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1 **U.S. ARMY CORPS OF ENGINEERS**

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4 PUBLIC INFORMATION SESSION ON THE REMEDIAL

5 INVESTIGATION REPORT OF THE NIAGARA FALLS

6 STORAGE SITE.

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10 **PUBLIC HEARING** held on Wednesday,

11 May 7, 2008, at the Lewiston Senior Center,

12 4361 Lower River Road, Youngstown, New York,

13 commencing at 7:15 p.m., before Denise C. Burger,

14 Court Reporter and Notary Public of

15 the State of New York.

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1 MR. KOWALEWSKI: Okay. Good evening.
2 Welcome to the U.S. Army Corps of Engineers
3 Public Information Session on the Remedial
4 Investigation Report of the Niagara Falls Storage
5 Site.

6 My name is Bill Kowalewski and I am the
7 Program Manager for the Corps; project here at
8 the former Lake Ontario ordinance works and the
9 Niagara Falls Storage Site.

10 The Corps' projects at this site are planned
11 and executed by a team of scientists and
12 engineers from throughout the country and we have
13 brought them here tonight to engage you on the
14 finding of this report and to take your questions
15 and comments.

16 We take this work very seriously and we
17 value your time coming tonight to learn more
18 about the site. We want to share with you our
19 findings and to accept your input and to answer
20 your questions.

21 We have really two purposes for tonight's
22 meeting. First, is to provide you with an
23 introduction, and overview of our findings from

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1 this lengthy study and share with you that
2 information. That information is basically about
3 the contamination that is at the site. The risks
4 that it poses and the possible movements of that
5 waste or contamination over time. The second
6 objective of the meeting is to open up a dialogue
7 with the community for your concerns with those
8 findings in advance of another meeting to be held
9 in August. And the purpose of the second meeting
10 is to zero in on those issues which appear to be
11 of most interest to the local community and go
12 into more depth of the technology, if you desire
13 so, or to address other issues related to the
14 project that you want to know more about from the
15 Corps of Engineers.

16 Before we begin the presentation, I'd like
17 to make some quick introductions of the Project
18 Team that's here tonight so you recognize them
19 when they're briefing and when they are
20 addressing questions.

21 First, tonight's presenters, and I am going
22 to ask them to just stand up and be recognized,
23 Hallie Serazin, Risk Assessor; David King, Health

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1 Physicist; Erik Evans and Don DeMarco, and they
2 will be presenting on the HydroGeoLogic Model.
3 Thank you.

4 Now I would like to introduce the rest of
5 the Corps' Project Team that's with us here
6 tonight. Again, from the Risk Assessment
7 Community, Dr. Karen Keil; Health Physicists,
8 Hank Specter and John Peterson. Hydro geologist
9 Bill Frederick. We have several engineers and
10 scientists here tonight. Michelle Rhodes, Dr.
11 Judith Leithner, Tom Mahichick(sic) Dave
12 Kulikowski. Our Public Affairs Officer is Lou
13 Sanders and he's in the rear of the room. And on
14 Community Outreach we have Ellen Reagan and
15 Arleen Kreusch. Arleen Kreusch is the Outreach
16 Specialist for the Buffalo District. She handles
17 environmental issues for communities throughout
18 New York, Pennsylvania and Ohio where the Corps
19 is conducting these sorts of environmental
20 investigations.

21 That's about it for introductions. Oh,
22 don't do this publically, forget to introduce
23 your boss, that would be Mr. Jack Rintoul, and

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1 he's representing the District Commander tonight,
2 Lieutenant Colonel John Hurly. Jack is the
3 Senior Civilian at the Buffalo District. Okay, I
4 think that's it for introductions for the Corps
5 staff. I am going to turn it over to Arleen to
6 kind of go through tonight's agenda and how we
7 would like to work it with you tonight.

8 MS. KREUSCH: Thank you, Bill. I am
9 going to just briefly review the agenda for
10 tonight. We are going to start with the Remedial
11 Investigation and Baseline Risk Assessment
12 presentation and then we're going to have a brief
13 question and answer session that will last about
14 fifteen minutes and then we will be doing the
15 groundwater modeling and future actions. And we
16 did receive a request yesterday to extend our
17 question period for the public so we are going to
18 be taking questions for the next half hour after
19 the ground water modeling presentation and the
20 future actions presentation.

21 Anyone that came in early for the
22 availability session, you might have noticed that
23 we had note takers taking down the questions that

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1 we received tonight. We want to make sure that
2 we captured all of your questions so that when we
3 do come back in August, that we will be sure and
4 have answers for you, and have the presentation
5 tailored to meet your needs based on the concerns
6 that you have.

7 We also have a court reporter here tonight
8 who is going to be taking a transcript of the
9 meeting and all of the questions. When we do get
10 to the question and answer period, if you want,
11 you can state your name before you ask your
12 question so that you're on record as asking a
13 question. If you don't want to, you don't have
14 to.

15 You also received a folder when you came in
16 and there's a comment card in there or a question
17 card in there. If you don't want to stand up and
18 ask a question but you do have one, there's a box
19 in the back, you can just write your question on
20 the comment card and stick it in the box. We're
21 going to be posting the transcript, the questions
22 we get and then the responses that we get on our
23 website, so that you'll all have access to that

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1 information.

2 We do also have CDs available of the
3 presentation tonight. If you'd like to pick one
4 up after the meeting, they will be at the sign-in
5 table where you signed in when you came in.

6 So I think that's -- I also -- oh, and I
7 have an easel here so that if there's anything
8 that we can't get back to you on tonight, we will
9 write it on the easel so that we'll have it kind
10 of the parking lot to make sure that we address
11 it the next time or address it on our website.

12 And with that I would like to introduce
13 Hallie Serazin and David King. Thank you.

14 MS. SERAZIN: I am told I am soft spoken
15 so I'll try to make this loud. Tonight we're
16 here to present a summary of the Niagara Falls
17 Storage Site Remedial Investigation, including
18 the Baseline Risk Assessment and the Groundwater
19 Contamination Phase Transport Modeling. The
20 Remedial Investigation was conducted to determine
21 the nature and extent of both radiological and
22 chemical contamination at the site.

23 To maintain the integrity of the Interim

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1 Waste Containment Structure, no intrusive
2 sampling was conducted during the remedial
3 investigation. The contents of the IWCS were
4 described using detailed historic records and the
5 integrity of the IWCS caps and sidewalls were
6 determined, or were evaluated using geophysical
7 survey techniques.

8 The Remedial Investigation involved numerous
9 activities starting with a historic document
10 review to gain an understanding of the site
11 operations and how they may have contributed to
12 site contamination. The field sampling and
13 laboratory analysis was conducted in three
14 phases, beginning with site-wide comprehensive
15 sampling and narrowing down to answer more
16 specific questions. A site-wide gamma walkover
17 survey was conducted to evaluate gamma-emitting
18 radionuclides in the top six inches of soil.

19 Background analysis was performed to
20 establish a baseline for non-impacted -- of
21 non-impacted areas in off-site properties. The
22 background survey included sampling for
23 groundwater, soil, surface water and sediment.

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1 And it also included a gamma walkover survey of
2 the Lewiston/Porter School Campus.

3 The geophysical survey was used to identify
4 potential contamination, potential underground
5 features such as pipelines and buried utilities,
6 which could act as contaminated pathways.

7 The geophysical survey was also used to
8 evaluate the integrity of the IWCS caps and
9 sidewalks. Environmental surveillances currently
10 ongoing at the site, and it includes sampling of
11 air for radon emissions and gamma radiation from
12 the site. It also includes an evaluation of
13 surface water sediment and groundwater. The
14 Niagara Falls Storage Site includes 191 acres, so
15 the site was subdivided into exposure units,
16 which are geographic areas over which a receptor
17 was assumed to live or work. The exposure units
18 were defined in coordination with the New York
19 State Department of Environmental Conservation
20 based on available data and site history.

21 Field screening was used to elect specific
22 sample locations and was focused on sample -- on
23 locations or areas where we thought chemical or

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1 radiological contamination was most likely to be
2 found. So, for instance, the results of the
3 gamma walkover survey were used to select sample
4 locations with the highest gamma readings. The
5 IR evaluated numerous environmental media and
6 they're listed there, surface and subsurface
7 soil, groundwater, sediment surface water,
8 pipeline contents, railroad ballast, road and
9 building cores and floor drains.

10 The Baseline Risk Assessment used the data
11 generated in the remedial investigation to assess
12 potential exposures and risks to current and
13 hypothetical future on-site receptors. The
14 Baseline Risk Assessment is a decision-making
15 tool that's used to help determine the need for
16 further investigation or site clean up.

17 It includes a Screening-Level Ecological
18 Risk Assessment to assess ecosystems with and a
19 human health risk assessment to evaluate
20 potential risk to on-site human receptors.
21 Because the model is used to evaluate chemical
22 and radiological risks were different, these two
23 risk sources were evaluated and quantified

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1 separately.

2 Where a Screening Level Ecological Risk
3 Assessment indicator species were selected to
4 represent land-based or terrestrial ecosystems or
5 communities as well as water-based or aquatic
6 communities. The indicator species were also
7 selected to represent all levels of the food
8 chain, so they range from earthworms and red fox
9 to mayflies and the Great Blue Heron.

10 The Screening Level Ecological Risk
11 Assessment found no unacceptable radiological
12 dose to ecological receptors. Several chemicals
13 did fail out the very conservative screening
14 steps of the assessment such as metals in surface
15 water, however, field observations showed
16 relatively healthy and functioning terrestrial
17 and aquatic ecosystems.

18 Although much of the available habitat at
19 the property has been disturbed, the ecosystems
20 present appear to be relatively healthy and
21 functioning, so impacts to the ecosystems are
22 more believed to be due to a loss of habitat
23 rather than to a toxic impact. The

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1 recommendation was for no further actions for the
2 relatively productive and recovering ecosystem at
3 the Niagara Falls Storage Site.

4 So let's look at the Human Health Risk
5 Assessment. The Human Health Risk Assessment has
6 four major components beginning with data
7 evaluation, which asks the question, does
8 contamination exist and if yes, what is the
9 nature of this contamination. Exposure Assessment
10 asks the question, who may be exposed? How
11 often? How long? How much? The Exposure
12 Assessment was used to calculate chemical and
13 radiological intake. The Toxicity Assessment
14 asks the question, how harmful is it and gathers
15 toxicity information on the substances being
16 evaluated. Risk Characterization asks the
17 question, how much risk or what is the likelihood
18 that a receptor might experience some adverse
19 health effect due to on-site contaminations.

20 Now I'd like to take a little bit more of an
21 in-depth look at each of these four components.
22 Data evaluation, does contamination exist? To
23 answer this question, a lot of sample and

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1 analysis were conducted. In fact, the Niagara
2 Falls Storage Site data set includes
3 approximately 1400 samples with over 150,000
4 analytical results. To select chemicals and
5 radionuclides that are concerned, the analytical
6 results were compared to background levels and to
7 conservative screening levels.

8 Exposure Assessment, who may be exposed.
9 The Exposure Assessment identifies current and
10 potential future on-site receptors. Under
11 current conditions, we assessed adults and
12 adolescent trespassers as well as maintenance
13 workers. Under future conditions, we assessed
14 the adult and adolescent trespassers, maintenance
15 workers, construction workers, industrial workers
16 and both adult and child residents and
17 subsistence farmers.

18 Next, complete exposure pathways were
19 identified and those would be things such as
20 ingestion or inhalation. I'll describe that on
21 the next slide as well. So as to not
22 underestimate risks, all of the exposure
23 assumptions used to evaluate exposures to the

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1 hypothetical receptors were very conservative.

2 And then finally contributions from the
3 multi -- the multiple exposure pathways were
4 summed to estimate intake. So for an exposure
5 path -- and exposure to occur, you really need
6 four things, starting with a source. That source
7 of contamination has to then be transported. So
8 you need a transport media, you need a point of
9 exposure and you need an exposure route. If any
10 one of these four elements is missing, the
11 exposure pathway is incomplete and no risk
12 exists.

13 For the Niagara Falls Storage Site, the
14 source of contamination is historic government
15 operations at the site that resulted in releases
16 to soil. Contaminants released to soil have
17 since been transported or moved through various
18 mechanisms, including wind erosion,
19 volatilization or leaching. There's more on the
20 figure there.

