

COMMONWEALTH OF PENNSYLVANIA
SENATE OF PENNSYLVANIA
SENATE ENVIRONMENTAL RESOURCES AND ENERGY COMMITTEE

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PUBLIC HEARING ON
RADIATION LEVELS AT LANDFILLS

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Before: SENATOR MARY JO WHITE, Chairman
SENATOR RAPHAEL J. MUSTO, Minority chair
SENATOR JOHN C. RAFFERTY, JR.
SENATOR BOB REGOLA

Staff : Patrick Henderson, Executive Director

Date : June 28, 2006, 9:00 a.m.

Place : Majority Caucus Room
Capitol Building
Harrisburg, Pennsylvania

By : Patricia M. Brown
Reporter - Notary Public

SPEAKERS:

Department of Environmental Protection
David J. Allard, CHP
Director, Bureau of Radiation Protection

Nuclear Information & Resource Service
Diane D'Arriago
Director, Radioactive Waste Project

Pennsylvania Waste Industries Association
Tim O'Donnell, P.E., PWIA Chair
Bill Belanger, P.E.

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1 SENATOR WHITE: Good morning. I'm going to
2 call this public hearing to order. This is a
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3 meeting of the Senate Environmental Resources and
4 Energy Committee to hear testimony from various
5 individuals on radiation levels at Pennsylvania
6 landfills.

7 I'm going to waive an opening statement, but
8 I will welcome Senators Regola and Rafferty. We
9 are conducting this hearing largely at their
10 request. And we are pressed for time, so I am not
11 going to make a true opening statement because we
12 have to give this room up shortly.

13 We received many items of written testimony
14 for persons who could not be accommodated to
15 testify today. Those submissions will be made
16 part of the record. If it is determined after
17 this hearing by committee that they would like
18 further hearings, that may be possible in the
19 fall.

20 But the senators are anxious to get this
21 process started before we adjourn, so we are doing
22 that today. Senator Musto?

23 SENATOR MUSTO: I have no opening statement.

24 THE COURT: With that, we'll see to the first
25 witness, Pat.

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1 MR. HENDERSON: Our first witness is David
2 Allard, director of the Bureau of Radiation
3 Protection in the Department of Environmental
4 Protection.

5 SENATOR WHITE: Good morning, Mr. Allard.
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6 MR. ALLARD: Good morning, Madam Chair,
7 Senators. It is truly an honor and a pleasure to
8 be here this morning.

9 If you'll allow me just a brief moment, I
10 know we're pressed for time, just a brief
11 background sketch on my background. I'm a
12 certified health physicist. I am the director of
13 the Bureau of Radiation Detection. My
14 undergraduate degree is in environmental sciences.
15 My master's is in applied physics, radiological
16 sciences and protection.

17 I joined the department seven years ago and
18 am quite honored to represent a very small group
19 within DEP that is charged with nuclear safety;
20 various radiological control programs around the
21 state involving thousands of x-rays units,
22 hundreds of radioactive material licensees, radon,
23 and quite a bit of involvement with our nuclear
24 power plants as far as emergency response.

25 One of the first issues I was faced with as I

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1 came to the state was these issues of landfill
2 alarms. Our staff in the regions were routinely
3 responding to alarms at these landfills, several
4 landfills of the fifty-plus active landfills we
5 have installed these radiation monitors. These
6 monitors were basically portal-type devices; and
7 as the trucks come in, they detect gamma
8 radiation.

9 Gamma radiation can be from natural sources.
10 It can be from man-made radioactivity. And the
11 fact as we started to explore this and look at the
12 nature of the radioactivity, the vast majority of
13 these alarms apparently were due to
14 patient-contaminated waste.

15 This waste was such that patients would be
16 given a diagnostic or therapeutic radionuclides for
17 perhaps thyroid cancer, treatment of thyroid
18 cancer, a diagnostic screening exam with a
19 radioactive material, go home and contaminate
20 their household waste items. That waste would
21 enter the household waste stream, put out in the
22 normal trash, and then go in and set off an alarm.

23 Now, the landfills had no way to identify
24 that radioactive material, so it would require our
25 staff to come out with specialized equipment and

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1 identify that material.

2 The regulatory structure is such that the
3 NRC's regulations allow these patients to go home.
4 The financial impact on the medical institution,
5 the risk benefits of holding these patients in a
6 hospital for eighty days which would be needed
7 would be totally out of line with the risks.

8 So we allow these patients to go home, and
9 the radioactivity goes out in the solid waste
10 treatment. We had a huge impact on our staff
11 time. We looked at this. We started drafting

12 guidelines. I'm quite proud to inform you that we
13 are actually leading the nation in this area, and
14 we developed regulations and guidance documents
15 associated with these radiation monitors such that
16 we could screen and help to assist the regulated
17 community to screen these alarms, identify what
18 the nature of the radioactive material is, either
19 allow it to go into the landfills and just decay
20 in place in a relatively short period of time with
21 no exposure to the workers or public, or if it was
22 dangerous source, retrieve that source.

23 And I'm also happy to report that since we've
24 implemented this and now require some hundred
25 seventy transfer facilities, landfills, and

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1 resource recovery facilities to do this, we have
2 prevented some very dangerous sources from
3 entering our landfills.

4 Just recently, for example, we found two 241
5 stack eliminators that were very dangerous.
6 They're actually generally licensed sources to a
7 government agency in D.C. that they lost control
8 of these sources. They ended up in the waste
9 stream, and we prevented them from going into the
10 landfill.

11 The other aspect of this is the Association
12 of Solid Waste Management Officials, ASWMO, which
13 is an organization which is involved in solid
14 waste around the country, that has actually

15 highlighted our regulations, our regs in our
16 guidance documents, to the National Health Physics
17 Society and the Conference of Radiation Control
18 Program Directors which are my counterparts as
19 models for initiating, A, an ANSI standard for
20 standardizing the protocol with the solid waste
21 facilities, and B, for the CRCPD to help develop
22 model regulations for managing the plethora of
23 radioactive source, natural sources.

24 In fact, the daily cover, as you may know,
25 Pennsylvania has high natural uranium/thorium

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1 series in the state. You can even have daily
2 cover that could set off the alarms in the
3 landfill. We don't want to be in the business of
4 regulating the natural environment here.

5 I'm quite proud of the work that the solid
6 waste group has done in the Bureau of Radiation
7 Protection and that we're being held out as
8 national models. As I mentioned, we do have these
9 procedures and protocols in place; and the
10 facilities now can identify the material. If they
11 do have a dangerous source or something they don't
12 know how to do deal with, they can contact us.

13 As a follow-up to this implementation of
14 these hundred and seventy action plans, we also
15 came across a study that the State of California
16 did with their leachate in landfills; and we
17 observed that the scoping study that the

18 California Resources Group, that they could get
19 high tritium in their landfill leachate. If you
20 actually go and google landfill leachate and the
21 second term tritium, you will actually see
22 Scotland, the UK, I believe South Africa, and
23 Italy also have noted tritium in their landfill
24 leachate.

25 In fact, this even came to our attention

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1 before we even did these regs and guidance back in
2 1996 in the Pottstown landfill. We were aware
3 that we had tritium in the landfill leachate
4 there.

5 Tritium is a naturally occurring radioactive
6 material produced in the upper atmosphere. It's
7 also a residual from fallout from above-ground
8 weapons testing. Hydrogen bomb is -- hydrogen is
9 actually tritium. Tritium is a heavy version of
10 the normal hydrogen that we see in our water, but
11 it's got a couple extra neutrons and it's
12 radioactive. It emits a very low beta particle.
13 A beta particle is essentially an electron. And
14 it's utilized to produce these self-luminescent
15 exit signs.

