trying to  
8 do, to answer the question.

9 Q. Can you answer the question that I  
10 asked?

11 A. I'm trying to explain.

12 Q. Which was -- which was --

13 MR. FORT: I think he's trying to  
14 answer your question, he said I can't answer  
15 it that way but I can answer it this way,  
16 so ...

17 BY MS. WILLIAMS:

18 Q. The question was pretty simple. Would  
19 there be a difference in the sediment levels if  
20 there was more radium? I mean, I think it's pretty  
21 simple.

22 A. Okay. It's simple.

23 Q. And you don't know the answer?

24 A. I think I've answered the question.

1 Q. I'd like to read you something from  
2 the module.

3 MR. FORT: Excuse me, counsel, if  
4 you -- Mr. Williams thinks that he can answer  
5 it, but it's not a simple answer.

6 MS. WILLIAMS: No, I mean I would like  
7 the Hearing Officer to ask him to answer  
8 unless you feel that he's answered it.

9 HEARING OFFICER ANTONIOLLI: Well, if  
10 you feel that you've answered the best that  
11 you can, then we can continue on and  
12 Mr. Williams can answer your question if you  
13 would like him to.

14 MS. WILLIAMS: That's okay, I'd like  
15 to stick with Mr. Adams.

16 HEARING OFFICER ANTONIOLLI: Okay.

17 BY MS. WILLIAMS:

18 Q. I would like to read you a sentence  
19 from page M1-3, the Module 1 of the Biota Dose  
20 Assessment just to see if you would agree with it.

21 A. I'm sorry, M?

22 Q. M1, Page 3. Just Page 3 of the  
23 module. Did you find it? I'll read it for you.

24 A. Sure.

1           Q.       Nationally and internationally, no  
2 standardized methods have been adopted for  
3 evaluating doses and demonstrating protection of  
4 plants and animals from the effects of ionizing  
5 radiation.

6                               Do you agree with that statement?

7           A.       Well, that's -- that statement is made  
8 in light of a need to do that type --

9           Q.       To do this --

10          A.       -- of that research and that's what  
11 this is all about. This is the DOE approach to  
12 addressing that.

13          Q.       Right, but you testified that this  
14 approach just tells you when you need to look  
15 further, correct? It doesn't tell you the dose that  
16 would cause harm to plants or animals, correct?

17          A.       I'm having a difficult time following  
18 you in your questioning. What this methodology does  
19 is establish criteria, the one rad per day -- the .1  
20 rad per day --

21          Q.       And that's the dose --

22          A.       -- that is consistent with the IAEA,  
23 the NCRP, the folks from Canada, the folks from --  
24 the folks from Canada or the advisory committee on

1 radiation protection, Canadian Nuclear Safety  
2 Commission, the UK Environmental Agency. I mean,  
3 it's not just the DOE, it is a group, in my opinion,  
4 internationally known and recognized and accepted  
5 agencies that have clearly identified a need to look  
6 at protection of the environment and exposure to  
7 radiation and that's what this methodology is  
8 talking about.

9 Q. On, I think it's on that same page,  
10 you refer to -- yeah, down -- the last -- well,  
11 second to the last paragraph I guess, yeah. You say  
12 moreover, new information arising out of sampling  
13 and investigations done in Florida including data  
14 just published in August of this year.

15 Can you explain for us where the  
16 data you're referring to was published this year?

17 A. Sure. It is of the same nature of the  
18 2000 data, it was by the same folks, the HSWMR, the  
19 Hazardous Substance & Waste Management Research  
20 folks exhibit.

21 Q. The exhibit -- Okay.

22 A. Yes.

23 Q. Those folks published it. Where was  
24 it published at?



1           A.       Under the same type of publishing  
2 requirements as the 2000.

3           Q.       But I mean this study in 2000 was just  
4 a contract study, right, it wasn't published in a  
5 scientific publication? Are you saying that later  
6 data was published in a peer-reviewed publication?

7           A.       It was published in a publication,  
8 yes, it was.

9           Q.       Which one?

10          A.       Peer-reviewed, I'm not ...

11          Q.       The reason I'm asking is it's not  
12 listed on the author's CV that I could tell so I  
13 just want to clarify is there somewhere I can look  
14 to that a peer-review journal has looked at this  
15 study and published it, I would like to see that  
16 that would have some impact I think on the Agency if  
17 that has occurred. That's fine, take your time.

