

Naegeli Reporting
"The Deposition Experts"

(800) 528-3335

NaegeliReporting.com

Serving all of Washington, Oregon, Idaho and the Nation
Selected "Best Court Reporting Firm"

Court Reporting | Videography | Copying and Scanning | Trial Presentation | Interpreters | Videoconferencing

0098267

PROPOSED CLEANUP ACTIONS FOR REMEDIATION OF
HANFORD WASTE SITES
CONTAMINATED WITH PLUTONIUM AND CESIUM



Tuesday, July 19, 2011
Richland, Washington

Naegeli Reporting
"The Deposition Experts"

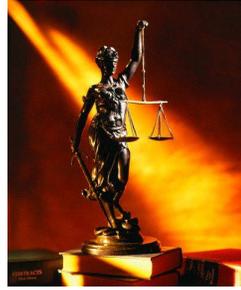
(800) 528-3335

NaegeliReporting.com

Serving all of Washington, Oregon, Idaho and the Nation
Selected "Best Court Reporting Firm"

Court Reporting | Videography | Copying and Scanning | Trial Presentation | Interpreters | Videoconferencing

**PROPOSED CLEANUP ACTIONS FOR REMEDIATION OF
HANFORD WASTE SITES
CONTAMINATED WITH PLUTONIUM AND CESIUM**



**Tuesday, July 19, 2011
Richland, Washington**

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Tuesday, July 19, 2011

Richland, Washington

BE IT REMEMBERED THAT, pursuant to the Washington Rules of Civil Procedure, the Public Hearing was taken before Kathleen McKee, a Certified Shorthand Reporter, #3115, and a Notary Public for the State of Washington, on July 19, 2011 commencing at the hour of 6:28 p.m., the proceedings being reported at Richland Public Library, 955 Northgate Drive, Richland, Washington.

1 PUBLIC HEARING

2 TUESDAY, JULY 19, 2011

3 6:28 P.M.
4

5 MS. SHOEMAKE: If I can have everybody go ahead
6 and have a seat we're going to start the actual public
7 meeting that we're here for tonight. We are here to talk
8 about the proposed plan for cleanup of the contaminated
9 waste sites in the Central Plateau. If you're not here for
10 that meeting you're on the wrong flight so you'll want to
11 exit left and find your other meeting. So tonight, let's
12 see, we are going to go through a couple of things here.

13 This is the agenda over here. You just hopefully
14 had some time to look at the posters in the back and ask
15 some questions and have some dialogue already during the
16 open house. I'm welcoming you right now so welcome to the
17 meeting. We're also going to have representatives from the
18 Department of Energy and EPA give an overview of the plan.
19 We'll have a local perspective. We'll do a Q and A session.
20 It's set on here for about 20 minutes. We can make that
21 last as, you know, a little bit longer if we need to. That's
22 your opportunity to ask the questions that you have. If you
23 have any clarifying-type questions that you'd like to
24 discuss we have a full room of experts here. You've
25 definitely got a captive audience so that's really your

1 opportunity to do that.

2 Then we have the formal public comment phase of
3 the meeting. And we have a court reporter sitting right
4 over here that is actually transcribing everything that
5 we're saying here at that meeting. But the formal comment
6 period will be I actually will give you the microphone and
7 your comment will be recorded verbatim into the record. And
8 so we would really like to get as much of the Q and A out of
9 the way during that section and leave the last section for
10 the actual formal public comment.

11 Out on the table out here there's several
12 handouts. There's a facts sheet that gives you kind of a
13 good overview of the plan and what's in it. There's also
14 available I'm told, Sonya, that there are some DVDs
15 available of the proposed plan, the fact sheet as well as a
16 couple of other documents. So if that's something you're
17 interested in you can see someone at the front table for
18 that. Your opportunity for public comments tonight is not
19 just here at this meeting. If you saw on the back of your
20 agenda there's actually a comment sheet on the back of that,
21 pretty brilliant I might add. Nice job. You can actually
22 write your comment on that and turn that in tonight. You
23 can also do it by fax or e-mail or on the website. So there
24 are plenty opportunities. There are also a couple of other
25 public meetings coming up. Thursday there will be one at

1 the Seattle Center. Next Tuesday there's one in Hood River.
2 And Wednesday there's one at Portland State University. So
3 it is a 30-day public comment period with the comment period
4 ending on July -- sorry, August 5th. So that's what I have
5 to kick off the meeting. And I think right now I'll see if
6 I can get this mic off and I'll turn it over to J.D. Dowell
7 with the Department of Energy.