21 The exposure point would be the location
22 where populations may actually come in contact
23 with that contamination. So for instance,

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1 contamination that was released to sill may now
2 have an exposure point in through food. And then
3 the route itself would be ingestion of the
4 contaminated food source.

5 Once we have estimated intake, we need to
6 ask ourselves how harmful is it. A very long
7 time ago, the Greek Philosopher, Paracelsus,
8 developed one of the founding laws of toxicology
9 that dose, not exposure determines harm. In
10 other words, exposure does not equal risk. The
11 practical example of this is if you drink a cup
12 of coffee or an alcoholic beverage, you may be
13 fine but if you drink ten cups of coffee or you
14 have ten alcoholic drinks, it could make you sick
15 or worse. The toxicity assessment for the
16 Niagara Falls Storage Site Baseline Risk
17 Assessment used Environmental Protection
18 Agency-approved toxicity criteria to calculate
19 the likelihood that a receptor might experience
20 adverse health effects or risk.

21 Then finally we moved to the Risk
22 Characterization, which answered the question,
23 how much risk? The Risk Characterization

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1 integrates the findings of the Exposure
2 Assessment intake with the results of the
3 Toxicity Characterization, the Toxicity
4 Assessment or those values, the toxicity criteria
5 to determine risk.

6 The Risk Characterization estimated the
7 likelihood that a receptor may experience an
8 adverse health effect and compare those levels,
9 those risk results to the regulatory limits, to
10 determine whether action is warranted.

11 Now David King is going to present some of
12 the key findings of the Remedial Investigation
13 and the Baseline Risk Assessment.

14 MR. KING: All right. First of all,
15 I'd like to say that I made my connecting flight
16 today but my bag did not, so I am giving this
17 presentation in my comfy travel cloths, I hope
18 that's acceptable.

19 I am going to discuss today the key findings
20 of the remedial investigation and the Baseline
21 Risk Assessment starting with Interim Waste
22 Containment Structure. Which I will also refer
23 to as the cell. Two types of data -- two types

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1 of data have been collected over the last eight
2 years, over the cell. Geophysical data and
3 environmental surveillance data, including radon
4 measurements and gamma radiation survey.

5 The geophysical data confirmed that the cell
6 is not deteriorating. No void spaces have been
7 found. No significant cracks or fissures have
8 been identified, et cetera. The radon and gamma
9 radiation data are also well below federal
10 standards, which is good.

11 Now as Hallie pointed out, these are
12 nonintrusive data. That means they do not
13 puncture the cell and directly samples the
14 materials underneath. There's discussion during
15 the remedial investigation planning session that
16 it's -- historical data are good enough and where
17 -- there's no reason to risk at this point
18 puncturing into that material and potentially
19 exposing workers or producing environmental
20 release. That's why the nonintrusive approach
21 was taken. And that's understood that the cell
22 is not a permanent storage facility.

23 The feasibility study will evaluate

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1 alternatives for developing a permanent solution
2 for the waste inside the cell. So again, in
3 summary, the geophysical data and environmental
4 surveillance data shows that these cells hold up
5 nicely.

6 Moving onto a key finding for the soils;
7 approximately 1000 surface soil and subsurface
8 samples, soil samples, have been collected during
9 the IR phase. This figure illustrates the
10 location of the those samples. Specifically
11 where chemicals have been identified above the
12 risk grade screening levels, you see a purple
13 circle, and where the radionuclides are
14 concerned, have been identified at that risk base
15 screening level, you see a green circle. And
16 where no chemical or radionuclide of concern have
17 been identified, you see a gray shaded circle.

18 Now both chemicals and radionuclides have
19 been identified above background levels for both
20 surface and subsurface soils. Now getting a
21 little more specific for radionuclides, the
22 constituents detected most frequently in soil are
23 radium, thorium and uranium. And for surface

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1 soil, also cesium. For chemicals, chlorinated
2 solvents have been identified near buildings and
3 former activities associated with low activities.
4 The low processes. And also PAH's and PCB's and
5 some metals have been identified in more isolated
6 spots. And you can see from the figure that some
7 of the chemicals are really more isolated to a
8 few locations, relative to the radionuclides,
9 which show more widespread contamination across
10 the site.

11 And something else I'd like to point out
12 about this figure is that in general, we can
13 consider, from a risk standpoint, a farmer or
14 resident receptor across everywhere except
15 exposure unit ten. In this area there really
16 wasn't a need to identify a resident there
17 because we knew if the resident broke into the
18 cell, there would be an unacceptable risk. So
19 what we looked at was more of a -- the current
20 situation, who was exposed to exposure unit ten,
21 and that would be a maintenance worker.

22 So still some contaminants were of concern,
23 chemicals specifically or I'm sorry,

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1 radionuclides were still identified in exposure
2 unit ten. But you also see that we did not
3 collect any cells -- and samples within the
4 footprint of the cell.

5 Now moving on to sediment surface water and
6 the pipelines. The sediment and surface water
7 only exist in some areas of the site and for
8 surface water, during only part of the year. The
9 pipelines are -- were manufactured or constructed
10 back in the 40's associated with TNT manufacture
11 -- the TNT Manufacturing Plant and have been
12 capped into boundaries that are no longer in use.
13 Dealing with sediment and surface water first,
14 first of all you see, I am sorry, back up a
15 little bit, this -- talk about this figure, this
16 figure uses the same color scheme as the last
17 figure. The purple circles represent where
18 chemicals of concern have been identified above
19 the screening level and the green represents
20 where radionuclides have been identified above
21 screening levels. And again, if nothing was
22 identified, you see a gray dot.

23 One thing is obvious from this figure, we

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1 don't have any green dots anywhere. The green,
2 the radionuclides were identified above
3 background but not above -- not to produce an
4 unacceptable risk. Which leaves only chemicals.
5 For sediment, actually no chemical of concern was
6 also identified. Leaving only surface water and
7 then the pipelines. For surface water, the only
8 chemical of concern was lead and lead was
9 selected as a chemical of concern because surface
10 water concentrations of lead in this ditch here
11 exceeds a very conservative drinking water action
12 level. So the assumption is somebody is going to
13 get all their drinking water from this ditch,
14 which only has water in it part of the year,
15 which is a very conservative step. For -- for
16 the pipelines a PCB was identified as a chemical
17 of concern leading at concentration primarily
18 right here and lead was also again identified in
19 the -- the pipelines using the conservative
20 drinking water action level. I have already
21 mentioned that the pipelines have all been cut
22 off at the site boundary, the -- they -- our
23 remedial investigation also showed that surface

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1 water and sediment contamination is not migrating
2 off the site.

3 Moving now to groundwater. Groundwater on
4 the site is -- was really located into two zones,
5 the upper water bearing zone, which is closer to
6 the ground surface and the lower water bearing
7 zone. We see the upper water bearing zone here
8 and the lower water bearing zone here. These
9 zones are separated by an average of about twenty
10 feet of clay, which is identified here at the
11 aquitard. The lower water bearing zone data does
12 show some results above background but nothing
13 exceeding risk -- a risk threshold. A
14 contamination has been identified in the upper
15 water bearing zone, primarily associated with
16 these isolated sand lenses and also associated
17 with soil contamination. So the idea is if you
18 get rid of the soil contamination, which is the
19 source of the groundwater contamination, you're
20 also taking care of the groundwater problem.

21 In the upper water bearing zone, some plumes
22 have been identified, specifically for
23 radionuclides, uranium was the only one

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1 identified. And then we have magnesium --
2 manganese, boron, some chlorinated solvents, and
3 that there. I'm a rad guy so I would call this
4 bis2 for future reference.

5 This figure uses the same color scheme as we
6 had for the prior figures, with the purple
7 representing a chemical, in this case a plume
8 instead of an individual location and then the
9 green now is -- is instead of a radionuclides, is
10 uranium plumes that were identified. And then we
11 added in this uranium screening level, maximum
12 concentration level I think is what it's called,
13 MCL, which is a drinking water standard for
14 uranium.

15 So we see this is where we're starting to
16 detect uranium above background and also what is
17 associated with this drinking water standard,
18 this all in the upper water bearing zone. And
19 what we see here is just like for soils, for
20 example, we see some isolated occurrences of
21 chemicals. This is boron. I believe these are
22 the chlorinated solvents and this is bis2.

23 Of particular importance in this case is we

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1 have up in the exposure unit one, we have this
2 plume that appears to be crossing the site
3 boundary. This is ongoing surveillance and is
4 going on to the monitor what is going on here and
5 I am not even sure we have any sample locations
6 across it. We do know, we think that it's
7 leaving the site. Which is of a particular
8 interest for obvious reasons.

9 Okay. In conclusion, one of the most
10 important things, there is a no immediate
11 off-site risk to the nearby communities. The RI
12 data confirms that the cell is not degrading.
13 There is no radon problems or gamma radiation
14 coming from the cell. Surface water and sediment
15 contamination is not migrating off-site. The
16 pipelines are capped at the boundary, so we don't
17 have any off-site risk or problems

18 The one groundwater plume was identified and
19 environmental surveillance and maintenance
20 activities will continue. And finally, the
21 feasibility study, which is coming up, will
22 examine the variety of options to address
23 long-term risks presented by site contamination.

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1 And that concludes my presentation.

2 MS. KREUSCH: Thank you, Hallie and
3 David. Could somebody turn the light back up for
4 the question part. If anybody needs to stand up
5 and stretch or anything while we're doing this,
6 please feel free to go ahead.

7 I just want to pull this out so that I can
8 write anything down we need to write down. Just
9 if everybody is okay, a couple of ground rules
10 kind of, we'll try to have one person go at a
11 time and try to give everybody a chance to talk
12 and be respectful and listen of everyone. Is
13 there any other kind of operating rules that
14 anyone would like to suggest for the questions
15 and answers? Is everybody okay with those?
16 Okay. Does anybody have any questions?

17 MS. ROBERTS: I have a couple. Do you
18 want me to come up front?

19 MS. KREUSCH: Whichever you prefer.

20 MS. ROBERTS: Can you hear or can
21 everybody hear? Okay, my name is Ann Roberts and
22 I have been interested in the NFSS for quite a
23 long time. One question I had was the -- of

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1 particular concern to me is a uranium plume,
2 which is south of the contained south. I think
3 in the RIR presentation it shows up as green just
4 south of the cell. But the levels of uranium are
5 very high and they're of the order of I think
6 9000, which seems is that right? Maybe the
7 coffee got to my math. I read it as -- let me
8 see, to me it looks like --- can you read that
9 9580, yeah, 9580, which seems way above any
10 other, you know, levels in groundwater.

11 I had a discussion earlier with some of the
12 engineers about the fact that their sample was
13 taken from a pipeline. I think my question is
14 what accounts for levels that high, even if it's
15 in the pipeline, so you might confine it more as
16 a mixture of infiltrated water from above. It
17 still seems very high and I just have worries
18 about the southern boundary of the containment
19 cell leaking and somehow, you know, the first
20 thing you would see is uranium. So I would
21 appreciate any other information that will put my
22 mind at rest on that particular question.

23 MS. RHODES: You can't really see the

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1 concentration on here but it refers to kind of
2 this area right here and when we were drawing the
3 groundwater plume map, we wanted to make sure we
4 were very conservative on how they -- we drew
5 them. So we took not only what was in the
6 groundwater itself but also what was in the
7 associated pipeline content.

8 The reason we did that is obviously if it's
9 in the pipeline, if the pipeline is breached,
10 there's the potential for it to leach into
11 groundwater. What we have here, and it's not
12 shown very well, is there's actually a building
13 south of the -- the southern dike on the
14 containment cell. This is former building 409.
15 It was originally part of a low waste water
16 treatment plant. It wasn't included in the cell
17 itself because there wasn't storage of the
18 residues in it. However, we actually did a
19 geophysical survey and determined that there was
20 extensive metal in this building. So based on
21 some of the documentation, what they have done is
22 actually taken some of the demolition debris from
23 when they originally were putting the residues in

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1 the building and put it in inside that building
2 409.

3 The geophysical defines that area where 409
4 was and we -- we sampled the boundaries of that,
5 both soil and groundwater to make sure it wasn't
6 a source of the -- of the, you know, the
7 contamination along the side where Ann pointed
8 out. This was drawn very conservatively and if
9 you look on this map, which unfortunately you
10 don't have, but it's in the Remedial
11 Investigation Report, there's actually sample
12 here, sample location here, here and there
13 (indicating) that was in the pipeline itself.
14 And so there was no sampling done here. We just
15 automatically assumed what was on this side would
16 obviously be on that side

17 This whole area was an area of a lot of
18 activity in the 80's when the Department of
19 Energy was constructing the cell. There was
20 former rad storage piles on this specific area
21 and another rad storage area was right here, you
22 could see. That obviously has a plume associated
23 with it. So it's not surprising that there is a

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1 plume there, and especially since this is where
2 the, you know, the higher activity residues were
3 stored at one point, not K65s specifically.