18          A.       It's 2004 --

19          Q.       No, it's 2000 -- according to your  
20 testimony, it's this year August of 2004.

21          A.       Well, that's part of my testimony.  
22 It's part of my attachment or exhibit.

23          Q.       So you mean it was published in your  
24 testimony? I know that's not what you mean, I'm

1 sorry but I'm confused.

2 A. You asked me about a particular  
3 publication, are you referring to the August 2000  
4 one?

5 Q. No.

6 A. No.

7 Q. I'm referring to where you say in your  
8 testimony that data has been published in August of  
9 this year.

10 A. Correct. And my response was there is  
11 a similar document, a follow-up publication, similar  
12 to the publication that is in my Attachment D --

13 Q. Right.

14 A. -- that is dated August 2004, it's  
15 additional information.

16 Q. And it was -- but it wasn't in a  
17 peer-reviewed journal, it was just supplementary  
18 information?

19 A. When you say peer-reviewed journal,  
20 would you consider -- if I may ask -- is this a  
21 peer-reviewed journal?

22 Q. According to Dr. Anderson it was -- it  
23 is not, no, and I don't think it is.

24 A. Well, maybe the simple answer is I

1 don't know.

2 Q. Okay. Well, I was wondering maybe the  
3 answer was that you meant to say August 2002, I  
4 guess, maybe that's what you meant and you were just  
5 ref- -- I wasn't sure if you were referring to a new  
6 publication, if you meant to say August 2000 or if  
7 there actually was something new in a new journal.

8 A. It's something new.

9 Q. Okay. I just want you to understand  
10 we are trying to look at everything that, you know,  
11 maybe other folks have found that we have not found  
12 and this is something that you referred to that if  
13 we need to look at it, we would like to.

14 A. Sure. And let me check that, how's  
15 that?

16 Q. That would be great. It's in your  
17 post-written comments, you can address that, that  
18 would be great.

19 A. We can do that, that's a better  
20 answer.

21 HEARING OFFICER ANTONIOLLI: If you  
22 found the citation to the article, are you --

23 THE WITNESS: No, wait a minute. Hang  
24 on.

1 HEARING OFFICER ANTONIOLLI: Okay.

2 MS. WILLIAMS: Can I move on? Because  
3 I'm happy with you just telling us later.

4 HEARING OFFICER ANTONIOLLI: You can  
5 go ahead.

6 MS. WILLIAMS: That's fine with me.

7 HEARING OFFICER ANTONIOLLI: Okay.

8 BY MS. WILLIAMS:

9 Q. On Page 3 of the testimony you start  
10 out with a question, are there other sources of  
11 radium discharging, and also you attach an Exhibit  
12 I, a copy of a permit from the LaSalle station.

13 Are you aware of what source of  
14 cooling water the LaSalle station uses?

15 A. The source?

16 Q. Yes.

17 A. I'm not.

18 Q. So you don't know if they use  
19 groundwater for cooling there?

20 A. No, I do not.

21 Q. On Page 3 there is a part of your  
22 testimony that I found very vague and I understand  
23 you're saying that due to confidentiality you cannot  
24 tell us the name of the facility that you're

1 referring to and that's fine, but can you at least  
2 provide us information on the concentrations?

3 A. Yes.

4 Q. You state that the sludge levels are  
5 consistent with predicted sludge levels. Could you  
6 at least tell us what they were?

7 A. If you give me the liberty to go back  
8 to my August testimony.

9 Q. Oh, you can look at whatever you need  
10 to?

11 A. I can show you.

12 HEARING OFFICER ANTONIOLLI: We're  
13 putting you on the spot here. Are you ready?

14 THE WITNESS: I've got to help you to  
15 find it, it's part of Exhibit C of my former  
16 testimony. It's part of the tables that show  
17 the biosolid results of the various  
18 numbered --