8 **MR. DOWELL:** I would like to echo Joy's welcome
9 tonight. Thank you for taking the time out of your busy
10 schedules to come here and listen to this public hearing on
11 PW-1, 3, 6 and CW-5. Before we do this I'd like to do a
12 quick introduction of the team from Department of Energy as
13 well as our contractors that are here to support tonight.
14 And we'll have a question and answer period later but we'll
15 also have time after the presentations to actually talk with
16 them. So we're just going to go around very quickly and
17 I'll have them introduce. Greg, why don't you start?

18 **MR. SINTON:** I'm Greg Sinton with DOE. I'm the
19 project manager for the CW-5.

20 **MR. CHARTA:** Bryant Charta, federal project
21 manager for soil and ground water.

22 **MS. TORTOSA:** Arlene Tortosa. I'm the project
23 lead.

24 **MR. DOWELL:** And CH-2?

25 **MR. JARAYSI:** I'm Moses Jaraysi. I manage the

1 environmental program for CHS.

2 **MR. MCKINNEY:** Dale McKinney with the CHPRC
3 environmental programs also.

4 **MS. ROHAY:** I'm Virginia Rohay. I'm one of the
5 technical support.

6 **MR. DOWELL:** Okay. Earlier tonight also as you
7 were coming in or if you were here for awhile looking at the
8 placards in the back we had the Hanford story running. We
9 also showed a number of slides that showed the progress
10 that's being made on the site. We're going to do that as
11 part of our continued outreach. Anytime we have a chance
12 with the public to show what we're doing out there I think a
13 picture tells a thousand words so it's a good opportunity
14 for you to see what's going on out there. It's not designed
15 to soften you up. It's just basically to make sure that you
16 understand that there is progress being made and there's
17 some really excellent work being done out there so it's an
18 excellent chance to do that.

19 So the purpose tonight is really to get your
20 input, to give you what we think our best plan is, our
21 preferred alternative is what we call it, for this cleanup
22 and remediation work and to get your input. I'm going to
23 start -- as you see the agenda I'm going to start with a
24 brief overview on the Hanford cleanup approach. And I know
25 many of you work and see this all the time. I just don't

1 know how many other people have not so bear with me because
2 it's got to go through a stage process so everyone has the
3 same level of understanding for this brief. There's 22
4 slides in the brief. I'll spend about a minute on each
5 slide is my goal. So that's the big picture. And then
6 we'll get actually into the applicable units and the
7 background, the remedial activities, and the preferred
8 alternatives in each one of those. And as Joy also
9 discussed lastly how you can provide input. So that's the
10 most important part of this reach-out tonight is making sure
11 that you understand how you can give us your input and that
12 it's valued. So hopefully you'll be able to give that for
13 us.

14 So from a cleanup approach perspective the
15 Department of Energy has two documents that I think are very
16 important. I'm the manager of the Central Plateau. I
17 haven't been there too long but these are two documents that
18 I refer to quite often. These are Department of Energy
19 documents. They're not EPA documents or Ecology documents.
20 They're guidelines for how we do our strategy. And the
21 first one is the one you see here. It's the Hanford Site
22 cleanup completion framework, this document right here. And
23 it provides exactly what you see here, an overview of the
24 Hanford site as well as the goals for cleanup, some of the
25 challenges we face in that cleanup, and the relationships

1 between the different areas that we are trying to remediate.