4 So like I said, we were conservative as far
5 as including that in our groundwater maps just
6 for a potential to get to groundwater. We wanted
7 to make sure we captured it and didn't lose sight
8 of it because of the concentration associated
9 with it. Not saying it's in the groundwater now
10 but we wanted to account for it in that manner.
11 So it is elevated and definitely is likely due to
12 former rad storage in the southern portion.

13 MS. ROBERTS: Michelle, could you be
14 certain that that's the cause though, because you
15 obviously don't take samples within the
16 containment cell for obvious reasons, so how
17 would you know if it was, if the cell should be
18 leaking on that southern boundary, how would you
19 know?

20 MS. RHODES: Actually what is not shown
21 here either, is we do have what's called nestor
22 welpairs(sic), and actually our next presentation
23 will elaborate on that a little bit more. We

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1 have an Environmental Surveillance Program that
2 we do each year and part of it is sampling the
3 groundwater wells surrounding the waste
4 containment structures. There's actually wells
5 along the southern side and actually another well
6 here that we do sample to determine if there is a
7 penetration, you know, of the waste containment
8 structure.

9 MS. ROBERTS: Would these actually show,
10 you know, that the cell was leaking because the
11 wells are a certain distance apart and if you had
12 pipelines remaining from building 409, they
13 haven't been removed, you could get material
14 traveling preferentially along those pathways to
15 building 409 and then giving you a plume that
16 emanates from that.

17 MS. RHODES: Building 409 is, you know,
18 around this area. The dike that was constructed,
19 the southern dike, obviously was between the
20 southern building within the waste containment
21 cell 409, so they actually did excavate that
22 quite far down to install that cut off wall and
23 again, HGL will get into that a little bit more .

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1 What is good about this site is that there is
2 tight clay, now obviously clay is not, you
3 know -- will allow some groundwater flow through
4 it but it's not, you know, it makes -- that's why
5 it makes a landfill is that, you know, it doesn't
6 allow water to flow through it readily. What we
7 found is these plumes are collocated or the same
8 location as sand lenses. So we did extensive
9 sampling, specifically in this area, you can see
10 on the soil map as well, to look for potential
11 sand pockets or anything that might indicate that
12 those wells couldn't capture any kind of
13 groundwater issues.

14 So we wanted to make sure that, especially
15 in this southern area, I think that's the area
16 most in question as far as, you know, potential
17 for leak, for leaking, that we address the
18 southern portion extensively to make sure that we
19 had adequate well distribution. I can't
20 remember, let's see, there's about five wells
21 across here, so they're very closely spaced. We
22 actually have a couple outside of this as well.
23 And they're both in the upper and lower water

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1 bearing zones.

2 So we do continue to monitor them. Anything
3 that has been -- has gotten into the groundwater
4 seems to be within these individual sand pockets,
5 which makes sense when you consider groundwater
6 prefers to flow through sand instead of clay.

7 MS. ROBERTS: Do you know if the pipes
8 still exist though in 409 on the outside
9 containment zones? Because that's my concern, if
10 you do have pipes still there, the -- if the cap
11 is deteriorated over time and you did have some
12 leakage, it would flow along the pipe and that
13 would not be picked up by the -- well presumably.

14 MS. RHODES: The geophysical didn't show
15 any connecting pipe. Now obviously, geophysical
16 is not perfect. It has its own limitations
17 associated with it. So the actual construction
18 of the dike at the cut off wall went down to the
19 gray clay, which is about twenty feet roughly on
20 average, that varies, and we found that the
21 pipelines didn't really extend much below, you
22 know, most of our lines on-site are about ten to
23 twelve feet. Obviously some are a little deeper,

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1 but any construction of the actual clay dike
2 itself would have forced the Department of
3 Energy, when they were constructing the cap, to
4 sever those lines and cap them.

5 I have some photos available, not
6 specifically, I was looking at 409 itself, but
7 some of the other buildings associated with this.
8 It was a former, you know, that's your -- I guess
9 your concern is correct, it was a former fresh
10 water treatment plant so obviously it had
11 pipelines associated with that. But I have some
12 photos of, you know, the actual capping and fill
13 critting grouting associated with those lines.

14 MS. KREUSCH: Does anyone else have
15 another question? Dr. Beck.

16 DR. BECK: Dr. William Beck, Chair of
17 the Radiological Committee. I have got a couple
18 of questions and most of them relate to the
19 contents of the Interim Waste Containment
20 Structure, because that's where almost all of the
21 radioactivity on site is located.

22 So will the Corps drill into the Interim
23 Waste Containment Site before the feasibility

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1 study to get data on the internal movement of
2 radioactive contamination, particularly between
3 the storage building such as 411 and the eastern
4 clay wall in the vicinity of the central drainage
5 ditch?

6 This data is critical for determining the
7 extent of any excavations in the feasibility
8 studies. If there is contamination beneath the
9 building and adjacent to the buildings, we are
10 now talking demolishing that entire massive
11 structure in order to excavate underneath it.

12 I think before you can assess the
13 feasibility, we need to know how much movement
14 has occurred in the twenty-five years since the
15 waste was placed there. And that's an
16 unanswerable question, I will leave it out there
17 and follow that with a second question.

18 MS. KREUSCH: Okay.

19 DR. BECK: Inside building 411, okay,
20 there was a pazometer (sic) and there are
21 photographs in it, I have seen the photographs,
22 it is non functional. Attributed to lightening
23 damage. Will those be repaired or a new one

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1 inserted, again, the key to the release of
2 radioactivity from that building and what is the
3 buildup of liquid inside those powder wet
4 residues? Okay. Two pieces of information, if
5 the groundwater level inside the residue is
6 rising, this is an indication of how much rain
7 water and irrigation water is coming downwards
8 and collecting in the building. Okay, there is a
9 computer model projecting this, this would be
10 ground truth as to how well that model is doing.
11 And secondly, if there is a seasonal variation,
12 if it is actually going up and going down inside
13 the building, this is then evidence that there is
14 a leak near the bottom and groundwater is forcing
15 itself up into the building when the groundwater
16 is high and as the groundwater drops, it would be
17 showing a change in the building as well.

18 So for this reason I believe a measurement
19 inside that building, inside the residue is
20 important for any feasibility study to decide
21 what has to be done and of course to set up how
22 you're going to do it.

23 MS. KREUSCH: Is that something that will

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1 be addressed in the next presentation or does
2 somebody want to respond to that tonight or just
3 keep it on the --

4 DR. BECK: Well, the third one is again
5 going to the same issue, the geophysical testing,
6 because I suspect of the steel in the concrete
7 building, that we're talking about, building 411,
8 has not examined the east, the west, or the south
9 side of that adjacent to the building.

10 And again, this is -- we're
11 all counting on that clay wall for our safety and
12 as far as I know, I have seen no evidence that
13 it's been examined and what technology there is
14 available to reassure us that that part of the
15 clay wall is also undisturbed. I realize that
16 the upper part, the northern part has been
17 examined, and I am not arguing about that. What
18 I am saying the whole piece that hasn't been
19 looked at

20 MS. KREUSCH: So that was the building
21 411 steel? I just want to make sure I got that
22 down right?

23 DR. BECK: Yeah, I believe in all of

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1 those buildings there is reinforced concrete --

2 MS. KREUSCH: Okay.

3 DR. BECK: -- and steel --

4 MS. KREUSCH: Okay.

5 DR. BECK: -- resulting in that the
6 electromagnetic technique found a lot of steel.
7 It didn't tell us anything about -- thank you.

8 MS. RHODES: I am a lot shorter than
9 Dave. So first I'd like to publically
10 acknowledge the radiation committee, they had
11 submitted a document to us for our review and
12 consideration of the feasibility study that was
13 excellent. I know they put a lot of work behind
14 it and did a lot of research and mainly a lot of
15 it was focusing on the Interim Waste Containment
16 Structure so we appreciate that.

17 Second, just to start with your point number
18 one, Dr. Beck, there are definitely, you know, we
19 did an extensive look at the history, is this
20 even helping? We did an extensive historical
21 search to obtain as much information as we could.
22 We also talked to the former workers on site that
23 actually helped construct the landfill itself and

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1 were able to get a little bit more information.

2 Now obviously do we know 100 percent exactly
3 where everything is perfectly? No. And it never
4 will be that way. There will always be
5 uncertainties but there are certain ways to
6 handle uncertainties. At this point, as far as
7 the penetration of the cell, as Dave King had
8 mentioned during the RI planning, we have just
9 determined that based on the historical
10 information, we had enough sufficient information
11 at least to assess some of the alternatives that
12 we're going to be looking at in the feasibility
13 study. Obviously there are data gaps and we're
14 trying to fill those and obviously if there is
15 any information that people have that can help us
16 with it, we'd appreciate it.

17 We did that for a reason that the landfill
18 was constructed for a reason. You know,
19 obviously the clay cap on it was designed to, you
20 know, minimize any infiltration of rain water,
21 you know, as the rain water would infiltrate it
22 would cause leaching and that could go to
23 groundwater. So we wanted to be protective in

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1 that manner. Additionally, the residues that are
2 buried inside the landfill generate radon, so
3 part of the reason that the cap was designed the
4 way it was, was to prevent this radon from
5 releasing and that's something that we test
6 during our environmental surveillance program.

7 So I guess we weighed the benefit of
8 penetrating the cell adverses what additional
9 information or value we would get from it and
10 determine that we had enough sufficient
11 information, although not perfect, we definitely
12 agree, to use for our planning purposes.

13 The pazometer, as Dr. Beck had mentioned,
14 when the cap was originally designed, it had
15 pressure transducers and all it means is it
16 monitors the levels of the water rising and
17 falling and obviously in a perfect situation, the
18 landfill, you want them to remain constant. You
19 don't want them to show any kind of seasonal
20 changes that would indicate that your, you know,
21 your containment amount is not -- has been
22 breached.

23 In the 80s I guess there was a lightning

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1 storm and the power associated with those I guess
2 fried the system and so that information is no
3 longer available for us to use. And again, not
4 wanting to penetrate the cell again is an issue.
5 However, we're still searching there in the
6 microfiche and I know Dr. Beck is very particular
7 with that. There was old vapor pressure
8 transducer data that we're trying to find so that
9 would be helpful -- helpful to our investigation.
10 We're constantly looking for that, to assist with
11 our planning.

12 The geophysical of the building that Dr.
13 Beck was referring to, we had done a seismic
14 survey in the landfill and the reason we did it
15 was to determine what -- where the water table
16 was and based on the geophysics we did to the
17 northern portion of the waste containment cell,
18 it appeared to be about three feet below building
19 4 level, where the residues were stored. Now
20 obviously this not directly under the residues.
21 One of the limitations of geophysics is you're
22 trying to see a water table underneath metal and
23 there's an interference there that won't allow

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1 you to see it.

2 We realize that -- that, you know, that was
3 a limitation in the study, although it appears
4 that there is no -- that it's not, you know,
5 above the residues and we can talk a little bit
6 to, HGL is going to talk a little bit about the
7 model and how that was addressed. So we were
8 aware that there is definitely -- there's more
9 information to be had. We're constantly looking
10 for more information but at this point we have
11 done an extensive search and as far as planning,
12 you know, we feel that we have sufficient data.

13 DR. BECK: One short comment, I have
14 repeatedly asked for drilling into the interim
15 waste containment structure and make only one
16 point, if it's as you believe, it is clean
17 outside the building, I have always asked for a
18 drill to do go in an area outside of the building
19 close enough so that if there is leakage, it will
20 be detected but both of us hope you will hit
21 nothing but clean water. It does not raise a
22 significant radon risk, that of course can be
23 dealt with. And it will not interfere directly

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1 with the structure.

2 Now the request for pazometer is another
3 issue. That would be directly into the residue.
4 But it is a key question that is sitting there in
5 the modeling and we have zero, zero data to
6 validate the model and that's then impinges upon
7 the rest of your groundwater migration models,
8 because inside that area you have zero data.
9 It's a guess at best. And we both want to have
10 data to come to some reasonable conclusions as to
11 what is happening.