16 They're a useful safety device. You see them
17 in hotels, in various shopping malls around. If
18 somebody could assist me, I've got some empty
19 tubes that are used to manufacture these. I'd
20 like to pass them around so you can actually see

21 the tubes and the schematic of how these devices
22 are manufactured. Basically it's a little
23 capillary glass tube that's coated with a phosphor
24 on the inside. And as that beta particle strikes
25 the phosphor, it emits a visible light. So you

9

1 can construct these glass tubes into a word, exit,
2 or whatever the word is. You'll see them in
3 planes. The old DC-10's use these tritium exit
4 signs.

5 The problem is it isn't detectable on the
6 gamma portal scans on the landfills. What has
7 happened, the EPA estimates there's some two to
8 three million of these exit signs out there in
9 commerce. They're generally licensed. They're
10 controlled under an NRC manufacturing license and
11 a general license for distribution. Technically
12 under the NRC regulations, they are to be returned
13 to the manufacturer or disposed of as low level
14 radioactive waste.

15 The problem is they're not being tracked.
16 There's labeling on there that we feel is
17 inadequate. We've corresponded with the NRC.
18 Deputy Secretary Fidler has written the NRC a
19 couple times on this issue. We're engaging the
20 NRC, the EPA. They're aware of the issue. And
21 we've got an action plan and a strategy to deal
22 with this.

23 We went out and looked at the fifty-plus

24 landfills. We looked at the leachate
25 concentration of tritium in 2004 and 2005. We've

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1 noted that the leachate concentration is above
2 drinking water standards. EPA has a drinking
3 water standard at maximum contamination limit,
4 MCL, of 20,000 picocuries per liter.

5 However, you don't drink leachate. The
6 leachate is either treated on site or it's run
7 through a POBW sewage treatment plan and then
8 discharged into the environment.

9 So what we've done is look at the
10 concentrations coming out of the landfills. We've
11 looked at the dilution factors in the receiving
12 streams and rivers. We've looked at the
13 downstream. What's downstream? Is there a water
14 intake, drinking water intake downstream? We've
15 calculated what the dilution factors, what that
16 concentration would be; and I'm here to tell you
17 that all of those concentrations are well below
18 the EPA's drinking water standards.

19 You have a list of the results of these
20 tritium sampling results in my testimony. We have
21 a website where we have all of our products, our
22 documents, fact sheets, guidance, the regulations,
23 our various reports and the sources we've
24 recovered from the landfills. As we move forward,
25 we will be notifying all of the tritium signed

1 licensees in Pennsylvania as to their
2 responsibilities not to throw these away. We're
3 working with the NRC to make sure the labeling is
4 improved as we move forward.

5 What else? I think that's -- it will come to
6 me. We're taking a lot of action. The NRC -- oh,
7 another point I wanted to make. I've actively
8 been discussing this with the NRC. I'm the
9 governor's liaison to the Nuclear Regulatory
10 Commission. I attend various meetings. We've got
11 a meeting of the state liaison officers this
12 summer. I'm on the agenda for that.

13 I'm also one of the two state representatives
14 to the Interagency Steering Committee on Radiation
15 Standards, ISCORS. It's an interagency radiation
16 inspection committee. EPA and NRC co-chaired it.
17 I presented a couple weeks ago to ISCORS. We're
18 going to continue to get the word out on this at
19 national meetings. We're working with the EPA on
20 training, online training, web page training for
21 exit sign licensees so they know how to properly
22 handle these exit signs.

23 We're just going to try to do our best as we
24 move forward to get the word out to other states
25 to look at their leachate, do that site-specific

1 dilution factor analysis, make sure they don't
2 have any impact on their drinking water.

3 I'd also mention that EPA drinking water
4 standards are conservative. I mentioned this in
5 our testimony. They were derived from circa 1960
6 models, and they're conservative by a factor of
7 four from primary drinking water standards.

8 Technically, to use today's internal symmetry
9 models and derive what the standard should be, it
10 really should be up about 80,000 picocuries per
11 liter versus 20,000 picocuries per liter. So I'm
12 very comfortable with the situation on site and
13 the discharges.

14 In that it is tritium and hydrogen and bonds
15 to water, it's tritiated water, there really is
16 nothing we can do to remove that tritiated water
17 from the landfill leachate, the tritium leachate.
18 We just have to rely on dilution.

19 I think I'll stop there. I know you're
20 pressed for time. I'm sure you have lots of
21 questions.

22 SENATOR WHITE: Can you tell me how many
23 permanent landfills we have?

24 MR. ALLARD: I can't tell you that. I can
25 get you that number. But the ones with active

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1 leachate collection systems are fifty-four. And
2 that's what we looked at. We looked at the ones
3 with the active leachate collection systems

4 because that's all we could -- if we're looking at
5 leachate, we need to get it.

6 SENATOR WHITE: You mentioned a hundred and
7 seventy solid waste facilities installed radiation
8 monitoring?

9 MR. ALLARD: Right.

10 SENATOR WHITE: You're saying not all of
11 those have leachate.?

12 MR. ALLARD: No. The hundred and seventy
13 number are the transfer facilities, and there's
14 probably maybe one hundred plus. We have six
15 resource recovery.

16 SENATOR WHITE: So there's no treatment
17 available for tritium contaminated leachate. It
18 simply has to be diluted?

19 MR. ALLARD: Right. The tritium is
20 chemically hydrogen. It decays chemically like
21 hydrogen. It goes in as hydrogen gas, T-2. And
22 once it gets out and is broken up in the landfill
23 as they do their daily cover and such, that
24 hydrogen gas that reacts with surfaces, metal
25 surfaces, exchanges with hydrogen in the water as

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1 well as biological activities in the landfill,
2 high temperature. So essentially it exchanges
3 with the stable hydrogen, and you get tritiated
4 water. So it really is water.

5 I have to say there is methods of removal of
6 tritium, but it's only at extremely high

7 concentrations like in reactor cooling water in
8 Canada. A company I used to work for, Arthur D.
9 Little in Cambridge, we actually advised the
10 tritium separation unit for the Canadian reactors
11 so they could recover tritium.

12 SENATOR WHITE: You say it's been found in
13 leachate. Has it been found in groundwater?

14 MR. ALLARD: Yes, it has. We just got the
15 results from one C and D landfill, did some
16 groundwater monitoring as well. We didn't require
17 that; but we will be requiring that for landfills
18 that don't have active leachate collection systems
19 or may have documented breakthrough of the
20 barriers, the clay and the membranes.

21 We did see one downgraded well. It was in an
22 area -- I believe it was -- I can't tell you the
23 name of the facility, but we can get you that. It
24 was in an area where there were no other drinking
25 water sources around. We'll continue to monitor

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1 groundwater.

2 I would add in the Pottstown landfill, we did
3 do some extensive studies on Pottstown. It's a
4 rather complex site because there's an older west
5 end that's partially lined, asphalt I believe and
6 then a modern side with the C standard barriers
7 and collection systems.

8 Interestingly, the older side had the lower
9 concentrations; and the east side with the

10 collection systems had the higher concentrations.
11 It's a theory, that these exit signs have been in
12 the commerce since the 70's, 80's, 90's; and now
13 we're in the scenario where we've got building
14 renovations. Somebody who takes the sign down
15 doesn't even recognize because of the poor
16 labeling that it's radioactive. It goes in the
17 dumpster. It can be municipal waste. It can be C
18 and D waste. That's how they're getting in, and
19 they get damaged.

20 SENATOR WHITE: Senator Musto?

21 MR. MUSTO: No.

22 SENATOR WHITE: Senator Rafferty?

23 SENATOR RAFFERTY: Thank you, Madam
24 Chairwoman, Senators. I want to thank you for
25 today's hearing. If I may, I have a couple

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1 questions.