2 The second one also available to the public is the
3 Central Plateau cleanup completion strategy. This goes a
4 step level further than that overall arching framework and
5 is a subset of that if you will but has excellent background
6 and details. Highly regarded read for you-all to get a good
7 understanding of how we see this cleanup strategy going at
8 Department of Energy. Just another note, too. This
9 document costs us \$65 apiece to copy so I'd like to hand one
10 out to everybody but we have it on a website link and I
11 would prefer if you go electronically to get that. We're
12 trying to do the right thing from that perspective. Next
13 please.

14 So in looking at the Hanford cleanup footprint,
15 again I'm going to kind of drill you down. So think of this
16 as the big picture macroscopic, which it is. 586 square
17 mile Hanford Reach National Monument area in green. The
18 River Corridor is another area we're going to remediate.
19 We're doing this by areas, is in yellow. And then the
20 Central Plateau is this brown area with two parts to it, the
21 outer area and the inner area. There's about 290 square
22 miles with the Hanford Reach National Monument, 220 with the
23 River Corridor. And then Central Plateau is a total of 75
24 with the inner area making up 10.

25 As I think of cleanup here I get an intuitive

1 thought about how we're trying to mac down into this inner
2 area as we conduct our cleanup and the idea of course is to
3 protect the Columbia River, our primary concern. So as we
4 remediate these areas we're shrinking. National Monument
5 this year, River Corridor by 2015, much of the outer area by
6 2015, and then trying to consolidate into that inner area.
7 And that's the theme for our strategy big picture. Next
8 please.

9 Within the Central Plateau as you break this area
10 out it's broken down into three focus areas. And basically
11 when we look at these area this is what the strategy
12 document that I use really breaks down our effort. And the
13 effort is broken into groundwater, the outer area, and then
14 the inner area, three very distinct areas. The groundwater,
15 again trying to remediate and pump and treat as much of the
16 known contaminants that are in the soil that are reaching
17 the soil and reaching the groundwater as we can and
18 targeting plumes with specific equipment to try and
19 remediate anything that gets into the groundwater. And
20 we're also trying to bring the standards from the outer area
21 basically to the same standards as the River Corridor which
22 is try and reach drinking water standards with groundwater
23 in the outer area. And if we can't reach drinking water
24 standards by all means prevent plumes from getting into the
25 groundwater and getting to the river. On the inner area I'm

1 going to talk about that next so I'll save that for then.

2 Next please.

3 So when we look at the inner area and we look at
4 this graph or this graphic you can see that there's been an
5 interim development of different remediation strategy --
6 remediation strategies that have taken us through decisions
7 or recommendations that bring us here today. You know, when
8 I think of an inner area I think of a geometry if someone
9 were just trying to just target an area and develop it, you
10 know, normally you do it by geographic rivers or natural
11 lines of demarcation. But you can see here that in trying
12 to define this inner area to as small as possible we are
13 defining the footprint by the decisions we're making on
14 these remediation strategies.

15 So as you see us go through 1965 when Ecology set
16 up a low-level radioactive waste disposal site right here,
17 nuclear reactor, parts disposal, and et cetera as we went
18 through all these decisions and some recommendations the
19 site began to take shape. And instead of just filling this
20 in and calling it let's make it that we are actually trying
21 to segregate where those bad areas are in those inner areas
22 where the government is going to be there. Our presence is
23 going to be there until further -- you know, for a long
24 time. We're there for a long time. We're custodians of
25 this material. We're custodians of these areas for as long

1 as it takes us to maintain human health and public safety
2 and safety to the environment. Next slide.

3 So for Hanford's cleanup footprint when you look
4 at the interim approach it's framed by keeping that inner
5 area to as small a footprint as possible which is ten square
6 miles. That's what we estimate that that area that you saw
7 before this is going to be. We also have a commitment for
8 that long-term management remaining in DOE control. That
9 area is going to remain in DOE control. I'll just leave it
10 at that. We can talk about that later I'm sure.

11 Then when you go through the inner area approach
12 you can see that our commitment is to make comprehensive and
13 consistent risk-based decisions. So we're going to
14 basically evaluate these areas using the nine CERCLA
15 criteria. And Greg, could you bring that up front please
16 for me and just put it maybe off to that side. I want
17 people to be able to see that as we talk.