12 MS. RHODES: Can you clarify what data, I
13 am sorry, what data; you're talking the actual
14 concentrations of the residue or --

15 DR. BECK: No, we know the residues
16 were put inside the former water treatment plant,
17 okay. We don't know if there has been any
18 movement of those residues or leaching out of the
19 building. My suggestion is a bore hole next to
20 the building and find and answer that question,
21 particularly the location right between the
22 drainage ditch and the building.

23 In particular, I have looked at, because

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1 there are documents provided by you, there were a
2 number of pipelines in that area which would
3 provide short circuit paths, if it is getting
4 outside of the buildings. If any of the eight
5 plugs have leaked, this is the place to be
6 looking for it moving in that direction. And we
7 would all like to find a negative answer. But
8 until someone goes in there and takes some data,
9 you have an opinion, I have an opinion, we agree
10 to disagree.

11 MS. KREUSCH: Okay. Thank you. Bill
12 gave me the high sign a while ago for our first
13 fifteen-minute session being done so if you don't
14 mind, we'll start the next presentation.

15
16 (Whereupon, the hearing concluded at 7:50 p.m.)

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1 **U.S. ARMY CORPS OF ENGINEERS**

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4 PUBLIC INFORMATION SESSION ON THE REMEDIAL

5 INVESTIGATION REPORT OF THE NIAGARA FALLS

6 STORAGE SITE: **GROUNDWATER MODEL & FUTURE ACTIONS**

7 -----

8

9

10 **HYDROGEOLOGIC GROUNDWATER MODEL**

11 **PRESENTATION** held on Wednesday, May 7, 2008, at the

12 Lewiston Senior Center, 4361 Lower River Road,

13 Youngstown, New York, commencing at 7:55 p.m., before

14 Denise C. burger, Court Reporter and Notary Public of

15 the State of New York.

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1 MR. KREUSCH: I'd like to introduce Eric
2 Evans and Don DeMarco. And can we put the lights
3 back on.

4 MR. EVANS: Can you people hear me okay?
5 Okay. I am Eric Evans, with HydroGeoLogic. We
6 were asked in 2001 to develop a groundwater model
7 for the Niagara Falls Storage Site. The purpose
8 of the model was to predict the long-term
9 migration of contaminants from the Niagara Falls
10 Storage Site.

11 We're going to provide kind of a fairly
12 general overview of the modeling analysis that
13 was performed. We're going to talk a little bit
14 about kind of the process that was followed for
15 the modeling. It consisted of four primary
16 steps. First we did -- we did an extensive
17 effort where we collected a lot of data. We
18 evaluated that data to kind of gain a conceptual
19 understanding of groundwater flow in the vicinity
20 of the Niagara Falls Storage Site.

21 From that we developed a groundwater flow
22 model capable of simulating the flow of water.
23 After that, based on the flow model, we developed

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1 a groundwater contaminant transport model that
2 uses the velocities from the flow model to
3 simulate how contaminants might move in the
4 subsurface. We used the model to do predictive
5 simulations. That was the final step in the
6 modeling analysis.

7 They said I'm going -- we're going to go
8 through this in kind of a broad --broad brush
9 view and we can answer any questions at the end.
10 And we also, we documented the modeling approach,
11 the data that went into the model, our
12 assumptions and the results and a modeling report
13 dated December 2007.

14 A groundwater model is really, it's a
15 computer model that uses -- well, it solves a
16 series of mathematical equations that describe
17 groundwater flow and solute transport, so it's
18 similar to a lot of other types of models that
19 people are more familiar with.

20 It helps us to get an understanding of
21 groundwater flow. We can't see beneath the
22 subsurface so it allows us to make predictions.
23 It is a very common tool for predicting what is

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1 going to happen in the future and also making
2 some observations or determining what might have
3 happened in the past.

4 A groundwater model typically should be
5 constructed and calibrated with real field data.
6 In this case, we had an extensive amount of data
7 that we used for both the construction and the
8 calibration in this model and I'll talk about
9 that in a little bit. This comprehensive
10 modeling study spans several years. It began in
11 2001, it wasn't continuous but it started in
12 2001.

13 At that point we compiled a lot of both
14 historical data and more recent data related to
15 the site's hydro-geology. We also collected a
16 lot of data from surrounding facilities. We got
17 data from modern landfills, CWM. D.C. gave us
18 some data. We got data from the army -- excuse
19 me the USDS. We picked through documents in the
20 Army Corps' warehouse. We have looked through
21 microfiche. We looked at a lot of records to try
22 to build an understanding of what is going on in
23 terms of the hydro-geology of the Niagara Falls

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1 Storage Site and the surrounding area.

2 This information was compiled into a
3 database and from that database we also developed
4 a geographic information system that allowed us
5 to visualize this data on maps. Things like
6 water level elevations, hydraulic properties such
7 as hydraulic connectivity for example. The tops
8 and bottoms of various geologic units in the sub
9 surface. That type of information.

10 The GIS allows us to visualize it, to
11 understand it and ultimately put it into a format
12 that we could bring it into a numerical model.
13 From the GIS we were also able to construct a
14 conceptual model which really describes all the
15 important aspects that control groundwater flow
16 and contaminated transport to the site and from
17 that conceptual model we developed our
18 groundwater flow and solute transport models. So
19 3D, three dimensional model. And finally we used
20 that model and the recent phase of the project to
21 do several predictive simulations.

22 A few key features of the model that we
23 developed, we put this together using a code

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1 called mod HMS. It's kind of -- it was built
2 around the USGS mod flow model, which is very
3 common. It's a commonly used model. Mod HMS
4 allows us to do some other things, like simulate
5 solu transport, which mod flow doesn't allow us
6 to do. And also has some very unique features.
7 It lets us simulate radioactive decay and
8 ingrowth, which is very important at this site.

9 We obviously need to simulate that process
10 because the key constituents are radionuclides.
11 Our domain for the area that we're simulating is
12 a 60 square mile area and as I said, it was based
13 on a lot of data. Over a hundred thousand
14 records in the database that we constructed.

15 In terms of the predictive simulations that
16 were performed, to date we have done base --
17 baseline case simulations and base -- baseline
18 simulations are really simulations where we
19 looked at trying to predict the long term
20 migration of contaminants up to actually ten
21 thousand years as if things right now wouldn't
22 change. So the IWCS has maintained that the
23 integrity of the cap stays the same. The base of

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1 the structure stays the same. So everything is
2 basically the same as today.

3 We see precipitation much like we see today.
4 It's variable but it's within the range of what
5 we have seen over the last thirty years. We did
6 simulations where we looked at some worse case
7 scenarios. We looked at inadvertent penetration
8 of the IWCS, where we made the assumption that
9 somebody would put wells, drill wells through the
10 entire IWCS and allow contaminated water to
11 migrate all the way down to the lower water
12 bearing zone.

13 We looked at a scenario where we had an
14 earthquake, catastrophic earthquake where it
15 would disrupt the integrity of the cap and also
16 break up the foundation at the base of the
17 building 411 and we looked at a scenario where we
18 considered a breach of the cap where maybe the
19 cap wasn't maintained for a series of years and
20 it really wasn't working effectively. So those
21 are the scenarios that we have done to date. We
22 are also going to be using a model to evaluate
23 various remedial alternatives as part of the

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1 feasibility study process, which is the next step
2 in all of this.

3 I think everybody knows there is uncertainty
4 in all models. Those uncertainties really are
5 based on the fact that we -- there are data gaps.
6 We don't have a complete understanding of the
7 subsurface at all locations. We, on this
8 particular site, I think have relatively low
9 uncertainty. We have a lot of data that base
10 this model around. Much more than we have at a
11 typical site. We also have the luxury that we
12 were able to gather data from the surrounding
13 facilities, which helped us reduce some
14 uncertainty.

15 There are still gaps. There is still
16 uncertainty and one of the ways that we dealt
17 with that is we made conservative assumptions
18 whenever possible when there were significant
19 data gaps that would allow us to ensure that the
20 predictions that we did make with the model, if
21 anything, overestimated the gamma concentrations.
22 And this slide just shows a few of them. One we
23 conducted the simulations for ten thousand years.

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1 We did it for a very extensive time period.
2 Typically for this type of project you might go
3 out 5, 200, maybe 1000 years. Ten thousand years
4 is a long time frame.

5 Cases where we didn't have site-specific
6 data for the transport properties, we used
7 conservative values that we derived from
8 literature. The values that would overestimate
9 contaminate concentrations. We assumed that the
10 upper portion of -- the upper portion of the
11 Queenston shale, the bedrock underlying the
12 region was fractured and weathered. Also, I
13 think as Dave indicated, the spacial distribution
14 of contaminants and groundwater and soil, I think
15 are fairly conservatively estimated. The actual
16 extent is more than likely smaller. And this
17 information was fed into the model.

18 Finally, I think this is something that we
19 have been discussing a little bit in the question
20 and answer period, the clay dikes that Michelle
21 was discussing are right here and IWCS, and those
22 were constructed to impede groundwater flow from
23 IWCS. And they surround the whole entire

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1 structure. We made the assumption in our
2 modeling analysis that they -- they're not
3 present, so we used properties that are similar
4 to the surrounding area. So we didn't take
5 credit for any kind of affects that these clay
6 dykes might have in terms of impeding groundwater
7 flow.

8 One key aspect of the modeling analysis up
9 front was to really get a handle on the sub
10 surface geography or stratigraphy beneath the
11 site. And some of you may have noticed the
12 three-dimensional animation in the other room.
13 We put a lot of effort into defining the geology.
14 We had a lot of data that we used to construct
15 kind of a three-dimensional representation of the
16 stratigraphy. But in general, as Dave, Dave King
17 mentioned, we have three hydro stratigraphic
18 units essentially beneath the site. In broad
19 terms, we have an upper water bearing zone, which
20 consists of this upper clay till, which is a low
21 permeability glacial sediment. Mainly clay.

22 It does have some sand lenses in it and we
23 did a study several years back where we did a geo

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1 statistical analysis to try to determine the
2 continuity of the sand lenses to see if they're
3 extensive, they might be a pathway for
4 contaminant migration. Based on that study, the
5 sand lenses appear to be fifteen to twenty feet
6 in length. That's the degree of spacial
7 continuity.

8 There is this aquitard right here consisting
9 of clays. Basically glacial lake clays and then
10 a higher transvicity unit down here, Alluvial
11 sand and gravel and then the Queenston formation,
12 the upper portion of the Queenston formation.
13 All the sediments from here down are very tight.
14 They are mainly clays. Water doesn't move very
15 easily through these materials.

16 One of the first steps in the model
17 construction process is to superimpose what we
18 call find a difference grid. It's really kind of
19 a mathematical grid that overlays the area that
20 you're interested in. A series of rows and
21 columns and at the center of each of these rows
22 and columns you solve the equations. So their
23 computer model solves the equations describing

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1 groundwater flow and contaminant migration.

2 So at the center of each of the cells in
3 here, you can't see them real well, we compute
4 water level elevations, groundwater velocities,
5 contaminant concentrations. And you -- you can
6 notice that the grid is a lot finer around the
7 Niagara Falls Storage Site. That's because we
8 have a lot more data there. We also -- that's
9 the area where we are mostly interested in so we
10 need a lot more resolution there.

11 Also note that the model extends up to Lake
12 Ontario to the north of the Niagara River over to
13 the west. And it's quite an extensive area, and
14 part of the reason that we extended the model out
15 to that wide area is because when we started the
16 modeling analysis, we went into it without any
17 preconceived notions as far as how far
18 contaminant migration might occur. So we want to
19 make sure that the domain of the model, the
20 boundaries of the model, were out far enough so
21 that we can predict how far contaminants might
22 make it in ten thousand years, another thing to
23 note.

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1 One other thing about these, these are, I
2 guess, regional hydrologic features, groundwater
3 flow throughout this whole entire region either
4 goes to the Niagara River to the west or Lake
5 Ontario to the north, or one of these smaller
6 screenings. But in general, the flow across this
7 area is either to the west or to the north or to
8 the northwest right here. Also represented in
9 the model is all the, are all these little
10 streams, drainage ditches and that kind of thing.

11 We also had to define kind of the, there's
12 five different grids and the vertical direction.
13 So we have four layers of these cells that we
14 solve these mathematical equations that the model
15 does. Layer one represents upper clay till.
16 Layer two, Glacio-Lactustrine clay. Layer three,
17 Alluvial sand and gravel and layer four is the
18 Queenston formation.