2 SENATOR WHITE: Yes.

3 SENATOR RAFFERTY: Thank you. How is the
4 alarm triggered when something shows up in a
5 landfill?

6 MR. ALLARD: We have a couple fact sheets on
7 our website. Basically the trucks drive through
8 what's sort of a portal system. They're large
9 radiation detectors that when the gamma rays
10 interact with the detectors, they send a signal
11 back.

12 Again, we've standardized the alarm set

13 points. What we did was when we developed the
14 regulations, we didn't want any false alarms. So
15 what we've done is we've maximized the sensitivity
16 and set an alarm set point, the technical term,
17 which is 10 microrams per hour over background.
18 It's about two times the background radiation.

19 If anything in the truck sets the alarms,
20 gives a gamma field aloft and hits that detector,
21 it will set off an audio and visual alarm in the
22 way station. Then the protocol requires the solid
23 waste operator go out. We want to make sure that
24 the driver is safe. First we want to make sure
25 the driver is not radioactive. We've had that

17

1 happen. We've had drivers with thallium scans and
2 were radioactive themselves, so the driver
3 actually set off the alarm.

4 Then we go out and make sure that the
5 radiation levels around the truck are okay, that
6 there's no contamination on the truck. And then
7 the facility has to identify the radioactive
8 material.

9 We have very specialized handheld devices
10 now. We couldn't have done this ten years ago.
11 We have very specialized devices that we just put
12 up on the side of the truck, let it count. It's
13 got a library, computer in there. It actually
14 will tell you what the radioactive material such
15 as iodine 131 or thallium or medical materials

16 that can go in. If it's radium or americium or
17 something like that, then the flags go up and
18 we're called.

19 SENATOR RAFFERTY: Are the alarms calibrated
20 on a specific? Are there any materials that can
21 slip in undetected? Tritium?

22 MR. ALLARD: That's what I was trying to get
23 at.

24 SENATOR RAFFERTY: The tritium is one. What
25 other ones?

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1 MR. ALLARD: The tritium definitely. I mean,
2 the beta particles wouldn't even come out of the
3 glass tubes. That's the problem we're having.
4 There's a fair amount of radioactivity in these
5 tritium devices, as I stated in my testimony. You
6 can have up to twenty-five curies. That's
7 twenty-five with twelve zeros picocuries as far as
8 the unit goes. So all you need is one of these
9 exit signs in that landfill to cause the levels of
10 contamination.

11 SENATOR RAFFERTY: I'll be quick because I
12 want Senator Regola to have a chance. I'm
13 concerned any time you talk about radiation. The
14 radiation levels that are detected, once
15 acceptable, are they based on an adult?

16 MR. ALLARD: They are. The standard is based
17 on a reference manual. But the standards are --
18 the safety margins and the ratio of protection

19 standards are of a factor of two. There's
20 biological variabilities. When we accept these
21 radiation acceptance standards, there's always
22 that factor of two in there.

23 I would also add that at these environmental
24 levels, with your dental bite wing, that's ten
25 milligrams exposure. Cross county, Pennsylvania

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1 to say California and back, you get five
2 milligrams from cosmic rays exposure.

3 This drinking water standard of 20,000
4 picocuries, if you drink two liters per day three
5 hundred sixty-five days a year, it will give four
6 milligrams in theory where in reality it would
7 take 80,000 picocuries per liter to give you that
8 four milligram. That's our reference point.

9 Just one other point. The human
10 epidemiological data, we only have data for human
11 effects above 10,000. Anything else is
12 theoretical that we assume a linear no-threshold
13 response. It's conservative.

14 SENATOR RAFFERTY: May I have one more
15 question?

16 SENATOR WHITE: Yes.

17 SENATOR RAFFERTY: Thank you. If the
18 acceptable levels of radiation are based on adult,
19 if a landfill is located near a residential
20 facility, neighborhood, municipality, they
21 necessarily aren't the safe levels for a child is

22 what I'm getting at.

23 MR. ALLARD: They are. My message is, those
24 environmental levels, at those kind of
25 environmental levels, you're in an area of

20

1 radiation --

2 SENATOR RAFFERTY: Same physiology for an
3 adult as a child is what you're saying?

4 MR. ALLARD: For some radioactive materials,
5 that is different. We do have different standards
6 for radioactive iodine in thyroids for children
7 than adults.

8 SENATOR RAFFERTY: I have to stop now. Thank
9 you.

10 SENATOR WHITE: I want to be clear. The
11 primary pathway of exposure for humans would be
12 drinking water?

13 MR. ALLARD: Exactly. Yes.

14 SENATOR WHITE: Senator Regola?

15 SENATOR REGOLA: Thank you, Chairman White.
16 Before I ask my questions, I'd like to thank
17 Senator White and Senator Musto for conducting
18 this hearing this morning.

19 We heard a good bit about the radiation
20 detection devices. Who checks the calculation,
21 and how often is that done?

22 MR. ALLARD: Good question. There's a
23 requirement to do an annual calibration on these
24 systems, and then there's a requirement to do a

25 daily spot check before they operate. We do

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1 inspect these facilities. The radiation
2 inspection staff in the regions go out, and we've
3 inspected all these facilities.

4 SENATOR REGOLA: Within the landfills, does
5 DEP take random core samples to see if radiation
6 levels have increased? And if so, are these made
7 public?

8 MR. ALLARD: No, we don't do that. The
9 leachate -- this was one of the reasons why we did
10 this scoping survey in 2004. What we actually did
11 in 2004 was look at all gross alpha, beta, gamma
12 radiation. We actually went in. If we saw
13 slightly elevated alpha, beta activity, we went in
14 and did what we call alphaspectroscopy. So we
15 actually identified what was emitting those
16 particles. We basically were able to associate
17 any elevated radiation levels with naturally
18 occurring uranium, thorium. Potassium chloride,
19 for example, is naturally radiative. The only
20 thing that really jumped out at us was this
21 tritium. It was way above the natural background
22 levels.

23 SENATOR REGOLA: What would happen in the
24 event, and you had mentioned you pulled trucks off
25 to the side and you do this testing, if the

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1 radiation levels reveals that they're harmful to
2 the nearby residents? How would they be informed?

3 MR. ALLARD: We never got to -- I'm not sure
4 if we can ever get into that situation. We have a
5 designated area within the facility. We have
6 flags where if the cabs, for example, the driver's
7 cab is above two milligrams per hour or fifty
8 milligrams per hour at the site of contamination,
9 we're going to be alerted immediately and we're
10 going to be in the loop. Again, we've seen some
11 pretty high level sources.

12 The radiation levels increase by the inverse
13 square of the distance. So if you increase the
14 distance by two, you actually decrease by a factor
15 of a quarter. So it drops off very fast. Even
16 with a very, very large source, you don't need a
17 whole lot of distance to have a safe distance.

18 SENATOR REGOLA: Referring to a question that
19 Senator Rafferty asked, I have a landfill in my
20 district in very close proximity to a school.
21 From a health perspective, if I understood you,
22 these radioactive levels are safe for children, is
23 that correct?

24 MR. ALLARD: Yes, yes, yes. Children,
25 adults. Again, this is not a public health issue.

1 It's more a widespread contamination issue we're
2 trying to get our arms around and prevent, and

3 it's really protecting the drinking water sources.
4 Again, it's really the technical. You know, we
5 want to make sure we don't exceed that 20,000
6 picocuries per liter number for drinking water.

7 SENATOR WHITE: How close do you come to that
8 with a single tritium exit sign in a landfill?

9 MR. ALLARD: Good question. The leachate
10 itself we've seen from a few thousand. Well,
11 background levels, fifty, one hundred picocuries
12 per liter up to 200,000.