19 BY MS. WILLIAMS:

20 Q. Would you mind if I look off you?

21 A. Those are the tables, samples taken  
22 from various POTWs.

23 Q. Okay.

24 A. Not names but numbers --

1 Q. Uh-hum.

2 A. -- for identification.

3 HEARING OFFICER ANTONIOLLI: Can you  
4 all speak up for the Board and for the court  
5 reporter?

6 BY MS. WILLIAMS:

7 Q. Is one of the numbers representative  
8 of the Illinois?

9 A. Yes, 118. One hundred eighteen  
10 picoCuries per gram.

11 Q. Okay. Thank you. And was that a  
12 measured value then?

13 A. Yes, it was. Measured being  
14 analytically derived, calculated.

15 Q. Okay. Can you explain how you  
16 calculated that?

17 A. Well, by the lab. The lab took  
18 samples of the sludge of the cake actually, sludge  
19 cake, it was sent off to one of two laboratories  
20 that were selected by the AMSA committee and that  
21 sludge was then subject to analytical procedures and  
22 118 picoCuries per gram for radium 226 was provided.

23 Q. You have provided an attachment, I  
24 believe it's Attachment G regarding your

1 calculations for the city of Joliet; is that  
2 correct?

3 A. My review of the calculations --

4 Q. Your review.

5 A. -- that were performed by the IEPA,  
6 not my calculations.

7 Q. So is this piece of paper your review  
8 or is this piece of paper --

9 MR. FORT: Just for the record,  
10 Counsel, so we're not confused, his  
11 Attachment G is two pages out of your  
12 Exhibit 12 and it's two pages that had the  
13 calculation, I think it was called Attachment  
14 1, the calculations on the content of the  
15 Joliet material.

16 HEARING OFFICER ANTONIOLLI: Are we  
17 talking about his last -- the last pre-filed  
18 testimony for the August hearing?

19 MR. FORT: No, it's the Agency's  
20 Exhibit 12 that they put in.

21 HEARING OFFICER ANTONIOLLI: Okay.

22 MS. WILLIAMS: Right, I understand and  
23 you resubmitted it as a new exhibit.

24 MR. FORT: We just took that page so

1           that you could get the page as opposed to  
2           everything else that was in that letter. I  
3           think that was the IEMA letter.

4                       MS. WILLIAMS: I would like to confer  
5           to see if I'm done for a second.

6                                       (Brief pause.)

7 BY MS. WILLIAMS:

8           Q.        You know, I did want to ask you one  
9           other question that I asked Dr. Anderson. Do you  
10          know what the effluent limit is for nuclear power  
11          plants?

12          A.        Well, that depends -- that's  
13          established by the NRC and it would be very specific  
14          to the radionuclides that the power plant is  
15          discharging.

16          Q.        I'm sorry, for radium. Did I say for  
17          radium?

18          A.        No, you did not.

19          Q.        I'm sorry. Thank you. I meant for  
20          radium. What would it be for radium?

21          A.        Well, radium is a natural occurring  
22          radionuclide and there probably would be no reason.

23          Q.        No reason to have it?

24          A.        Unless there was some special



1 man-enhanced process that would discharge radium.

2 Q. Like using groundwater?

3 A. Well, whatever the source is. It's  
4 regulated at a discharge point not from the source.

5 MS. WILLIAMS: I think that's all I  
6 have.

7 MEMBER OF THE AUDIENCE: I'm sorry, I  
8 apologize, could you read that answer back?

9 (Whereupon, the requested  
10 portion of the record  
11 was read accordingly.)

12 MS. WILLIAMS: I asked that question  
13 because someone had told me they thought  
14 there was a limit of 60 picoCuries per liter  
15 but I don't know if that's true, I thought  
16 you know a lot about these things, you might  
17 know.

18 THE WITNESS: I don't.

19 MS. WILLIAMS: You don't?

20 THE WITNESS: I don't know what that  
21 particular -- that particular license  
22 includes, what the standards are. They  
23 are --

24 THE COURT REPORTER: I'm sorry, they

1 are what?

2 THE WITNESS: I'm sorry. I don't know  
3 what the particular LaSalle license, NRC  
4 license is. You have to look into the  
5 details and the discharge limits would be  
6 specified on that license.

7 MEMBER GIRARD: Could I ask a question  
8 then? Could someone introduce this into the  
9 record, either the Agency, or ...

10 MS. WILLIAMS: Yeah, we can look into  
11 that both if there is a standard for LaSalle  
12 and if there is an NRC effluent limit.

13 MEMBER GIRARD: Thank you.

14 MS. WILLIAMS: In fact, we would hope  
15 that maybe we can try and get that from the  
16 Division of Nuclear Safety at IAE and they  
17 would be the ones that would know that I  
18 think, that will be what we'll try and do.