19 Once the model is constructed, we have
20 basically the grid overlaying. We -- we specify
21 all the sources and sinks of groundwater. We
22 specify all the rivers and creeks, precipitation
23 recharge. Then we go through the model

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1 calibration process and that involves adjusting
2 some of these parameters in the model within
3 observed ranges. So we use the field data to
4 kind of bracket how far we can move some of these
5 parameters. And we honor the field data when we
6 have it. We adjust these so that we get a good
7 match between field observations and what's
8 predicted by the model.

9 In our case, we used the water level
10 variations elevations measured in monitoring
11 wells. We use these to evaluate how accurate our
12 model is in terms of being able to make
13 predictions and we achieve a very good
14 calibration of the mean residual. Our residual
15 was the difference between observed and
16 stimulated water levels at each of these wells.
17 The mean residual was less than point one feet.
18 So you can't really see it very well, but most of
19 these residuals are less than two feet on the
20 Niagara Falls Storage Site. And we also -- the
21 model does a good job matching the general trend
22 in water levels across this site as well.

23 So with that I am going to let Don talk a

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1 little bit about the contaminant transport and
2 also some of the modeling results.

3 MR. DEMARCO: Thank you, Eric. So as
4 Eric had indicated, I am going to discuss some of
5 the solute transport components of the modeling
6 efforts and basically like when we looked at the
7 objective of the solute transport modeling, was to
8 be able to use the model to obtain some insight
9 into the questions of what is the concentration
10 spatially at a certain location in the model
11 domain both in space and in time.

12 So let's say, for example, if we have a
13 quantity of a constituent, let's say in the IWCS,
14 what we're looking to the model to provide us a
15 prediction of is will this constituent migrate
16 out of the IWCS based on our known understanding
17 of the geometry and physical characteristics of
18 the IWCS and the hydro-geology in the zone. Will
19 this constituent migrate from the IWCS and travel
20 with groundwater to, for example, a receptor or a
21 point such as the Niagara Falls Storage Site
22 property and if it does reach the property, when
23 does it reach it and what is the concentration.

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1 And so we're looking to the model to provide
2 us with that type of information. But we're not
3 just looking at one constituent and we simulated
4 twenty-four different constituents. And as you
5 can see here, the twenty-four constituents are
6 listed. And we selected these constituents, and
7 we limited it to twenty-four, but we selected
8 them based on various physical and chemical
9 properties of the constituents such as, for
10 example, the contaminant mass. Is the mass
11 present in a notable quantity on site, or
12 concentrations or solubility or mobility and
13 they're listed here on the slide.

14 Mobility is one that pertains to the ability
15 of the contaminant to move. Some contaminants --
16 some constituents are highly absorbed and they
17 don't have a tendency to move. So we took that
18 into consideration looking at constituents that
19 are more mobile in selecting this list of
20 twenty-four constituents that we simulated.

21 And as you can see here, they're grouped
22 into three different categories. We have our
23 radionuclides in a box at the top. We have some

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1 metals here in the middle of the screen and then
2 at the bottom we also have some chlorinated
3 solvents, including the, you know, the bis that
4 Dave referred to. So we narrowed it down to
5 these twenty-four constituents and then based on
6 extensive field data that's been collected, we
7 then took that data and put it into the model.
8 Data for example, the reported concentrations of
9 various constituents in groundwater. So here we
10 mapped out the plumes and we took that
11 information and we incorporated it into the model
12 so the model will then be able to, during its
13 simulations, account for the movement of these
14 plumes.

15 As Dave pointed out, there was also some
16 contamination identified within the soil and
17 although this contamination was not necessarily
18 in the groundwater at this point, we considered
19 the possibility that it may then leach from the
20 soil down to the groundwater and then from there
21 migrate with the groundwater. And considering
22 the simulation times that we're looking at, we're
23 looking at simulations extending out to ten

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1 thousand years; some of these processes take
2 time.

3 But over that time frame, you know, we
4 realize, you know, these are things we have to
5 consider, are these contaminants going to migrate
6 through the soil and so on. And then, of course,
7 we have up here the wastes that are within the
8 IWCS. Of course the IWCS accounting for the bulk
9 of the radionuclide material on the site. And in
10 doing the solu transport model, a lot of our
11 effort focused on the IWCS. And so as you can
12 see here on this slide, it shows the schematic of
13 the IWCS and some of the physical processes that
14 our modeling had to account for.

15 And now as Eric had indicated, we built a
16 three-dimensional model that simulates
17 groundwater flow and when looking at the solu
18 transport modeling, in particular, the transport
19 modeling for the IWCS, we went to two other tools
20 to perform -- to, you know, to determine the
21 concentrations that are getting down to
22 groundwater the most accurate way that we could.
23 And one of the tools that we used is called a

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1 help model. Now the help model is a very
2 commonly used model to calculate the infiltration
3 through a landfill. Through a layered system
4 such as we have here in the IWCS. And the help
5 model will account for several of these processes
6 that are illustrated here such as precipitation
7 and runoff and so on, and it will calculate the
8 infiltration into the IWCS.

9 So we ran the help model and came up with a
10 prediction of how much water are we expecting to
11 get into the IWCS. And then here we just see a
12 little cutaway showing a sort of schematic ladder
13 and so on. And then understanding, you know,
14 looking at the model predictions of the water
15 flow into the cell, we then went to another model
16 to simulate the one-dimensional solu transport
17 through the cell, and understanding in each bay,
18 each bay has its own different thicknesses of
19 units, different quantities of waste and so on.

20 So we then used that one-dimensional model
21 in conjunction with the predicted water flux to
22 come up with an estimate of the concentrations
23 that are coming out of the bottom of the IWCS and

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1 it's those concentrations that we then input into
2 the 3D model to then use as a basis for, you
3 know, the predictions of these transports across
4 the site and so on.

5 So the solu transport model then
6 incorporated an extensive amount of data and
7 information that had been collected. This
8 information was put into the model under various
9 QAQC control and so on and run. And then we have
10 results. But now the challenge that we're faced
11 with is how do we look at these results and how
12 do we interpret them. And one of the tools that
13 we go to that we find to be very useful is to
14 look at animations. Okay, and so what we have
15 here, I am showing a preview screen of an
16 animation that will start running in a minute but
17 just to orient you with some of the features that
18 are on the screen, before I run the animation
19 first. So you can see here we have a planned
20 view of the Niagara Falls Storage Site. You can
21 see the IWCS of course and I will just draw your
22 attention down here, time equals zero. As I run
23 the animation, you'll see time move forward.

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1 You can see on the Niagara Falls Storage
2 Site property here, there are various colored
3 regions which correspond to the groundwater
4 plumes that have been measured. And looking up
5 at the ledge in here, we can see that the ledge
6 stands from, this is for uranium transport, and
7 it spans from a background concentration up to
8 higher levels. So these existing groundwater
9 plumes, they're already in the -- in the
10 groundwater at this point. The model is right at
11 zero ready to run and so we see that they're
12 there. And you can see here also there is shown
13 some contours of hydraulic head indicating the
14 groundwater flow direction and a couple cross
15 sections. So we have A to A prime here. This is
16 a slice through the model, so then we can look at
17 not just the lateral transport of these plumes
18 and IWCS constituents, but we can also look at
19 the movement predicted by the model in a vertical
20 sense.

21 And so this cross section A to A prime is
22 then shown up here and you can even make out the
23 sort of topography feature here, this is the IWCS

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1 vertically exaggerated in this image up here and
2 it goes across. So the A to A prime. And
3 likewise we have B to B prime coming up here and
4 B to B prime and notice here how this cross
5 section crosses across two plumes and you can see
6 how those groundwater plumes are also shown in
7 the cross section.

8 So, Dave, if you would just, yeah, go ahead
9 and start it. Okay, so this must have been when
10 the power outage happened at the site. Okay,
11 there we go. It looks as though maybe we could
12 even just go back a slide. So if you just take
13 the mouse and left click with the mouse on the
14 image itself, there you go. Okay, so what you
15 can see here, we can see some vertical movement
16 here coming from, this is a C soil source. Some
17 of the contamination that we have seen in soil,
18 the model predicting that it gets down to the
19 groundwater table. We're coming up to 380 years
20 now. But you can also see here we have some
21 waste being, the model is predicting that these
22 wastes are moving out of the IWCS at this time
23 and but you will notice here too that many of the

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1 existing plumes remain fairly mobile even after
2 800 years, this is going to run up to a thousand
3 years, the plumes are remaining somewhat
4 stationary. And this is a reflection of the
5 permeability of that upper clay till. And so we
6 looked at the animations as one way of
7 visualizing and understanding our model results.
8 Another way we look at it, is we look at, okay,
9 let's look at the specific concentrations, for
10 example, at the property boundary. We're
11 interested in looking at these predictions, see
12 how the model predicts concentrations of property
13 boundary. And so in a querying of concentration
14 property boundaries, we find that of course
15 here's this contentious plume up in the northwest
16 corner. It's a groundwater plume that is
17 suspected to be already at the boundary. It's
18 based on a couple of well points there but it --
19 at time equals zero, the concentrations are
20 suspected to be crossing the boundary.

21 And, of course, this is an area where these
22 concentrations are not in any way associated with
23 the waste coming; that's stored within the

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1 Interim Waste Containment Structure and the
2 source of this plume is different, this is
3 uranium and this is also an area too where
4 groundwater is not being used for any source of
5 drinking water or anything like that but for the
6 sake of comparison we're showing it here.

7 But that is the only -- the only constituent
8 of the twenty-four that we simulated that
9 reaches, is predicted to reach the property
10 boundary within a thousand years. And so then
11 our solu transport model is telling us that we
12 have these twenty-four constituents in there. We
13 let it run out. We ran it out to ten thousand
14 years but just looking at the first thousand
15 years, this is the only one that occurs at times
16 zero.

17 We also looked at constituents that are
18 predicted to exceed background or MCL
19 concentrations within the property boundary and
20 there was a number of constituents that are
21 listed here which -- which did exceed background
22 or MCL values and many of those, like uranium up
23 here, exceedance is already occurring. Although

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1 here we find out the case is for arsenic, the
2 model is predicting that after 400 years the
3 concentrations of arsenic in the groundwater will
4 exceed a background value based on the model
5 result.

6 So in summary and just to sort of capture
7 the modeling efforts, we developed a
8 three-dimensional model of groundwater flow. It
9 was a regional model but it incorporated a lot of
10 data, not just of the Niagara Falls Storage Site,
11 but adjacent properties. And the model was then
12 calibrated to observe groundwater data and then a
13 solu transport model was then adapted to run in
14 conjunction with this 3D flow model.

15 And the solu transport model is telling us a
16 few things and I have just put -- kept taking
17 three saline points here to put on this slide and
18 it's that within the Niagara Falls Storage Site
19 there are a number of constituents that are
20 predicted to exceed background concentrations or
21 MCLs within a thousand years and they are listed
22 here as I had just presented on the last slide.
23 And we have here also this point that is

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1 indicating that again the model is predicting
2 that there are, of the twenty-four constituents
3 simulated, none will be elevated beyond MCL or
4 background levels at the NFST property boundary
5 with the exception of uranium, which is currently
6 exceeding those background values.

7 And also, you know, this is one result here
8 that I put into the summary but I didn't
9 necessarily mention it in the previous slides and
10 that is we also -- in addition to looking at the
11 concentrations and a lateral sense of a boundary
12 within a site, we also looked at what the model
13 predicted the concentrations to be below the cell
14 and so we found that an exceedance of uranium,
15 that is uranium exceeding a background or MCL
16 value occurs after 160 years, okay.

17 So this is a model prediction that then
18 accounts for, you know, we have the help modeling
19 predicts the flux, we have the one-dimensional
20 solu transport modeling and then it's that one
21 dimensional solu transport modeling, it's like
22 how long is it going to take based upon our
23 understanding of the integrity of the cell and so

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1 on. How long is it going to take for
2 concentrations within a cell to migrate outward
3 and the model indicates it's 160 years.

4 So on that note that concludes our
5 presentation of the modeling. And we look
6 forward to answering any questions or providing
7 any additional information that might not have
8 been covered.

9 MR. KOWALEWSKI: Okay. Folks, before we
10 open up the next round of questions and answers,
11 what I wanted to do for you is to kind of put all
12 of this information into context for you. What
13 does the future hold, what is the Corps required
14 to do in the short-term with regards to this
15 Remedial Investigation Report and the data
16 generated by it.