13 SENATOR WHITE: But as you say, no one's
14 drinking the leachate.

15 MR. ALLARD: That's right. Then you get the
16 dilution. You get the outside treatment, or it
17 goes through a POTW and then discharge. And then
18 you've got thousands, millions of gallons of water
19 in the stream of a river; and it's just diluted
20 out. Instantaneous mixing.

21 Actually, let me -- I'm sorry. I just
22 wanted, in the strategy, moving forward, one
23 important point I didn't make. I'm glad you
24 reminded me of this.

25 As we move forward, we will be watching. All

1 the landfills will now be required to do quarterly
2 monitoring of the leachate for tritium. We have
3 set a ten percent action limit such that if they
4 trigger a point where they may impact the
5 downstream drinking water where it would be ten

6 percent of the drinking water, they have to notify
7 us.

8 SENATOR WHITE: Senator Rafferty?

9 SENATOR RAFFERTY: Thank you. One quick
10 question and a quick answer.

11 MR. ALLARD: Sure.

12 SENATOR RAFFERTY: Aside from lead, are there
13 any other materials that could be used to block
14 the gamma rays from being detected? And if a
15 truck is found to have radioactive material, who
16 ensures that that truck is decontaminated before
17 it comes back to the landfill with another load?

18 MR. ALLARD: To answer your question briefly,
19 anything can attenuate the radiation, the air, the
20 solid waste, the truck walls, and such. I'm not
21 sure how to answer the question because we've set
22 the limits extremely low. We have a high
23 probability of detecting sources which we feel
24 would be dangerous, and we would ensure that it's
25 dealt with. They have to report to us every

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1 single alarm. There's an annual report that comes
2 to us, and we're reviewing all those.

3 SENATOR RAFFERTY: Thank you. Thank you,
4 Madam Chair.

5 SENATOR WHITE: Thank you, Mr. Allard.

6 MR. ALLARD: Thank you, Madam Chairman.
7 Thank you, Senators. I will stick around if you
8 want to follow up if we have time.

9 MR. HENDERSON: Our next witness is Diane
10 D'Arri go of the Nuclear Information and Resource
11 Service.

12 SENATOR WHITE: Good morning.

13 MS. D'ARRIGO: Good morning. Thank you for
14 inviting me to speak. My name is Diane D'Arri go.
15 I'm the radioactive waste project director at
16 Nuclear Information and Resource Service. We are
17 based in the DC area, and I have been following
18 the nuclear waste issue with this organization for
19 twenty years and prior to that worked in industry,
20 academia, and this public interest job most
21 recently.

22 My main points, I'll give my conclusions to
23 start with, are that ionizing radiation at any
24 level is of some concern; that legal levels do not
25 necessarily mean safe levels; that tritium even in

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1 small amounts can initiate cancers and other
2 health effects; and that tritium can come from
3 many other sources other than, in addition to,
4 exit signs.

5 Also, there are a variety of consumer
6 products that deliberately use radioactive
7 elements like tritium in the exit signs,
8 americium-241 in smoke detectors. And I wonder
9 with more broad detection if we might actually
10 find other isotopes which would be of potential
11 concern. We do agree that the way to go is to

12 prevent these from getting in which is the law,
13 and we support that.

14 Secondly, that Pennsylvania's law requires
15 licensed control over human-made nuclear waste;
16 and it is not being fully enforced. Nuclear
17 materials appear to be getting into and leaking
18 out of places that were never designed or intended
19 to isolate them, and residents' concerns are not
20 being meaningfully addressed.

21 I have, and believe they've already been
22 submitted, but just to be make sure it's in the
23 records, the testimony of ACE, the Alliance for
24 Clean Environment near Pottstown Landfill, and
25 testimony of Citizens Action for Safety

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1 Environment which is near to the Kiski and Apollo
2 and Parks Township site to submit along with mine.

3 Nuclear materials, as I say, are getting into
4 and out of landfills, both legally and illegally
5 in Pennsylvania and elsewhere. And since
6 Pennsylvania is the largest importer of solid
7 waste, you stand to receive a large amount of this
8 waste as around the country it could be
9 deregulated and into the solid waste stream.

10 My third point is to encourage further
11 investigation. I'm glad to hear that there will,
12 of course, be monitoring. Learn from and correct
13 the problems that led to the contamination at the
14 landfills and at the nuclear sites themselves to

15 prevent that material from being put into the
16 landfills and exacerbating the problems there, but
17 also to manage it legally and appropriately.

18 Fourth, that large amounts of licensed
19 radioactive waste internationally, nationally, in
20 other states, and here could be systematically
21 deregulated, cleared, released from regulatory
22 control. There are a lot of different names for
23 this; but essentially it means to treat what has
24 been considered nuclear waste from licensed
25 activities, material now under lock and key and

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1 requiring labeling and care to be deregulated
2 treated as if it's not radioactive, released into
3 the solid waste stream, potentially into
4 recycling, into landfills, incinerators, MSW
5 facilities in the state.

6 And unfortunately as was brought up
7 previously, the monitoring and system that's in
8 place is not adequate to find all of those things
9 that might come in. Some of them might be
10 alpha-beta. Some of them might be gamma that
11 don't trigger the alarm.

12 And it really shouldn't have to be the solid
13 waste industry's problem to do all of this very
14 expensive and difficult detection. It really
15 should be dealt with beforehand and the materials
16 that we know are radioactive not deliberately
17 deregulated and released to exacerbate an already

18 difficult and expensive problem.

19 So the large amounts of licensed waste could
20 be cleared. This is happening on -- the efforts
21 for this have been happening over the past couple
22 of decades. And the general public, states like
23 Pennsylvania, local communities, unions, solid
24 waste and steel industries have all participated
25 with environmental groups, public interest groups

29

1 to prevent waste from being deregulated. However,
2 the push is on.

3 The last recommendation is to enforce your
4 state law that requires regulatory control over
5 material that's made in a licensed or regulatory
6 way; to not deregulate it and let it into the
7 landfills and other MSW facilities; and to
8 investigate more closely what has happened in the
9 past that has allowed this to happen; to assess
10 the safety at those sites to better protect those
11 sites. It sounds like some of this is already
12 underway. But also to prevent violations in the
13 future.

14 To elaborate on my first point that ionizing
15 radiation is of concern, I have attached to the
16 packet a couple of fact sheets with references.
17 One is No Safe Dose. It's quoting scientists in
18 the past who have stated that there's a risk at
19 every level. This doesn't mean that we can never
20 be exposed to radioactivity. What it means is

21 that we're already exposed to radioactivity in so
22 many ways, that when the material is in the
23 regulatory system, it should remain there and not
24 be deregulated because it happens to be
25 potentially at comparable levels to materials that

30

1 are already naturally occurring.

2 The health effects, as pretty common
3 knowledge, cancer, birth defects, reduced
4 immunity. And the National Academy of Sciences
5 just came out this year reaffirming that linear
6 no-threshold theory which was mentioned by the
7 previous speaker, so there is no level below which
8 it's safe and there's no effect. Then the
9 European Commission on Radiological -- ECCR,
10 European Committee on Radiation Risk, also
11 released a report last year affirming that and
12 also criticizing the international committee on
13 radiological protection, commission on
14 radiological protection, for underestimating the
15 risk from radiation and therefore, which is in the
16 document provided, goes through the details of how
17 they believe the biokinetic modeling and so forth
18 is inadequate and that the risks are actually
19 higher than those upon which our legal levels are
20 based.

21 The Department of Energy is also funding
22 studies on radiation and learning that there are
23 new ways that we didn't know about before that

24 cells are affected, and these are not calculated
25 into the risk factors.