18 We're going to shrink the waste disposal and
19 residual contaminations protective of human health and the
20 environment. CERC words, LA. Human health and environment,
21 that's what we're here to protect. That is our commitment
22 as the custodians of this area long term. And then
23 throughout the time I see, you know, right now that as we
24 make decisions here and start our remediation process for
25 these areas it doesn't stop there. Number one, we have a

1 commitment by CERCLA to give out five-year reviews for
2 reevaluating the effectiveness of all the measures that we
3 take for remediation. Number two, the exciting part to me
4 is that we're here long-term custodians. If there's other
5 technologies that come up in the future and we evaluate that
6 we're not effective in what we've done we'll be able to
7 leverage other technologies in the future that are probably
8 more cost-effective than what we have today to again try and
9 remediate this to ensure human health and the environment.

10 Next slide.

11 So from a CERCLA process standpoint these are the
12 six steps for the CERCLA process. And on that placard right
13 there is the CERCLA evaluation criteria. So as we talk
14 about the preferred alternatives I'll talk more to this. But
15 right now as you look at this process you can see where
16 we're at today. You see the "we are here" sign. To get
17 there we actually did site inspections. We did the thorough
18 assessment, the background work to determine what was done
19 with these areas. We looked at historic precedent. We
20 looked at, you know, all the history and everything that was
21 documented on all these sites. The process documentation of
22 the flow paths through the PFP and the Z plant and Purex
23 plants. And then we -- and then we did all that data
24 evaluation. We looked at all the samples that have been
25 taken. And we started the remedial investigation. Again,

1 that kind of fed into the remedial investigation and
2 feasibility study where we took all that data, did a
3 feasibility study which evaluated the risk facing that
4 material, determined whether we had enough information to
5 actually go to a decision, and then started to develop the
6 alternatives that we started to present to the public
7 basically two years ago in 2009 and 2008 and 2009 and
8 started to receive input on those back then.

9 For managed input we developed a proposed plan so
10 of all the alternatives we looked at. And some of those are
11 dictated by CERCLA for us to look at those. We came up with
12 the actual documented preferred path. And that's what we're
13 here to look at tonight. So we've identified the preferred
14 alternative. We're in the process now for public
15 solicitation of comments and that's what we're here to do
16 tonight. After that we'll take it back to the EPA and
17 Ecology. We'll compare notes. We'll determine whether we
18 need to make changes. We'll tune our alternatives and then
19 make the decision. That's done in a tri-party agreement.
20 And then we go to the record of decision that we all sign
21 and commence the remedial action. And then get into that
22 five-year review process with CERCLA as I talked about under
23 a long-term custodial strategy. Next please.

24 So this actually starts where we get into the
25 actual operating units and talking about the actual

1 remediation strategy. So here's the meat. The previous
2 part was the potatoes. This shows you the four sites that
3 we're talking about. 200-CW-5, 200-PW-1 and 6 are over on
4 the west area of the inner area. And 200-PW-3 operating
5 unit is over on the west -- or east side of 200 east and the
6 inner area. We're going to drill down like I said so next
7 slide.

8 And I don't necessarily need to take too much time
9 with these but again, this slide is good because even though
10 it's color-coded and you can't read that you can see all the
11 things that make up that definition of that inner area form.
12 We call it a soup bowl. I don't know what Ecology or EPA
13 calls it but we call it a soup bowl. That's what we've been
14 taking about earlier. But it does have that look to it. And
15 you see disposal areas in brown, dark brown. You'll see
16 tank farms in green. You can see the geometry has been
17 defined by those decisions and previous decisions made for
18 remediation areas that are actually defined in this
19 boundary. So again, try and keep that footprint as small as
20 possible. You know, it's not the best one in terms of
21 efficiencies for getting to and from a place but it does
22 make it so that it's the smallest footprint possible.

23 We're going to be talking about these red areas
24 basically. That's the areas where CW-5 in that red circle
25 there. And PW-1 and 6. And then PW-3 is on this side over

1 here in the west area. Next slide please.