17 We're really doing three of four things at
18 once over the next several months. First, we're
19 gathering your questions or concerns or input
20 from this meeting from anything we receive
21 through the mail, through the internet, to plan
22 for another meeting in August. And the purpose
23 of the meeting in August is to follow up from

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1 tonight's presentation and focus on those topics
2 that the community expresses an interest in going
3 into some more depth on, okay.

4 So we are looking for that input tonight.
5 We'll accept it up into, through July. But we
6 will begin putting our presentation together in
7 July and come back out here to the community in
8 August to re-engage you on these topics.

9 We are also taking a look at our
10 Environmental Surveillance Program. That's the
11 program that's been run for the last twenty or so
12 years that measures the environment around the
13 property to ensure that there's no dose to the
14 public and there is no risk. We're taking the
15 data and what we know from this investigation
16 report to adjust our sampling, adjust our
17 procedures to make sure that we capture new
18 information that was not included in the
19 Environmental Surveillance Program when it was
20 started.

21 And finally, this data will eventually
22 support a feasibility study. And the feasibility
23 study is the vehicle by which the Corps will

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1 evaluate alternatives, long-term alternatives for
2 this site. And so we face a decision here and
3 we're thinking it's going to be in the fall of
4 this year to address some of Dr. Beck's concerns
5 and others. Has the Corp gathered enough
6 information and have a solid enough understanding
7 of this site to resume the feasibility study and
8 to start identifying and evaluating alternatives.

9 That's what we face over the coming months
10 and we will address these concerns and questions
11 specifically and ultimately the Corps of
12 Engineers faces a decision on whether or not
13 additional IR data required. So that's why your
14 input is important now. We have deliberately
15 built that into the process so that we may get an
16 educated decision when we restart and resume the
17 feasibility study.

18 With that I'll open up again for questions
19 and answers and, Arleen, if you want come up and
20 help facilitate again. And again, any Corps team
21 member that wishes to contribute to the answer,
22 please do so and we'll follow up to these
23 questions with a written response on our website.

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1 MR. KREUSCH: Okay, we're set to go, who
2 has a question to start? Amy.

3 AMY: Just a couple comments, a
4 couple requests. First of all, very pleased to
5 hear that we have until the end of June to
6 provide comments, although given the fact that we
7 have got, you know, seven volumes of information,
8 submitting written comments or questions and then
9 getting back a presentation in August is a far
10 cry from the kind of dialogue from, you know,
11 regular interactions with the Army Corps that the
12 community doesn't have anymore in a different
13 type of format for folks who want to read in more
14 detail.

15 With respect to the Remedial Investigation
16 Presentation, I thought the points, the issues
17 that were identified in the conclusion were
18 excellent. My only problem is is that I disagree
19 with most of the conclusions but I thought in
20 terms of the key issues where we need more
21 dialogue, that a lot of them are contained in the
22 -- in that slide. And the gentleman who made a
23 reference to data gaps in the remedial

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1 investigation, I think for -- for those of you
2 who have the time to go through those volumes and
3 read through it, the data gaps are very
4 significant and as a result my comment on the
5 modeling is with the best of intentions and that
6 is AIC is an excellent firm. It's kind of a
7 garbage in, garbage out situation for us. Again,
8 with the best of intentions, there are
9 limitations on the types of investigations that
10 can be done on the site like this, if we can't do
11 any sort of intrusive analysis.

12 With respect to the requests, again, beyond
13 the seven volumes, we have thousands and
14 thousands of documents that are housed about the
15 low site under something that is called the
16 Administrative Record. The Army Corps has
17 flip-flopped over the past two or three years as
18 to whether or not it's going to maintain that on
19 the internet and what we have in your written
20 materials today is that it's going to be housed
21 in hard copy in the Town of Lewiston Library,
22 which in this day and age, is very limited public
23 access for an enormous volume of documents, which

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1 in the Lewiston Library, costs us fifteen cents a
2 page to copy. Which would make your materials
3 there probably worth millions.

4 But in any case, for a community that has
5 very limited access to technical assistance,
6 sometimes, you know, to get an academic who has
7 got a very narrow expertise that we need, they
8 might be in a different part of the country, a
9 different part of the world and we need to have
10 that access on the internet or we need some
11 assurance that when we make a request to the Army
12 Corps, that we get an entire, complete set of the
13 Administrative Record on disc so that we don't
14 have to run bake sales for ten years to supply
15 somebody in here to sit at the library and put
16 them up in a hotel for two months to read what is
17 on there as we face, as I think Bill made a very
18 good point, some very critical decisions here
19 over the next few years. So I would strongly
20 urge the Army Corps to reconsider where it's
21 going to house the Administrative Record and
22 would encourage you to think beyond a hard copy
23 in the Town of Lewiston Library.

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1 With respect to responsiveness, I hope that
2 the Army Corps will not just respond to what it
3 considers the most common community concerns but
4 in keeping with the Department of Defense
5 Guidelines per the Restoration Advisory Board,
6 that they make a good faith attempt to address
7 every single public concern, whether a majority
8 or a minority so that all opinions, all
9 questions, all voices, can be heard. And if we
10 need to take an extra two weeks to do that or an
11 extra three weeks, this community has been
12 waiting 60 years to have this site cleaned up. I
13 think any -- any person in this community with a
14 question, I am certainly willing to wait to get
15 answers to my questions to make sure that theirs
16 are answered as well. Thank you.

17 MR. KREUSCH: Thank you. Bill, did you
18 want to?

19 MR. KOWALEWSKI: Yeah, let me just try to
20 respond to some of your concerns and I agree with
21 you and I think they are very valid concerns and
22 let me provide a little update for you. We
23 recently calculated that we have got over a

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1 million pages just of DOE archives at the
2 district, in either hard copy, photographs or
3 microfiche and I agree, we're dealing with, you
4 know, almost 19th century technology today.

5 We are actively working to see about getting
6 that material scanned, digitized, and available
7 in a digital format through the internet so we
8 can facilitate better research not only for our
9 own team, but for the public as well. So we are
10 actively pursuing that. I think that would be a
11 good step forward. It's a matter of some of the
12 technology and then getting a contract in place
13 for that.

14 AMY: Will it be done in time, you
15 know, we have twelve months before a record of
16 decision to, you know, utilize it?

17 MR. KOWALEWSKI: Let me just, the answer
18 I think is yes.

19 AMY: Okay.

20 MR. KOWALEWSKI: The record of decision,
21 which, folks, if you want to talk process
22 afterwards, we can show you what that means but
23 that is the formal Corps of Engineers selection

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1 of a long-term remedy and we are at least in the
2 2011 to 12 time frame before that could possibly
3 happen. So we are working to dove tail that
4 effort.

5 As far as the hard copy versus internet or
6 digital, I believe our office of counsel will
7 tell us we have to maintain both for -- for
8 accessibility for -- with different abilities, we
9 would have to do both, so that's kind of the
10 scope of our effort there and we want to share
11 that information.

12 We had Dr. Beck come in a couple months ago
13 and kind of go through our archives, go through
14 the photographs that the DOE provided us to sort
15 of help with his research and we want to put that
16 out and I agree, it's not a very user-friendly
17 format at this point.

18 MR. KREUSCH: Dr. Gardella.

19 MR. GARDELLA: Joe Gardella, from the RAD
20 Chemical Committee. And, Bill, you can stand up
21 as I have a couple quick questions for you. The
22 first is, is this date of August 6th, is that
23 fixed in stone or can the community have some

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1 input as to when that meeting is scheduled?

2 MR. KOWALEWSKI: At this point it is
3 scheduled. I guess we'd be willing to listen to
4 what time frame you're considering and your
5 reason for that and make a final decision. But
6 at this point --

7 MR. GARDELLA: I think it would be good
8 to work a little bit on, you know, to work on
9 that date. I appreciate that you want to get it
10 in that time frame but it would be good to
11 consult the community on scheduling that without
12 fixing it to a particular date. That's a key
13 time when a lot of people take vacations so we
14 might be able to find a date that would, with
15 some consensus.

16 Secondly, as you mentioned the Radiological
17 Committee had a work product that's -- that you
18 have seen in draft and will be issued I think
19 soon in final form sometime in the next week or
20 so probably.

21 DR. BECK: Two weeks.

22 MR. GARDELLA: The Chemical Committee is
23 beginning its work on the IR data and also have

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1 gotten to move through some of the database, so
2 we'd like to make sure we can have the same kind
3 of interactive access Dr. Beck's Radiological
4 Committee has had in this interim period so that
5 we can have informed analyses similar to his from
6 the chemical standpoint in this period.

7 I have a specific question that might
8 actually be good, even though it's related to the
9 last presentation; if we can go to the previous
10 presentation and back to that slide 17. It has
11 to do --

12 MR. KREUSCH: With this presentation?

13 MR. GARDELLA: No, the previous one
14 because it shows the plumes in the area. So you
15 mentioned this plume at the boundary but I am a
16 bit concerned about this -- this plume given that
17 if you look at the total uranium in surface
18 water, that the sampling points along the Niagara
19 Mohawk boundary here, the same trend in high
20 concentrations of uranium follows the groundwater
21 plumes. So I am wondering and it's my
22 understanding that there's no groundwater
23 sampling points on the Niagara Mohawk property;

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1 is that right?

2 AUDIENCE MEMBER: Go back to the slide
3 sample location. It would be --

4 MR. GARDELLA: So there's nothing out
5 here.

6 AUDIENCE MEMBER: Oh, you're looking
7 beyond.

8 MR. GARDELLA: Yeah, so even though you
9 have identified this plume as at the boundary, I
10 am wondering why given the connection between the
11 surface water uranium and if we can go back to
12 that 17 slide, and the shape of this plume, why
13 not consider that there might be a plume at that
14 boundary also? There's no data outside and there
15 is no way to follow whether there is movement
16 across that boundary.

17 AUDIENCE MEMBER: There's an outboard --
18 well, there's an outboard well at that plume,
19 that's why that plume is drawn, enclosure,
20 because there are lines of, you know, inboard and
21 outboard wells.

22 MR. GARDELLA: But if you look at the
23 trend of the total uranium in the surface water,

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1 it mirrors the high concentrations exactly, which
2 suggests that uranium in the surface waters in
3 that ditch could be connected to the plume.

4 Here are the numbers if you'd like to look
5 at them. They, you know, the sampling points
6 that are close to that plume follow the same
7 trend as the shape of that plume.

8 AUDIENCE MEMBER: So just the same
9 concentrations.

10 MR. GARDELLA: The same trends where
11 there's higher concentration following the shape
12 of that plume. Here's the numbers. Well, that's
13 the question, so I don't need an immediate
14 answer. But I think it's worth considering that
15 that's another plume at a boundary that has to be
16 monitored. And that would suggest then there
17 needs to be something done on the NIMO property.

18 MR. KREUSCH: So just that I have that
19 down, you have got a western plume reaching
20 boundary and what kind of concentrations?

21 MR. GARDELLA: The total uranium, the
22 surface water, the total uranium concentrations
23 monitor the same high and low values as the

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1 groundwater inside that.

2 MR. KREUSCH: Okay. Does anyone have a
3 response for that one or is that something we
4 need to get back to?

5 MR. GARDELLA: So that would -- that
6 would suggest that you need to look beyond that
7 boundary.

8 MR. KREUSCH: Okay. I am going to put a
9 star by that one. Okay, are there any other
10 questions? Yes, Ann.

11 MS. ROBERTS: Okay. Can I ask a question
12 about the groundwater modeling, the last
13 question.

14 MR. KREUSCH: The other presentation?

15 MS. ROBERTS: Yeah.

16 MR. KREUSCH: Okay.

17 MS. ROBERTS: Does the model take into
18 account the underground utilities which interlace
19 the site, because from reading the IRI, there
20 seems to be a close interaction between the
21 surface water, the upper groundwater and the
22 underground pipeline is actually at the shortcuts
23 or the contaminant migration across the site, so

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1 is that something you have taken into account?

2 MR. EVANS: No, the pipelines aren't
3 represented in the model. And are you talking
4 about the pipelines below the water table or
5 above the water table?

6 MS. ROBERTS: The pipelines below the
7 water table. Certainly, at certain times of the
8 year because groundwater comes up?