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1 There are also effects from radioactivity
2 being routinely cumulative, additive effects from
3 repeated and routine exposures, also synergistic
4 effects when one is exposed to not just say
5 tritium but also other chemicals that are in the
6 landfill or that are in the environment in
7 general, that combinations of pollutants and
8 sometimes just everyday chlorine and mixed
9 plutonium are effected. So there are synergistic
10 effects that are not taken into consideration in
11 the radiation standards.

12 Tritium, I have attached a couple of
13 documents on tritium and also provided some
14 abstracts on tritium, the toxicity of tritium, the
15 health effects on living tissues, including one on
16 human tissues, and also wanted to point out that
17 tritium is playing a very significant role in
18 Illinois right now where reactors are found to be
19 leaking tritium.

20 There is a state lawsuit. There's a class
21 action suit that has been filed. There's agencies
22 for toxic substances and disease registry
23 investigation that's begun at the request of one
24 of the senators. And the industry itself is
25 investigating the problem and looking at -- doing

1 studies of a lot of its reactors around the
2 country because it turns out this material is
3 leaking and is of significant both health and
4 economic concern.

5 I want to point out that the EPA's maximum
6 concentration level of 20,000 picocuries per liter
7 may be the legal level; but what naturally occurs
8 with tritium is in the range of 3 to 25 picocuries
9 per liter. So what's legal is a lot higher than
10 what's natural.

11 And as I said, there's not necessarily a safe
12 level in the first place. Every amount increases
13 a person's risk. So that's my health effects
14 section.

15 I'll move on to the Pennsylvania law which
16 passed in '89 or '90, requiring that any licensed
17 material, radioactive waste that's generated under
18 licensed control or by a government agency -- the
19 Department of Energy, for example, doesn't have
20 licensed facilities; but its material is supposed
21 to be under regulatory control. That material
22 needs to be stored or disposed of in a facility
23 that's licensed for radioactivity in this state.
24 And since there --

25 SENATOR WHITE: Is there such a facility?

1 MS. D'ARRIGO: Not in Pennsylvania right now,
2 no. There are three such facilities in the
3 country, in South Carolina, Washington, and Utah.
4 And the Nuclear Regulatory Commission, the EPA are
5 in the process of trying to facilitate various
6 methods for deregulating the waste that would
7 potentially allow it to go legally to RCRA C or D
8 hazardous or solid waste landfills; and that is of
9 concern.

10 My understanding, you don't have a RCRA C
11 hazardous facility in the state; but you certainly
12 do have RCRA D facilities. So if those -- those
13 rule makings are on hold right now at the
14 Environmental Protection Agency and at the Nuclear
15 Regulatory Commission. EPA is deciding whether or
16 not to proceed, and the Nuclear Regulatory
17 Commission has postponed for two years last year,
18 so it could come up next year, its rule making
19 which control the release of solids, radioactive
20 solids.

21 The Department of Energy on the other hand
22 has a moratorium, a suspension, a ban on
23 radioactive or potentially radioactive metals
24 being released into commercial recycling. They do
25 however allow, using their own standards that are

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1 questionable, very questionable, release of metals
2 into regular trash, radioactive metals, and other
3 materials other than metals. So the ban is only

4 on radioactive and potentially radioactive metals.
5 So they are in the process of cleaning and closing
6 many of their weapon sites around the country, so
7 this stuff could get into the solid waste from a
8 variety of locations.

9 And I don't know. I haven't really compared
10 where those are in comparison to what comes into
11 Pennsylvania solid waste. Let me think. My time
12 is probably running here. Let me try to shorten
13 it.

14 I provided the testimonies of the local
15 organizations and encourage the committee to
16 follow up as you said you might with their
17 specific details because time doesn't allow and my
18 perspective doesn't allow.

19 But I think learning from what is happening
20 there, what has happened there, how the policies
21 of the state have affected those locations will be
22 very instructive in both cleaning the places up
23 and also preventing repeats of the radioactive
24 concerns at both solid waste facilities and at
25 licensed facilities that need to be cleaned up.

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1 So I would encourage further investigation by the
2 committee on that.

3 I wanted to add in addition to the Nuclear
4 Regulatory Commission, The Environmental
5 Protection Agency moving to deregulate waste, my
6 main point there is that as the federal agencies

7 in other states like Tennessee actually allow
8 nuclear materials that would have been considered
9 radioactive waste under Pennsylvania law to be
10 deregulated or moved to doing that -- it's been
11 opposed. But if this were to proceed, the amount
12 of radioactive material that could come into the
13 state in solid waste could very likely go up.

14 And the Department of Transportation and the
15 Nuclear Regulatory Commission adopted radiation
16 transportation standards in 2004 which the Sierra
17 Club and my organization, Nuclear Information and
18 Resource Services, and three others challenged in
19 court because it increases the allowable amounts
20 of radioactivity that are considered exempt.

21 More of the radioactive elements, the
22 majority of the radioactive elements, can have
23 higher amounts of contamination in shipments that
24 no longer require placarding or labeling. They're
25 just not considered radioactive anymore.

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1 And in some practical terms, I don't know if
2 this is done in Pennsylvania, but I know in other
3 states the transportation numbers are the numbers
4 that are used sometimes de facto to allow the
5 material into the landfill or into an MSW
6 facility.

7 So by allowing the stopping of labeling of
8 things that should be licensed, it's a possibility
9 that these -- it's a step toward doing it legally

10 and it's a possibility that things could be done
11 in a confused or an illegal way to allow nuclear
12 materials to get into solid waste facilities.

13 So DOT, NRC, EPA, the people I told you
14 about, and there are international agencies. The
15 International Commission on Radiological
16 Protection is now suggesting that perhaps we
17 should have exempt, what's the other one, the
18 excluded materials, radioactive materials; and
19 they're raising the amount of dose that they
20 consider acceptable.

21 I'm going to point out that both the
22 international and Atomic Energy Agency which is on
23 this path actually took the lead in getting the
24 transport regs changed, that that those agencies
25 do not have any kind of democratic process whereby

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1 the American public can participate. And so we
2 are the recipients of those recommendations when
3 our agencies adopt their standards, but we have no
4 ability to interact in a meaningful way on
5 affecting those standards that are set.

6 So as I said before, my recommendations are
7 to enforce the state law that will protect the
8 Commonwealth and its residents and to investigate
9 the existing apparent violations in that law and
10 to hold further hearings to learn more about the
11 specifics. I very much appreciate your having me
12 here.

13 SENATOR WHITE: Thank you. I have just one
14 quick question. You said that it really shouldn't
15 be the landfill's responsibility to --

16 MS. D'ARRIGO: Yes.

17 SENATOR WHITE: Whose responsibility is it?

18 MS. D'ARRIGO: Well, for licensed material,
19 it will be the licensee, the industry or the
20 entity that generates the material. The materials
21 that are of most concern to our organization are
22 the large highly concentrated -- well, I don't
23 think they would deregulate the highly
24 concentrated stuff that would give a lethal dose,
25 but the refuse that comes from that. So the

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1 nuclear power, the nuclear weapons, and the fuel
2 chain industries.

3 SENATOR WHITE: Do you have any reason to
4 believe that is being disposed of in the municipal
5 solid waste landfills?

6 MS. D'ARRIGO: Yes. I believe that after the
7 Nuclear Regulatory Commission's policy -- I
8 skipped a part here. The Nuclear Regulatory
9 Commission did have two policies in '85 and '90
10 called below regulatory concern that would have
11 allowed for, according to EPA, a quarter of the
12 radioactive waste in nuclear power waste stream or
13 actually to be deregulated and treated like
14 regular trash. Those policies were revoked from
15 Congress in '92 partly due to states like

16 Pennsylvania passing laws saying we're not going
17 to have that here.

18 After that happened, the licenses for
19 reactors were changed to allow for an easier
20 method for releasing materials. And I also know
21 that there are case-by-case approvals for
22 releasing radioactive materials from, for example,
23 the decommissioning of the Yankee Row plant in
24 Connecticut. Approval was given to that to go to
25 a hazardous facility in Idaho. Idaho was very

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1 concerned; and they ended up not taking it, so it
2 went somewhere else.