2 So getting into the term west area you can see
3 some of these areas and they're kind of hard to see. They're
4 on the placards in back so hopefully you had a chance to
5 take a look at those. But what we're talking about when we
6 look at these areas are a lot of trenches, a lot of
7 different types of drainage systems, engineered systems for
8 getting waste readily into the ground from the plutonium
9 finishing plant and Z plant which we're located here and
10 here.

11 So as you break down these areas, these various
12 sites, I'm not going to go through them and show you which
13 ones are part of CW-5, PW-6 and PW-1 because we'll get into
14 that here in a second. But this gives you a physical layout
15 of how these things were arranged around the plants. And of
16 course they're in proximity to these plants because they
17 were used for dumping the waste or dumping the steam
18 condensate from the cooling process.

19 So when we look at this when we talked about
20 specific areas in detail there is a color code to this.
21 Again, I think it's more efficient if you see it. If you
22 want to see it in detail that you go in back and look at the
23 placard after the brief. Next slide.

24 So this slide shows 200 East area. 200 East was
25 predominately -- clearly that's on the other side of the

1 inner area. Purex is the source for the sites in this area.
2 And again, we're going to be getting -- kind of drilling
3 down into these so we'll talk about the specific
4 constituents, risks, the analysis as we get to those. Next
5 slide please.

6 This kind of gives you a general view of the idea
7 of how each of these sites were processed, how the waste was
8 disposed. You can see it down here. Cribs, pile fields,
9 trenches, tanks, cribs, and file fields. Most of the cribs
10 and the tanks if you think of a septic system, a pipe
11 running into a tank and then distributing into the ground
12 and maybe having a gravel bed underneath it, that's the kind
13 of tank to think of when you think of a crib or a tank. For
14 a ditch it can be anything from a straight dirt ditch where
15 they just let the effluent flow out. Or it could be an
16 engineered ditch where they actually either laid concrete or
17 laid some kind of pathway into a gravel bed with an
18 engineered pipe called a French drain when you have pipes
19 with holes drilled in them so it more evenly and officially
20 distributes that water into the ground. That's what it was
21 all about back then and this kind of shows you exactly where
22 those processes were done in each of these areas. Next
23 please.

24 So for this 200-CW-5 operable unit it basically
25 had three shallow open ditches. These were known as Z

1 ditches. These were really, really long ditches, 4200 feet
2 long. And I think I've got that right. 4200 feet on Z
3 ditches. There was one tile field and one unplanned release
4 site. So these are very long ditches. These are very kind
5 of low technology ditches. They were dirt. Some of them
6 had some of the drainage that I talked about but mostly very
7 low tech. They received cooling water and steam condensate
8 from the plutonium finishing plant, the Z plant. And their
9 contamination was located primarily at and below the bottom
10 of the trenches, so very shallow. It was a very shallow
11 contamination field. In fact most of those fields when you
12 look at the engineered part of it the rock is about two
13 meters deep, about six feet deep. And it's kind of hung
14 right in that general facility. It got into the ground and
15 right underneath that if at all. Very few of them exceed 15
16 feet.

17 The primary risk factors here were americium-241,
18 plutonium-239, cesium-137 and radium-226. As we went into
19 the remedial alternatives we looked at the no action
20 alternative, which again is required for us to look at. We
21 looked at maintaining the existing soil cover, and
22 institutional controls. We looked at remove, treat, and
23 dispose. I think these are all -- if these aren't
24 understandable raise your hand. We looked at engineered
25 surface barriers. An engineered surface barrier would

1 simply be a way of engineering a barrier on top so that
2 water can't penetrate into that field and drive, as a
3 motivating force drive that contamination further down. So
4 that would be an engineered surface barrier.