9 MR. EVANS: Yeah, the scale mod doesn't
10 incorporate pipes, I mean --

11 MS. ROBERTS: But isn't that like a major
12 --

13 MS. RHODES: Actually, the way the model
14 does incorporate the uranium plume as drawn --

15 MS. ROBERTS: Right, but if you --

16 MS. RHODES: That is the concentration in
17 the pipeline as well, so they are considered as
18 far as source --

19 MS. ROBERTS: Right, but the fact that
20 you have got pipelines and you have gravel-filled
21 roundup, that acts as a hide-away if you like,
22 bringing contaminants to zoom across the site
23 comparatively in terms.

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1 MR. KREUSCH: Wait, Michelle, when you
2 answered before we couldn't hear what you said so
3 when Ann gets done can you repeat what you said.

4 MS. ROBERTS: So does that not negate
5 your groundwater modeling? If you're concerned
6 with how fast contaminants can get moved across
7 the site, if you haven't taken into account the
8 fact that the clay is interlaced with other
9 materials, then what use is your groundwater
10 modeling?

11 MR. EVANS: My understanding of the
12 pipelines and I am, you know, maybe somebody else
13 can chime in here, is they're not continuous
14 pipelines going across the entire site. So you
15 might have, similar to like the sand lenses, you
16 might have a sand lense that goes a certain
17 distance but that sand lense is completely
18 surrounded by clay, there is only so far that
19 that's going to transmit.

20 MS. ROBERTS: My understanding is the
21 pipelines would cut off the borders of the NFF,
22 seal the borders as far as I am aware. There
23 hasn't been an exercise to actually chop them up.

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1 So in effect, they are continuous?

2 MS. RHODES: We did do sampling during
3 our remedial investigation of the bedding
4 material and select locations to determine just
5 that. But we did target the soils to see, you
6 know, to a certain extent possible, logistically,
7 you know, getting a sample down in to see if
8 there was any leaching from the pipeline itself.
9 We targeted that sampling to the areas that have
10 the highest concentration in the pipeline surface
11 water and sediments themselves.

12 So we do try to address, and you bring up a
13 good point, that obviously if you have bedding
14 materials surrounding the pipeline, that could
15 act as a pathway to the migrated contaminants.
16 So we try to target those elevated areas to
17 ensure, you know, that there wasn't obvious
18 leaching of that material into the soils.

19 MS. ROBERTS: But that still leaves the
20 question of if your groundwater model doesn't
21 take into account what is actually on the site,
22 then it's not valid.

23 MR. EVANS: Well, it's a matter of scale

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1 as well, you know, if you look, our models
2 represent groundwater flow contaminant transport
3 of surface scales. You can see we are
4 representing things on a local scale but also a
5 regional scale and our model is not going to be
6 100 percent accurate if you're looking at a lot
7 of detailed predictions right within the Niagara
8 Falls Storage Site. What is the grid spacing on
9 the site?

10 MR. DEMARCO: The grid spacing is on the
11 order of about twenty-five feet. So that's --
12 that's a cell. And I think that, you know, as
13 Eric pointed out here too, is that looking at the
14 time scale the model simulates, if you're looking
15 at rapid movement over say one year, two years,
16 three years, five years, something like that, the
17 model is looking transport over 50 years, 100
18 years, 1000 years, okay, and so -- so while there
19 may be discrete movement of the transport through
20 the sand lenses, through a pipe, an abandoned
21 pipe system below the water table, we base on
22 your understanding of the site, those -- those
23 features are not continuous.

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1 MS. ROBERTS: But they are, the pipelines
2 are.

3 MR. EVANS: Over a certain scale. Over
4 a certain scale.

5 MS. ROBERTS: And when you say over a
6 certain scale --

7 MR. EVANS: The model is just not
8 capable of simulating down to something below
9 twenty-five feet.

10 MS. ROBERTS: But the pipeline covers the
11 entire site, so it's like having a grid, a
12 network of highways for contaminants to move, so
13 I don't see how you can produce a model without
14 taking that into account.

15 AUDIENCE MEMBER: Well, you also have to
16 consider a certain hydraulic head driving that
17 transport condition. If the -- if you want to
18 say the head is around those, that bedding is an
19 equilibrium with your natural system, that
20 preferential pathway is there, it's just that do
21 you have the velocity to have the head
22 differential across the site than regionally to
23 actually move that material off-site.

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1 The radiants are so shallow. The material
2 around the pipes are so tight that it may allow
3 the disburse of nature and kind of follow the
4 bedding, you know, if there's -- depending on the
5 type of bedding that's down there, usually sand
6 or gravel, and it's just a matter of are the
7 hydraulics available within this bedding
8 material, looking at this -- this site in general
9 and which -- on how the hydraulics go, to drive
10 that migration down that bedding in here or
11 there, you know what I mean, in that net area.

12 MS. ROBERTS: But in the certain case of
13 uranium south of your containment cell, your
14 demonstration shows, and I know you are taking
15 those points of concentration that you have got
16 at the end of the pipe, right, is to --

17 AUDIENCE MEMBER: From within the
18 pipeline.

19 MS. ROBERTS: Right, but it's 248, so
20 clearly material has moved quite a long ways. So
21 there must have been some hydraulic head to move
22 it.

23 MR. EVANS: That's within the pipeline,

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1 so not within the groundwater flow system.

2 MR. KREUSCH: Can everybody hear Bill
3 before we get too far.

4 AUDIENCE MEMBER: I am just saying that
5 the plume map that was, that you are looking at,
6 what is the figure number on that?

7 AUDIENCE MEMBER: Fifty-four.

8 AUDIENCE MEMBER: Fifty-four, that takes
9 -- that does use surface water like standing
10 water in the pipes. Standing water in the pipe
11 may have been, you know, below the pipe, it
12 doesn't -- it's not indicative of being --

13 MS. ROBERTS: Right.

14 AUDIENCE MEMBER: -- a fully filled pipe
15 that we sample because it's full of groundwater.
16 We included the plume maps because in theory, it
17 can become available to the plumes to move. So
18 when -- the starting condition of the model that
19 takes into account all those concentrations
20 already in the ground, it helps us say, okay,
21 well, where would that go if it just moves in the
22 ambient flow system.

23 These guys were explaining the scale of the

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1 model does not allow us to simulate a four-foot
2 wide trench. And it's not an engineering scale
3 model.

4 MS. ROBERTS: Right.

5 AUDIENCE MEMBER: It's more of a larger
6 scale. We didn't want to restrict our model
7 domain to where if we transport stuff to the edge
8 of the model, now where does it go. So we chose
9 to sacrifice a little detail, and maybe on this
10 scale of the model and the scale of the site, to
11 see if we can see what the bigger picture was
12 going to be, not knowing what bigger picture was
13 going to be. So I think -- I know what you are
14 saying because what it does, you envision the
15 pipelines as having a labyrinth of available
16 places to go.

17 MS. ROBERTS: I think, the information
18 that's actually in the IRI that says that the
19 pipelines and the surrounding fill are
20 potentially acting as a transport for --

21 AUDIENCE MEMBER: Yeah, that's why we
22 sampled some of the material around it. One,
23 because we hit some of the high points inside the

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1 pipeline, we wanted to make sure that stuff
2 wasn't getting out of it.

3 MS. ROBERTS: Right. Because the IRI
4 seems to indicate that the materials are actually
5 moving. You'll find contaminants in areas that
6 the NFSS wouldn't expect ordinarily to find them.

7 AUDIENCE MEMBER: You have to remember
8 that the DOE housekeeping and the use of the site
9 over the years, really a lot of those plumes are
10 facilitated from surface practices.

11 MS. ROBERTS: I think the findings of
12 certain contaminants in areas which were not
13 known to have been used for those particular
14 contaminants, I know that's one of the findings
15 of the IRI.

16 AUDIENCE MEMBER: Well, I think there was
17 a statement in the IRI just basically saying if
18 potential is there for this stuff to get into
19 these, you know, sub surface conduits, I know
20 when we have had discussions, when we were
21 leading into the DFS, how we want to handle these
22 things, because we don't want them to exist, so.

23 MS. RHODES: When we did find those

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1 pipelines, we actually did look back and did
2 sampling on the bedding material between that
3 specific area we started in and it wasn't
4 leaching into the bedding in that area. So
5 obviously captured the highest areas on that
6 plume map so that was kind of our area of
7 interest specifically for that reason.

8 So again, we did sample the bedding material
9 between those two hot spot locations in the
10 pipeline to ensure that the bedding material
11 wasn't providing a means of transport basically.
12 But definitely, you know, that is something that
13 is of concern, you have bedding material around a
14 pipeline and it will allow groundwater flow and
15 therefore contaminant transport more readily than
16 if you have just the tight flow around. That's
17 something that we're concerned about.

18 MR. EVANS: The pipes are below the
19 water table most of the time.

20 MS. RHODES: Generally these pipes are
21 above the water level, however, the upper water
22 bearing zone fluctuates seasonally and quite
23 significantly in the upper quarter bearing zone,

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1 so definitely we were concerned about the
2 potential for fluctuating in that area.

3 MR. KREUSCH: Can I take another question
4 from someone else before -- okay.

5 DR. BECK: Just to followup on the same
6 area, mainly the computer model you indicate has
7 a twenty-five foot resolution, so you have the
8 capability if you had to finance, to include the
9 walls of the building, the location of the
10 various pipelines and the clay wall and to model
11 them, and to instead of giving us a uniform block
12 of clay, you give us twenty-five foot blocks of
13 variant permeability, to essentially as a rough
14 scale model, the existence of these pipelines,
15 the capability is there, it hasn't been done,
16 right?

17 MR. EVANS: It would be hard to
18 represent the pipelines exactly. I mean the
19 pipelines, I mean you could, you could find the
20 grid space to actually. You could make the grid
21 space an area of interest and add pipelines. And
22 I mean at some sites where you have a lot of
23 pipes or below the water table where you have

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1 back fill around the pipes, the permeability, the
2 high permeability pathway, it can be done.

3 DR. BECK: What we have here is the
4 water treatment plant, we have got thirty-inch
5 pipes in there. We have got some documents
6 saying they were plugged. What we don't have is
7 the location of the plugs and we don't know how
8 much of the pipes, thirty-inch openings, are
9 still open. Where the plugs are. How effective
10 those plugs are. We have got diagrams that show
11 you where all the openings of the concrete
12 buildings are. And you could build a model, we
13 know the location, we know they are eight inches,
14 we know they are thirty inches. We know where
15 they are. We have got twenty-five foot
16 resolution. You can come close to getting the
17 aspects of it. And the final point is we don't
18 know what the head is inside the waste
19 contaminant.

20 So there may be a pressure-head forcing
21 liquid out of that. We may be getting more rain
22 water coming, infiltrating through the cap. And
23 we are lacking the data to deal with the

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1 speculation. You can speculate one way, I can
2 speculate another way, neither of us certain of
3 the truth because we are dealing with data gap.

4 AUDIENCE MEMBER: I mean for the dynamics
5 of more of what I like to refer to it as, an
6 independent scale model, the final resolution,
7 higher tighter spacing on all of your nodes.
8 Putting that together, recalibrating that,
9 probably will also require a greater deal of
10 hydraulic head information. You don't know, we
11 really don't have, I mean how do these conduits,
12 how do these pipelines affect the term
13 groundwater, you know. We actually don't have,
14 we would have to probably make more Swiss cheese
15 of the site to get a date set to calibrate again
16 to give a confident answer. That becomes an
17 exercise in uncertainty.

18 So the likelihood of producing an
19 engineering scale model that even kind of leads
20 to answering some of these questions, probably
21 would lead to even more questions. The
22 calibration of such a model probably would never
23 be nice. It would be a lot of assumption. A lot

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1 of assumption.

2 DR. BECK: You just endorsed my point
3 that to go forward with a feasibility study
4 without this information is of a great deal of
5 uncertainty to me.

6 AUDIENCE MEMBER: It's uncertainty that
7 when we look at these feasibility studies, you
8 try to account for that in some way. You say,
9 well, we don't -- we have an ex data gap. We
10 don't know what the heads are inside the
11 contaminant structure. Geophysical data
12 indicates it's below the building 411. Is it a
13 data gap, yes. Are we likely going to go in and
14 investigate that, that seems like something that
15 if that was going to be paid for and gone after
16 in a safety aspect, then it looks like that would
17 be something much farther down the line toward
18 like remedial action. Wherever the remedial
19 study takes us, we have to go through the
20 process, the circle process and our -- we have to
21 know that answer when we get to the eleventh hour
22 to finalize our bill to the government. Then
23 that has to be kind of revisited.