3 SENATOR WHITE: But we don't have a RCRA
4 landfill in Pennsylvania.

5 MS. D'ARRIGO: You don't have a hazardous
6 one.

7 SENATOR WHITE: Right.

8 MS. D'ARRIGO: But also through the NRC's
9 10-CRF-20.2002, alternative methods of disposal,
10 applications can be made to dispose of radioactive
11 material in alternative ways. They don't only
12 have to go to hazardous facilities. They could go
13 to solid waste also or be recycled.

14 SENATOR WHITE: Questions?

15 SENATOR RAFFERTY: Thank you. I'll focus on
16 one area. I'm very concerned over some of the
17 previous testimony about the difference of
18 physiology between a child and adult. Recognizing

19 that I don't think anybody here today is a medical
20 doctor who is testifying; but your studies that
21 you've done, is there a difference on health
22 effects to a four-year-old as opposed to someone
23 my age and weight, 125, someone my age and weight?
24 There has to be some kind of difference as to how
25 much is safe for me as to how much is safe for a

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1 four-year-old.

2 MS. D'ARRIGO: As I said, there's not
3 actually a safe amount.

4 SENATOR RAFFERTY: I'm sorry?

5 MS. D'ARRIGO: There are greater risks to
6 kids because their cells are dividing more
7 quickly, because they may not have as strong
8 immune systems, because -- there's a variety of
9 reasons that all of the pollutants, not just
10 radioactivity, can affect kids more. They're
11 smaller, so a smaller amount would be distributed.
12 More would go further.

13 And then supposedly with the elderly or
14 people who have reduced immunity, they would be at
15 greater risk. So radiation standards are not
16 designed to protect the most vulnerable parts of
17 the population, the fetus, the children.

18 And I would argue that the factor of two is
19 not really adequate to cover the variety of ways
20 that it's weakened. In the ECRR report, there is
21 some discussion of the kinds of factors that

22 should be applied to more adequately protect.

23 SENATOR RAFFERTY: Thank you.

24 SENATOR WHITE: Senator Regola?

25 SENATOR REGOLA: Thank you. These are two

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1 brief questions, more or less an opinion answer.

2 A lot of my constituents are concerned that their

3 property values near the landfills that have

4 accepted radioactive waste would be devalued.

5 Would that be a fair statement?

6 MS. D'ARRIGO: The potential is there. I

7 can't answer for the landfill situation. I would

8 have to -- I think there's a potential for that.

9 I would point out that in Illinois, at least one

10 reactor, there have been offers by the utility to

11 purchase the property of landowners.

12 So I think there's a potential with any

13 pollutants and particularly with radioactivity

14 which cannot be cleaned up, which cannot be

15 filtered out for that concern.

16 SENATOR REGOLA: And a second question, this

17 pertains back to my district again. In November

18 of '05, a bid was rescinded to accept low level

19 radiation, contaminated ash from a treatment

20 lagoon.

21 MS. D'ARRIGO: I'm sorry. What happened? I

22 didn't hear you.

23 SENATOR REGOLA: Basically a bid was rejected

24 to accept low level radiation from contaminated

25 ash from an adjacent lagoon. At what levels do

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1 radioactive waste become a health hazard?

2 MS. D'ARRIGO: Well, to my understanding, if
3 I've got the landfill and the source right, that
4 there's plutonium there in that material. There's
5 not a safe level of plutonium. There's not a safe
6 level of radioactive material.

7 It is my understanding that that material
8 could meet the definition of material that must go
9 to a licensed regulated facility and therefore --
10 a facility specifically licensed to manage
11 radioactive waste. So sending it somewhere other
12 than that is an apparent violation of your state
13 law.

14 SENATOR REGOLA: Thank you.

15 SENATOR WHITE: Thank you, Ms. D'Arri go.

16 SENATOR RAFFERTY: Thank you.

17 MS. D'ARRIGO: Thank you.

18 MR. HENDERSON: Our next witnesses are Tim
19 O'Donnell and Bill Belanger of the Pennsylvania
20 Waste Industries Association.

21 SENATOR WHITE: Good morning, gentlemen

22 MR. O'DONNELL: Good morning, Senator White,
23 members of the Environmental Resources and Energy
24 Committee, ladies and gentlemen.

25 My name is Tim O'Donnell. I am general

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1 manager of Modern Landfill in York. I'm here
2 today in my capacity as president of the
3 Pennsylvania Waste Industries Association. As
4 most of you know, the PSIA represents private
5 sector solid waste haulers, recyclers, and
6 landfill operators in Pennsylvania. We are the
7 state affiliate of the National Solid Waste
8 Management Association. We are pleased to be here
9 today to provide the waste industry perspective on
10 the issue of radioactive material in the waste
11 stream.

12 Before I introduce Bill Belanger whom we've
13 asked to provide information on our behalf, let me
14 emphasize that PWIA members and their employees
15 are just as interested in this issue as your
16 committee and the Department of Environmental
17 Protection and the public at large.

18 We take very seriously our responsibility to
19 dispose of our society's municipal waste in an
20 efficient, economical, and most importantly safe
21 manner. We have said many times before and we now
22 say it again, that we see ourselves as effective
23 stewards of the environment. We're governed by
24 laws and stringent regulations, and we are
25 committed as businesses and citizens of the

1 Commonwealth to do our jobs in a way that protects
2 and preserves our environment.

3 As you know, the state amended the solid
4 waste regulations in December of 2000, requiring
5 municipal waste landfills to develop approved
6 radiation monitoring plans that include
7 established procedures and the installation of
8 equipment to detect and safely manage radioactive
9 materials that might be present in the waste
10 stream. Our members follow these procedures and
11 interact with the Department of Environmental
12 Protection in a cooperative manner.

13 Our members work hard on a daily basis to
14 live up to their responsibility to protect and
15 preserve our environment. They also work equally
16 hard to protect the health and safety of employees
17 and our communities across the state.

18 I would now like to introduce Mr. Belanger
19 who held the position of senior health physicist
20 with the radiation program in Region Three of the
21 United States Environmental Protection Agency from
22 1981 to 2002.

23 Mr. Belanger is a registered professional
24 engineer. He holds a bachelor of science degree
25 in engineering from Swarthmore College and a

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1 master's degree in systems and biomedical
2 engineering from the University of Pennsylvania.

3 He is now affiliated with Porter Consultants,
4 Incorporated, as an expert on the topic of
5 radiation. He is here in his capacity as a

6 consultant to the PWIA. Mr. Belanger.

7 MR. BELANGER: Thank you, Mr. O'Donnell.

8 Good morning, Senator White, members of the

9 committee, ladies and gentlemen.

10 As you are aware, Pennsylvania Department of
11 Environmental Protection recently studied
12 Pennsylvania landfills for the presence of tritium
13 and found that it occurs above background leachate
14 of nearly all such facilities. This finding
15 produced a widespread response from the state,
16 concern about whether there might be any potential
17 impact on drinking water.

18 I understand this issue is generally what's
19 prompted this hearing today. Let me start then by
20 giving you some background on radiation at
21 municipal waste landfills generally before
22 addressing tritium specifically.

23 As Mr. O'Donnell mentioned, since December
24 2000, DEP regulations have required landfill
25 operators to monitor incoming waste for the

1 presence of radioactivity. This regulation was
2 designed to ensure that we have a systematic and
3 effective planning in place that protect health
4 and safety.