19 MEMBER GIRARD: While I'm asking  
20 questions along that line, is it -- we seem  
21 to be having some conflicting testimony about  
22 the radium standards throughout the United  
23 States and various states, and you've  
24 presented information on mostly the Region 5

1 states but we've got some information now on  
2 Florida. Is it possible for you to go  
3 through and give us a spreadsheet on what the  
4 standards are in the different states?

5 MS. WILLIAMS: I think that would  
6 take -- I think that would take serious  
7 research commitment that I'm not sure we  
8 could do in the time that we have. I know  
9 that we have done a lot more research even  
10 since the last hearing expanding on that if  
11 you would like testimony from Bob on what he  
12 knows more broadly, we can do that here today  
13 and see what -- I mean, I just don't know if  
14 I can make a commitment for his time because  
15 we don't have a spreadsheet like that, we  
16 have to create it. We can do our best to  
17 create it with what we have.

18 MEMBER GIRARD: Certainly the more  
19 testimony to enhance your record would be  
20 great but I mean if you've got a spreadsheet,  
21 please put it into the record. Thank you.

22 MS. WILLIAMS: I don't think I have  
23 any more questions at this point for either  
24 witness so I would like to rest if that's

1           okay. I mean, not rest rest but rest my  
2           case.

3                       HEARING OFFICER ANTONIOLLI: Okay.  
4           Let's go off the record for a moment.

5                               (Whereupon, a discussion  
6                               was had off the record.)

7                       HEARING OFFICER ANTONIOLLI: It is  
8           about ten to 5:00 now and we have this  
9           hearing room again tomorrow, we'll be --  
10          we'll see each other again back here at  
11          9:00 o'clock in the morning unless anyone  
12          else -- I'll take any other requests for  
13          comments at this point.

14                               (No response.)

15                       HEARING OFFICER ANTONIOLLI: And  
16          seeing no further requests, I'll adjourn the  
17          hearing for today and we'll reconvene  
18          tomorrow morning. Thank you all for being  
19          here.

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1 (Whereupon, the  
2 proceedings were  
3 continued until 9:00  
4 o'clock a.m. on October  
5 22nd, 2004 pursuant to  
6 agreement.)

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1 STATE OF ILLINOIS )  
 ) SS.  
2 COUNTY OF L A K E )

3

4 I, MARGARET MAGGIE JANKOWICZ, a notary  
5 public within and for the County of Lake and State  
6 of Illinois, do hereby certify that heretofore,  
7 to-wit, on the 21st day of October, A.D., 2004,  
8 personally appeared before me at The Thompson  
9 Center, 100 West Randolph Street, Room 02-025, in  
10 the City of Chicago, County of Cook and State of  
11 Illinois, the transcript of proceedings were called  
12 by the Illinois Pollution Control Board in a certain  
13 cause now pending and undetermined before the  
14 Illinois Pollution Control Board in regards to  
15 Revisions to Radium Water Quality Standards:  
16 Proposed New 35 Ill. Admin. Code 302.307 and  
17 Amendments to 35 Ill. Admin. Code 302.207 and  
18 302.525.

19 I further certify that the said  
20 witnesses were by me first duly sworn to testify the  
21 truth, the whole truth and nothing but the truth in  
22 the cause aforesaid; that the testimony then given  
23 by them was by me reduced to writing by means of  
24 shorthand in the presence of said witnesses and

1 afterwards transcribed upon a computer, and the  
2 foregoing is a true and correct transcript of the  
3 testimony so given by them as aforesaid.

4 I further certify that the reading  
5 and signing of said proceedings will be  
6 presented to the Illinois Pollution Control Board  
7 for review and deliberations.

8 I further certify that the taking of  
9 the proceedings were pursuant to notice to the  
10 public, and that there were present at the taking of  
11 the proceedings the aforementioned parties.

12 I further certify that I am not  
13 counsel for nor in any way related to any of the  
14 parties to this suit, nor am I in any way interested  
15 in the outcome thereof.

16 In testimony whereof I have hereunto  
17 set my hand and affixed my notarial seal this 2nd of  
18 November, A.D., 2004.

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MARGARET MAGGIE JANKOWICZ, CSR.  
Notary Public, Lake County, IL  
Illinois License No. 084-004046