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1 Is it great information to have it up front?
2 You're talking to a hydro geologist, oh my God,
3 it would be wonderful. If all those piezometers
4 that were still working, still working inside the
5 IWCS, it would just be a dream of data and we
6 would know exactly what's the infiltration rate,
7 you know, what is the ex-filtration rate. Where
8 we do see a hydraulic variation that might
9 indicate.

10 So yes, there's -- if there is an internal
11 data gap, did the DEO plan for lightning to
12 strike, I doubt it. So where we almost had the
13 information that could answer all of our
14 questions that way, we don't unfortunately.

15 DR. BECK: But you are the Corps of
16 Engineers, why didn't you have the engineering
17 data before you got into feasibility.

18 MR. KOWALEWSKI: Bill, I think -- I think
19 Bill has kind addressed the other side of the
20 coin and that if the engineering data, if the
21 technical solution proves to be a bridge too far,
22 that uncertainty can be built into the
23 feasibility study as potential long-term

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1 remedies.

2 For example, conceptually these pipelines,
3 an analysis for a future long-term remedy could
4 include locating, severing, plugging those
5 pipelines to deal with that uncertainty that's in
6 the model. That is the other way that we can
7 deal with the uncertainty. And I think it's a
8 huge topic and it's very valid and we will
9 respond to that I think with some alternatives to
10 deal with that risk.

11 DR. BECK: One final comment. Once you
12 put the uncertainty into your models, you have
13 now escalated the cost beyond the ability of the
14 Congress of the United States to finance it, and
15 therefore you have loaded the conclusion by being
16 unable to come up with some reasonable cost
17 because you don't know how much material you have
18 contaminated and where it is, how much excavation
19 is going to be needed to remove it.

20 AUDIENCE MEMBER: On the contrary, there
21 is quite a bit of visible information regarding
22 the interim waste of the containment structure.
23 Are there things that may have occurred since its

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1 burial.

2 DR. BECK: Twenty-five years?

3 AUDIENCE MEMBER: Yeah, I mean if there
4 is some internal contamination we haven't exposed
5 in the file. If you look at the plumes that are
6 on the north side and the west side of the
7 Interim Waste Containment Structures, those are
8 probably legacy plumes left over from the R10
9 pile twenty-five years.

10 Now are those, that same kind of
11 contamination located around 411 and things like
12 that from closure and they internally closed it?
13 Yeah, I would say that's probably in there as
14 well, around the building. Is there some of that
15 operation that occurred around that building, the
16 slurring and everything may have made of little
17 -- a couple of disasters around that building, I
18 wouldn't doubt it.

19 So do we -- inside our feasibility study, we
20 may say, well, let's assume there's a halo of
21 soil contamination above the gray clay, in your
22 ground clay, inside your cutoff wall and then we
23 include that as, let's say a remedial item if we

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1 ever had to go after that, and that's now become
2 a known -- a pretty well-known volume, we can
3 make some estimates on the thickness of the brown
4 clay, we may not have, you know, point-specific
5 data, but it's not really something that can be
6 included inside my kind of volume and cost
7 structuring and stuff like that.

8 MR. EVANS: I just wanted to, if I may,
9 I just wanted to point out, you know, as a model,
10 another, if we're talking per site, a fractured
11 rock environment, okay and a fractured rock
12 environment in some ways is impossible to
13 characterize because you may drill and then we
14 look at the fractures that are encountered along
15 the drill, the bore hole and we measure the
16 affature and then we drill another bore hole and
17 we say the affature is this much.

18 So in building a model then we have a couple
19 of choices, and looking at the available
20 technology, one way is to do what we call
21 discrete fracture modeling, and we build a domain
22 that represents each individual fracture as a
23 discrete affature. And so in the model these are

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1 represented as like parallel plates or tubular
2 features to simulate this. And some of them we
3 have to assume fracture lengths, fracture widths,
4 fracture affatures and there's a lot more data
5 and the more data that goes into the model, the
6 more uncertainty that can also be attributed.

7 And there's the question that begs, like,
8 well we didn't dig a bore hole, is there a
9 fracture there. And so the challenge that, you
10 know, scientists and modelers face in modeling
11 fracture media in addressing this uncertainty, is
12 instead of using a discrete fracture model, they
13 represent a system as an equivalent course media
14 using a single value or, you know, just a few
15 values of like a bulk average hydraulic
16 conductivity.

17 And over a short time frame discrete
18 fracture models might show, yeah, you have a
19 little contaminant shooting out over here and
20 here. Over 50, 100, 1000 years, the analog, this
21 equivalent course of the media analog matches the
22 results of the discrete fracture model. And so
23 this is a question that's not unique to this site

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1 but also what modelers will do is we'll try to,
2 like, try keep it simple but let's also, you
3 know, let's not have one tool that is going to
4 have the extreme amount of complexity and try to
5 answer every question but what we're really
6 looking at here is what is the long-term
7 migration of these constituents and in that case,
8 it's appropriate to consider, let's look at the
9 existence of our scale average permeability
10 rather than trying to incorporate individual --

11 AUDIENCE MEMBER: I believe in the
12 vicinity of the IWCS, you should use modified
13 permeability but take into account the existence
14 of these items.

15 MR. KREUSCH: Okay. One more question
16 and then we're going to try to focus --

17 AUDIENCE MEMBER: What is the cost of the
18 program annually?

19 MR. KREUSCH: The cost of the program
20 annually.

21 MR. KOWALEWSKI: The national program
22 that we're operating under is funded by Congress
23 at approximately 130 to 140 million per year

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1 nationwide. Of that, this site generally
2 competes for about three million dollars a year
3 in the study phase.

4 MR. KREUSCH: Okay. I had actually
5 intended to take your question so go ahead.

6 AUDIENCE MEMBER: We have seen -- we had
7 maps in the past that shows the labyrinth of
8 pipelines, that -- of known pipelines on the
9 site, is that loaded in the machine anywhere?

10 MR. KOWALEWSKI: In the machine here?

11 AUDIENCE MEMBER: Yeah.

12 MR. KOWALEWSKI: No, just for this
13 property or for the entire network?

14 AUDIENCE MEMBER: No, just this. And
15 showing which ones lead off-site and which do
16 not?

17 MR. KOWALEWSKI: Yeah, I believe that's
18 fairly well known.

19 AUDIENCE MEMBER: But I mean one of the
20 things we're going to be concerned about is which
21 of these are going off-site and which have been
22 disrupted, I mean?

23 MR. KOWALEWSKI: Correct. And there is a

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1 general practice here and on the large and low
2 site with regard to these pipelines, we made a
3 deliberate effort at property boundaries and
4 fence lines when we were sampling them to sever
5 them and plug them to prevent any future
6 migration. We have done that on this site as
7 well.

8 AUDIENCE MEMBER: So how many, I mean,
9 can you show where the remaining, I mean where
10 that potential, the number of pipes that are --
11 currently exist that were severed at the property
12 line?

13 MR. KOWALEWSKI: I don't have that exact
14 answer here tonight. It's generally the ones
15 that --

16 AUDIENCE MEMBER: Are we talking about
17 one or two or twenty or fifty?

18 MR. KOWALEWSKI: We're talking I think
19 three or four pipelines in that neighborhood that
20 ran north, south that we investigated.

21 AUDIENCE MEMBER: You say well at that
22 location near that perimeter?

23 MR. KOWALEWSKI: I don't know if we have

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1 wells. I understand what you are getting at.

2 AUDIENCE MEMBER: Is this stuff migrating
3 or a potential for migrating?

4 MR. KOWALEWSKI: Yeah, that's a fair
5 concern. Okay. The last question and then we're
6 going to have to wrap it up, we're turning the
7 facility back over at 9:30 and we'll go from
8 there.

9 AUDIENCE MEMBER: One question I have is
10 how does cutting and plugging the pipes keep from
11 migrating the material off-site?

12 MR. KOWALEWSKI: Outside the pipeline?

13 AUDIENCE MEMBER: If you were to cut
14 those pipes and plug the lines, how does it keep
15 the contaminants on site without them crossing
16 over into another site if this is a major piping
17 structure throughout the entire -- the old site,
18 how does it keep it from -- if you just cut the
19 lines and plug them up, how does it keep them
20 from migrating further down off the site?

21 MR. KOWALEWSKI: Well, the short answer
22 there is and excuse the poor plug here, but it
23 depends on the pipeline. Some of them are in

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1 bedding material depending on what the piping
2 material was. It may be surrounded by concrete
3 or stone. Some piping is just directly buried in
4 the clay. So cutting it and plugging it to keep
5 material inside the pipeline moving is the simple
6 answer. And that you have now got clay on the
7 end of that pipeline.

8 AUDIENCE MEMBER: But these are also most
9 likely at the time were steel pipes.

10 MR. KOWALEWSKI: We have got stainless
11 steel. We have got cast iron. We have got clay
12 pipes. We have got tile pipes. It depends on
13 which pipeline you're talking about.

14 AUDIENCE MEMBER: And even if it was
15 steel or even stainless steel, does have a
16 tendency over time to start rotting out, start
17 pitting and even though you cut them and plug
18 them up, it doesn't mean that two feet away from
19 where you cut the line, that it's already started
20 to pit. So as material comes through, it's going
21 to go in and exit out through one hole because it
22 is a pipeline and ditch and however it's
23 constructed, can go out one site, bypass your

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1 plug and then come up through another hole within
2 that same line.

3 So again, how do you keep -- basically you
4 might end up having to pull those pipes.

5 MR. KOWALEWSKI: Conceivably, and we're
6 not attempting to provide a long-term answer
7 tonight.

8 AUDIENCE MEMBER: Unless you want to do
9 protection which after forty years it's pretty
10 much, you might as well say forget that idea.

11 MR. KOWALEWSKI: Yeah, okay. Well, we'll
12 see what kind of answers we can provide on that.
13 I don't think we have all the information here
14 tonight to answer that fully.

15 AUDIENCE MEMBER: That represents the
16 data gap that can be, you know, public data gap
17 brought.

18 MR. KOWALEWSKI: I guess in closing what
19 I'd like to do is just very quickly, are there,
20 you know, is there is a top three topics that the
21 community would like readdressed or brought up on
22 this report for the next meeting? We don't need
23 to make a decision tonight, I am just curious

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1 from the group what those maybe top three topics
2 would be. We will still accept your input any
3 way you want to send it to us to consider for the
4 agenda at the next meeting.

5 I think the pipelines and the migration is
6 clearly one.

7 MS. ROBERTS: Could I just add one that
8 we can maybe discuss at the next meeting that we
9 haven't touched on, which is one concern I have
10 about the IRI, is the widespread 137
11 contamination. I am not concerned about the
12 levels that you found but just the fact that
13 that's there and looking at the IRI, I see no
14 review of the historical data for, you know, the
15 nuclear process and waste that came.

16 So I also see no reference to the finding of
17 plutonium in building four or one, which was only
18 a small amount, but nevertheless, it was
19 plutonium with no vision products. So I tend to
20 think this is an area that was really swept under
21 the rug and it's not really addressed and it
22 should have been at the initial stages of the
23 historical review documents so.

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1 AUDIENCE MEMBER: If this is the only
2 forum for dialogue with the community, I would
3 submit that every question offered, every issue
4 raised, ought to be the subject of a public
5 meeting and if it needs to be in two parts, so be
6 it but I don't think we should cut or minimize
7 any issues that have been raised.

8 MR. KOWALEWSKI: Fair enough. Okay.
9 Well, it's been a long night. I do thank you for
10 your patience and your cooperation. I thought
11 the meeting was well run and we appreciate you
12 sticking with us tonight. We will be providing
13 additional details on the future meeting and
14 we'll be gladly accepting any other input that
15 you folks want to provide to us.

16 MR. KREUSCH: And again, the CD of the
17 presentation is available at the sign-out,
18 sign-in table. And don't forget to turn in your
19 comment card if you have any other questions.

20
21 (Whereupon, the deposition concluded at 9:15 p.m.)


22 * * * *

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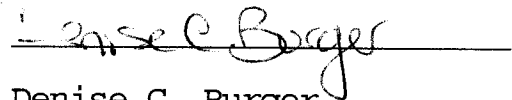
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IN WITNESS WHEREOF, I have hereunto subscribed my
name on this 18th day of June 2008.



Denise C. Burger
Notary Public No. 01BU5080749
State of New York
My commission expires
July 25, 2011

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