5 We looked at in situ vitrification which I think
6 is a fairly sophisticated way of glassifying the ground by
7 placing electrodes on four corners in the area to be
8 vitrified, putting an electrical charge through it, and then
9 actually glassifying the material in place to hold it where
10 it's at. And then we looked at a combination of
11 alternatives. In looking at the final alternative we did a
12 remove, treat, and dispose. So the objective here is to
13 remove the contaminated soil up to approximately 15 feet
14 below the surface of the structure, treat it as necessary,
15 and then dispose as required. Let's see. When we look at
16 that, you know, one of the things that -- if you can go back
17 just real quick. This kind of fits into this process right
18 here because this is the first one we're talking about.
19 When we look at the balancing criteria we're looking at the
20 long-term effectiveness, the short-term effectiveness, the
21 cost-effectiveness, the implementability, that is how
22 achievable, how successful you'll be in going down that path
23 of remediation. And then how well it's going to reduce the
24 toxicity. You know, clearly the driver is going to be human
25 health and environment safety. But we look at all these

1 things to make sure that we're selecting the best
2 alternative. And the way DOE does this is we put it into a
3 matrix and we compare those things out. So when we go
4 through the selection process sometimes it's very apparent,
5 you know, what you're supposed to do. Sometimes there's a
6 lot of, you know, evaluation that needs to be done. You
7 have to dig deeper to see if there's more information and
8 sometimes make decisions based on what you have. For all of
9 these operating units tonight we have enough information to
10 make those decisions. So we wouldn't be here, we wouldn't
11 be talking to you unless we felt we had the right and the
12 solid amount of information to make that decision to protect
13 health -- human health and the environment. So looking at
14 200-PW-1, 3, and 6 operable units these are 1600 ground
15 engineered sites. And when we talked about engineered sites
16 these are just sites that were designed to place this stuff
17 into the ground quickly. They're organized into five waste
18 groups and this is important because the decisions are
19 broken out by these waste groups. There's a high-salt waste
20 group. There's a low-salt waste group. There's settling
21 tanks. There's cesium-137 and there's other sites. And all
22 those things aren't the same category. Cesium-137 is not
23 like a settling tank. A settling tank is a geographic
24 configuration of how it was disposed whereas cesium is a
25 constituent. High salt and low salt are two forms of aqueous

1 plutonium and non-aqueous plutonium that -- and americium
2 that are evaluated separately because they had different
3 penetration depths as we were evaluating them and they went
4 through the soil. So it gets a little complicated but not
5 too complicated. Just stay above it and as we go through it
6 I think it will become more intuitive for you. The primary
7 risk drivers -- I'm sorry, the Hanford site operations were
8 from disposal of plutonium to waste water. Predominately for
9 PW-1 and 6 it was PFP and Z plant. Z plant was the old
10 plutonium finishing plant. And then in PW-3 it was Purex,
11 plutonium uranium refraction and--

12 **AUDIENCE MEMBER:** Plutonium uranium extraction
13 facility.

14 **MR. DOWELL:** Extraction facility. Thank you.
15 Thank you. The primary risk factor for plutonium-239
16 through 40 americium and carbon tetrachloride. Carbon
17 tetrachloride is important. We'll talk about it later
18 because it was a mechanism for driving some of the plutonium
19 into the ground. And of course I talked about the cesium-
20 137 and PW-3. Next slide please.

21 So looking at the alternatives the only difference
22 between this and the previous slide is two-fold. Number
23 one, we have no actual alternative but we have a maintain or
24 enhance existing soil cover with this acronym. Again we
25 have engineered surface barriers. We have in situ

1 vitrification. Remove, treat, and dispose. And soil vapor
2 extraction. Soil vapor extraction is a means that we go to
3 get carbon tetrochloride by pumping air into the ground,
4 basically desiccating it and pulling it out as we try and
5 recover that material because it's highly volatile. It goes
6 into a vapor very quickly and it's very effective in
7 extracting that material. Next slide please.

8 So looking at the high-salt waste group
9 predominantly in PW-1 we know more about this than any
10 others because 216 Z-9 is the area that we've really studied
11 very hard for a long time. PNNL has done studies on it. In
12 fact as we look at plutonium mobility I've got two examples
13 of studies that were recently conducted in 2008 by PNNL
14 looking at plutonium mobility in these area in both PW-1, 3,
15 and 6 as well as specifically for Z-9. Z-9 I think we have
16 the most amount of data on to really base this decision.