5 Pursuant to these plans, landfills are
6 required to install detection equipment that scans
7 incoming waste vehicles and sounds an alarm if
8 radiation is present. If the vehicle sets off the

9 alarm, the landfill operator is required to direct
10 the vehicle to a designated area and to identify
11 the type of radioactive material involved.

12 If the material is from the natural
13 environment or from an unregulated consumer item
14 or a short-lived radioactive material related to a
15 medical procedure, it may be disposed of at the
16 landfill. This is what DEP calls a Level 1
17 scenario, and it meets acceptable DEP regulations
18 for disposal.

19 If the material turns out to be something
20 from another type of source and of a more serious
21 nature, it becomes what DEP terms a Level 2
22 scenario. And in a Level 2 scenario, the landfill
23 operator must contact DEP immediately. DEP will
24 send a health physicist to the scene to identify
25 the material and see that it's either returned to

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1 the point of origin or sent to a facility licensed
2 to accept radioactive waste.

3 The waste industry has been cooperating with
4 DEP and fully complying with these regulations
5 governing the monitoring of incoming waste. As
6 reflected in a recent study conducted by DEP and
7 by my own personal experience, radioactive
8 materials are being dealt with in a safe and
9 responsible manner by the waste industry.

10 The only radionuclide that seems less
11 controlled at this time is tritium. The challenge

12 with tritium, a radioactive isotope of hydrogen,
13 is that it emits the weakest form of beta
14 radiation, too weak to register on a landfill's
15 radiation detector and therefore impossible to
16 detect as the material passes by a landfill
17 radiation monitor or any other field instrument.

18 Let me remark briefly a little outside these
19 comments that there is no radiation that escapes
20 an intact tritium exit sign. It's only when the
21 sign is broken that we have a problem. Therefore
22 it's totally undetectable.

23 As part of my work with Porter Consultants,
24 Incorporated, and our combined experience over the
25 past ten years covering the issue of radiation in

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1 Landfills, we've responded to hundreds of landfill
2 radiation alarms, none of which has ever been
3 triggered by a tritium source.

4 So where does the tritium in the waste come
5 from? It is generally believed that debris from
6 renovated or demolished commercial buildings often
7 contains improperly handled or discarded
8 self-luminescent exit signs. These signs contain
9 tritium. Certainly, tritium also is found in a
10 variety of other consumer products such as
11 watches, compasses, instrument dials, and so
12 forth.

13 In addition, tritium is produced naturally in
14 the upper atmosphere and exists as fallout from

15 nuclear weapons testing dating from the 1950's and
16 1960's. Natural tritium concentrations in water
17 range from about 150 to 300 picocuries per liter,
18 depending on the rainfall. Rain brings water from
19 the stratosphere down, and the tritium
20 concentration is increased. Fallout
21 concentrations have been decreasing here since
22 nuclear test bans.

23 However, these secondary materials and
24 environmental sources do not appear to account for
25 a significant component of the tritium levels

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1 measured in landfill leachate. As such, both
2 federal and state agencies have determined that
3 the dominant source of tritium found in
4 Pennsylvania landfills comes from improperly
5 discarded exit signs, and I fully concur with this
6 conclusion.

7 It's important to understand that external
8 exposure to tritium does not produce a hazard
9 because the weak radiation from it can't even
10 penetrate the dead outer layer of our skin.

11 Ingesting and inhalation at high
12 concentrations obviously is not desirable. Also,
13 the chance of inhalation of dangerous quantities
14 of tritium from evaporation of landfill leachate,
15 for example, is remote; and the acceptable
16 concentration of tritium in drinking water is as
17 much as 20,000 picocuries per liter, according to

18 the Environmental Protection Agency. Note that
19 the drinking water standard applies at the tap,
20 such that any treated discharge from a landfill to
21 a stream would be greatly diluted before reaching
22 any potential water user.

23 The Department of Environmental Protection
24 has assured the public that, based on its recent
25 study, there is no imminent or long-term threat to

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1 public health and safety from the presence of
2 tritium in the landfill leachate tested and
3 measured concentrations.

4 Let me tell you as straightforwardly as I
5 can, the issue of radioactive material in the
6 waste stream is an evolving topic since the great
7 majority of the buildings with tritium signs have
8 yet to be renovated or demolished. As such, the
9 potential for higher levels of tritium in the
10 future gives us reason to act today. We are
11 presented at this time with a unique opportunity
12 to nip a potential problem in the bud. Not acting
13 now would cause us to miss this opportunity.

14 Tritium is not a significant problem at this
15 point; and with education and proper enforcement,
16 it need not become one. The education and
17 enforcement of which I speak refers to ensuring
18 the proper disposal of tritium signs by their
19 owners.

20 Tritium signs are regulated by the Nuclear

21 Regulatory Commission. It's a federal agency.
22 Thus the jurisdiction for addressing this issue
23 currently lies with the NRC. However, DEP and the
24 waste industry can play an important role in
25 increasing awareness of the precautions that need

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1 to be taken and the proper disposal procedures
2 involved.

3 Those involved with building maintenance and
4 with the renovation or demolition of older
5 buildings may not be aware that exit signs contain
6 radioactive material. Exit signs tested for
7 disposal are supposed to be returned to the
8 manufacturer or sent to a waste site specifically
9 designated to receive radioactive materials. This
10 may not be well known either. The NRC in
11 cooperation with DEP and the waste industry must
12 do a better job of educating the public.

13 The only way we can effectively address the
14 tritium issue is to take action before the
15 material enters the waste stream. What can be
16 done after it's at the landfill is extremely
17 limited. We are better off focusing our efforts
18 on making sure the exit signs containing tritium
19 are properly disposed of.

20 The NRC needs to make sure that devices
21 containing tritium bear highly visible warning
22 labels with instructions for proper disposal. All
23 of us need to ratchet up the effort to create

24 public awareness of the proper procedures and who
25 to contact for help.

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1 The NRC has already begun this process with
2 enhanced controls over generally licensed
3 radioactive materials, but it is difficult and
4 impossible for the commission alone to track exit
5 signs in thousands of buildings.

6 As a consultant to the waste industry, I am
7 well aware that the industry is ready to do its
8 part. The industry can spread the word to its
9 customers. The industry is anxious to work and
10 cooperate with DEP and the NRC to improve the
11 current situation. But industry must look to the
12 NRC and DEP to take the lead and hopes your
13 committee can use its influence to convey this
14 message.

15 Thank you for giving us this opportunity to
16 speak. I'll be happy to take any questions.

17 SENATOR WHITE: One question occurs to me
18 right away. At the state legislature, we are
19 somewhat limited in the impact we can have on all
20 these other agencies other than to make
21 recommendations. But prospectively, you're an
22 engineer, is there some alternative to these
23 tritium exit signs? You know, we could ban them,
24 for example, in new buildings. There is that
25 alternative.

1 MR. BELANGER: There's a very easy
2 alternative. Tritium exit signs are only used
3 because it's inconvenient to run a wire.

4 SENATOR WHITE: That's what I'm thinking.
5 Plug them in.

6 MR. BELANGER: Yes, there are plug-in signs.
7 The only thing that you have to have is a way to
8 keep the sign lit when the electricity goes off.
9 Most building signs you'll find back-up batteries.
10 So yes, it's just a matter of running a wire; and
11 tritium exit signs are used mainly in cases where
12 it's inconvenient to run a wire.

13 SENATOR WHITE: Senator Musto? Questions?

14 SENATOR RAFFERTY: I have a question. Thank
15 you, Senator White.

16 The individuals at the landfills -- well,
17 first of all, the question that Senator White
18 asked earlier. How many landfills do we have in
19 Pennsylvania since you're president of PWIA?