17 And what we can see there is, you know where our
18 alternative is focused on continuing to operate the soil
19 evaporation system or the soil vapor extraction system.
20 We're going to excavate the highest concentration
21 contaminated soil and dispose as required. We're basically
22 going to take two feet of the material underneath the
23 structure and recover that material and dispose of it as
24 required. We're going to have to remove and dispose of all
25 the associated structures which is basically the structure.

1 If you look at this tank, it's not a tank but if you look at
2 it it's got a physical structure about it. It's got a
3 cement cap on the top of it. It's actually got stairs that
4 lead down into it and a viewing window. It's a very
5 extravagant site and of course it's one of the sites that
6 are like that. But there's a lot of structure that we're
7 going to remove for that. And then we'll backfill with the
8 evacuated area of clean soil and then construct an
9 evapotranspiration barrier on top. The evapotranspiration
10 barrier is very similar to an engineered cap in that it's
11 designed to evaporate water by various layers of sediment
12 and different kinds of materials along with some sheeting to
13 ensure that the water doesn't get to the source and drive it
14 down further. Next please.

15 For the preferred alternatives for the low-salt
16 waste group we're going to remove significant portions of
17 the contamination and dispose of parts. So basically R2d
18 and an evapotranspiration barrier. And we're going to get
19 most of the material, a significant amount of material.
20 We're taking basically 15 feet of the low-salt waste group
21 and then we're going to put that transpiration barrier on
22 top of it and that will be the solution for that.

23 For 200-PW-3, the cesium-137 waste group, there's
24 no significant plutonium in this area right now. So when
25 you look at that cesium-137 is the driver for the decision.

1 Cesium-137 had a half-life of about 30 years. Our solution
2 for this is to maintain and enhance the existing soil cover.
3 Some of this material is already covered by 15 feet. It's
4 in an area of a lot of other material, a lot of other
5 remediation sites that are going to require similar types of
6 decisions in the future. So at this point our choice is to
7 ensure that the waste sites are at least 15 feet below the
8 ground. And again, a reminder. This is in the inner area.
9 We're there long term. We're going to be watching this
10 material. We're going to have institutional controls that
11 prevent people from working on or using the water from or
12 doing other things that we'll be able to do in the Central
13 Plateau outer area and River Corridor that we will not be
14 able to do inside the inner area of the Central Plateau.
15 Next slide.

16 And I'm almost there, all right? Slide 21. Slide
17 22 is coming. We're almost done. Everybody wake up. On
18 the waste group we have I think two settlement tanks. We're
19 going to basically remove the sludge, the liquid from those
20 tanks. We're going to process that appropriately. It's
21 going to be remediated appropriately. We'll dispose of it
22 as required.

23 What that means is that it's either going to go to
24 WTP or it's going to go to ERDF. I don't want to play
25 around with what that means because, you know, we talked

1 about this material and everybody wants all the plutonium to
2 go to WTP, right? Everyone wants that. But we're going to
3 dispose of it according to what we find and how we dispose
4 of it. I mean, that's just the facts of what we can do and
5 what we're planning. And then we're going to grout those
6 tanks in place.

7 Lastly on 200-PW-6 which is another site waste
8 groups there's no action required. This is a French drain
9 in Z-8 and an injection reversal well on Z-10 where the
10 concentrations are below the risk range and therefore don't
11 require remediation.

12 Last slide is the get off the stage slide. It's
13 basically a continuation of what Joy left and emphasized so
14 well and that is that the public comment period will end on
15 August 5th. You can provide the verbal comments here.
16 There's a web site -- or not a web site but an e-mail
17 address right there you can provide comments at. We want
18 your comments. It made a difference in the decisions we
19 made to get here. We could have taken Z-9 and capped it.
20 And we didn't do that. We're actually going for some of
21 that material. We're going to extract some of that
22 material. That's not what you necessarily call a pure risk-
23 based decision depending on who you talk to. But at the
24 same time it was the right thing to do. We listened to what
25 you had to say about that so your comments matter and it's

1 very important that we get them. Like I said the tri-party
2 agencies consider all the comments and then we expect to
3 have a record decision by the end of September. Thank you
4 and I'll put Emmie on stage.