20 MR. BELANGER: I think currently there are
21 fifty-four permitted sites in the state.

22 SENATOR RAFFERTY: Fifty-four? Thank you.
23 The individuals at the landfills who detect a
24 radiation in the truck, how are they trained?

25 MR. O'DONNELL: They go through pretraining

1 whenever a site initially gets their permit, and
2 then there's annual renewal training as well.
3 Basically what they need to do is recognize when
4 the alarms go off, and then they also use the
5 handheld device. The vast majority of the alarms
6 that we see are medical.

7 For example, in 2004, our facility in York,
8 every one of our alarms was either a driver or
9 medical waste in the truck. So with the handheld
10 devices, it basically identifies what the device
11 is. And we have target levels. We know if it's
12 below a certain target, then it's accepted be to
13 disposed of in the landfill.

14 SENATOR RAFFERTY: A handheld device will say
15 medical waste or tritium or something like that?

16 MR. O'DONNELL: Yes. Like Dave mentioned,
17 it's a library. So there's a list of
18 predetermined isotopes I guess is the right word
19 in the device that tells them exactly what it is.

20 MR. BELANGER: And if they don't know what it
21 is, they call me.

22 SENATOR RAFFERTY: With fifty-four landfills,
23 if one shows up each day, you're going to be a
24 busy guy. And this training is on an annual
25 basis?

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1 MR. O'DONNELL: Yes.

2 SENATOR RAFFERTY: So it's really up to the
3 machine to make the determination. It's not the

4 i n d i v i d u a l ?

5 MR. O' DONNELL: By the way, the instruments
6 are sent out to be recalibrated every year as
7 well. The big units that are mounted on the
8 scales obviously have to be calibrated on site,
9 but the smaller units can be sent out and be
10 recalibrated in the lab and returned.

11 SENATOR RAFFERTY: But again, it's the
12 machine itself that makes the determination of the
13 radioactive material, not the individual?

14 MR. O' DONNELL: That's correct.

15 SENATOR RAFFERTY: And once the steps are
16 taken, the cursory steps by the landfill
17 operators, do you know, do you record the truck
18 taht may have had radioactive material? Do you
19 make sure that that truck is decontaminated before
20 it comes back to your site tomorrow?

21 MR. O' DONNELL: Again, as Dave Allard talked
22 about it earlier, I don't believe there's
23 contamination of that. The truck doesn't actually
24 get contaminated. As you move out from that
25 source, it doesn't really contaminate through the

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1 truck.

2 For example, back in 2003 when we first
3 started our system, we did have a source of radium
4 that came in. It was remarkable to me how it
5 literally was a needle in the haystack.

6 Sid Porter who works with Bill came out to

7 our site, and we dumped a load out on the ground.
8 We picked through it down to the nth degree, and
9 we found the source that was about the size of a
10 filler for an ink pen.

11 And it was a hot source, but it didn't
12 contaminate the containing that it was in. So
13 once we were able to isolate and remove the
14 source, the container itself didn't really have
15 any contamination on it.

16 SENATOR RAFFERTY: I guess the only way you
17 would be able to determined if the truck still had
18 contamination if it would set off the gamma rays
19 the next day when it returned?

20 MR. O' DONNELL: Right.

21 SENATOR RAFFERTY: But there's no procedure
22 in line to take that specific truck --

23 MR. O' DONNELL: Well, actually, there is.
24 The procedure that's involved, first of all, when
25 someone removes the radioactive material from the

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1 truck, let's say it's something that has to be
2 separated rather than something that can go into
3 the landfill, the material would have to be
4 separated.

5 We are required by state regulation to wipe
6 the truck to make sure there's no contamination.
7 And before the truck leaves the facility, it goes
8 back through the alarms again to make sure that
9 there's nothing there that's going to kick off the

10 alarms. So yes, the trucks are screened after
11 radioactive material has been in the truck.

12 SENATOR RAFFERTY: This is some of the
13 information I'm trying to obtain, so thank you for
14 that.

15 Are any of the trucks constructed in such a
16 way that they can mask the gamma rays or distort
17 the gamma rays? I'm not saying a purposeful
18 method. I know lead is one item. Is there
19 anything else that might prevent you from reading
20 whether it's tritium or some other radioactive
21 material?

22 MR. BELANGER: Well, actually, anything will
23 attenuate gamma rays. It doesn't have to be lead.
24 The only reason we use lead is it's convenient
25 because it's a lot of waste in a small package.

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1 When the state regulations were set for the
2 trigger point on the radiation alarms, I was
3 involved in that process when I was with EPA. One
4 of the things we had to consider was the fact that
5 a piece of radioactive material in the center of a
6 trash truck would be shielded by the trash in the
7 truck, so it would be much more difficult to
8 detect than radioactive material near the edge of
9 the truck. So the threshold for the alarms going
10 off was deliberately selected to detect things
11 that are located in the center of the truck and
12 therefore shielded.

13 SENATOR RAFFERTY: If I could follow-up one
14 more question?

15 SENATOR WHITE: Just briefly.

16 SENATOR RAFFERTY: Thank you. You said that
17 tritium is not a significant problem at this point
18 and with education and proper enforcement that it
19 need not become one. I think you may have
20 answered my question later on, but at what point
21 does it become a significant problem?

22 MR. BELANGER: When the drinking water
23 standard is exceeded at the cap of course, it's a
24 very significant problem. We're talking about
25 something we want to get not even close to that

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1 level.

2 It becomes a significant problem when you
3 have a rising trend in the landfill leachate and
4 no apparent end in site. This is where it becomes
5 a problem. And this is what we're advising that
6 we avoid because as I think Dave Allard said, when
7 we deal with a tritium exit sign, there are
8 twenty-five trillion picocuries in there. The
9 drinking water standard is 20,000 picocuries in a
10 liter of water. So you need a lot of dilution
11 just for one exit sign if all those tubes get
12 broken, and we don't want to be in a position to
13 have to rely on dilution.

14 SENATOR RAFFERTY: Thank, Madam Chairperson.

15 SENATOR WHITE: Senator Musto?

16 SENATOR MUSTO: Thank you very much, Madam
17 Chairman. The previous speaker suggested that we
18 investigate more closely apparent failures to
19 enforce our outright violations of the law by DEP.
20 That's not what we're hearing from you.

21 MR. BELANGER: I'm not aware of any
22 situations like that.

23 SENATOR MUSTO: From your testimony, you're
24 doing what you are required to do. And DEP
25 certainly is doing what they're required to do by

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1 law. So where are the failures?

2 MR. BELANGER: I think the failure, if you
3 really look at it carefully, it's an institution
4 failure. Let's talk about tritium exit signs for
5 the moment because they're generalized licensed
6 devices. They go into the building, and the
7 building owner may not even be aware that he has
8 tritium exit signs.

9 Now, we have seen other instances. I can
10 think of one in particular. I think it was a
11 tritium exit sign problem with an industrial
12 gauging source where the source was painted and
13 the paint department had no idea that they were
14 painting over the label that would have identified
15 the source as radioactive. And it then went to a
16 scrap metal recycler when it never should have.
17 Things like this can happen.

18 So really what we're dealing with is a

19 situation where there's a failure to be sure that
20 the end user of the tritium exit signs know that
21 these things are there, first of all, and that
22 they have to have special treatment.

23 SENATOR MUSTO: Could that be a requirement
24 before a permit is issued?

25 SENATOR WHITE: Demolition permit.

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1 MR. BELANGER: Absolutely.

2 SENATOR MUSTO: We'll look into that. Thank
3 you very much.

4 SENATOR WHITE: Thank you, gentlemen. That
5 concludes the hearing. Thank you all. Very
6 interesting. Thank you.

7 (The proceeding concluded at 10:20 a.m.)

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