5 **MS. LAIJA:** Hello everyone. My name is Emmie
6 Laija and I work in the Environmental Protection Agency. I'd
7 like to take a second just to introduce some of my
8 coworkers. Craig, did you want to introduce yourself?

9 **MR. CAMERON:** I am Craig Cameron. I'm the project
10 manager for the CW-5 file program.

11 **MS. LAIJA:** And this is Dennis Faulk. He heads
12 the Hanford project office located here in Richland. So I
13 just wanted to take a second again to thank everyone for
14 coming out. Public involvement is very important. As J. D.
15 had mentioned it makes a difference. It makes a difference
16 in the decision we take when cleaning up the Hanford site so
17 not only your attendance here but any comments you might
18 submit will be looked over and they will have impact or
19 influence on the decisions we're going to make.

20 For EPA our main mission is to continue in helping
21 the environment. In looking at these preferred alternatives
22 that have been identified here tonight we do find them to be
23 protective. So I'll put that out there. But we are
24 particularly interested in how the public feels about the
25 preferred alternative for the cesium sites. The preferred

1 alternative was to maintain or enhance the existing soil
2 cover by having a 15-foot depth. That's a unique approach.
3 It's something new for EPA so we are potentially interested
4 in hearing what you have to say about that but we're
5 interested across the board in hearing what you have to say
6 on any of these preferred alternatives or just to clarify
7 any questions you may have as well. I think that's all.

8 **MS. SHOEMAKE:** All right. Thanks J. D. and Emmie
9 for that. I appreciate that. Before we go any further I
10 also wanted to recognize John Price is here in the audience
11 from Ecology. And so John will be available too if you'd
12 like to ask him any questions later. So now let's turn this
13 over to Susan Leckbank who is the chair of the HAV.

14 **MS. LECKBAND:** I only have 84 slides. No, zero
15 slides. Thank you very much. I would like everybody who is
16 a member of the Hanford Advisory Board to raise your hand
17 please. Great. We've got great participation tonight.
18 Thank you very much.

19 For those of you who aren't familiar with the
20 Hanford Advisory Board it is a citizen's regional advisory
21 board that provides advice to the Department of Energy, the
22 Environmental Protection Agency, and the Washington
23 Department of Ecology. It's made up of 31 seats
24 representing a very diverse group of interests as well as
25 some individuals from the public. So we provide consensus

1 advice.

2 Let me give you an image. Every one of you has to
3 pick what you're going to eat for dinner and you all have to
4 agree on what it is. That's what our board does. We look
5 over the technical issues and determine how we can be most,
6 effective in providing advice to the agencies in the
7 consensus process. Not particularly easy.

8 The board has been following these waste sites
9 ever since I've been on the board. We're very concerned
10 about them. One of the basic values of the HAV is
11 protection of the Columbia River. In order to protect the
12 river the groundwater that flows into the river must be
13 protected and remediated if contaminated. Contamination
14 reaches the ground water that flows under the Hanford site
15 to the river from many different sources, some of which are
16 these waste sites. There is a very big potential for that.

17 We're concerned about the many miles of trenches
18 containing varying levels of plutonium and cesium and other
19 wastes that are not planned for retrieval. Plutonium is
20 forever. The board feels and understands that. We're not
21 particularly convinced that watching and putting caps on
22 will be protective over the long haul. This is a long, long
23 time.

24 The message in the Hanford Advisory Board Advice
25 247 -- and I don't know how many of you notice that there is

1 copies of the advice out there and I would suggest that you
2 visit the Hanford Advisory Board website, www.hanford.gov.
3 Look at the advice that we've given over time. And there
4 are two particular pieces of advice specific to this
5 proposed plan. We advised DOE to get as much plutonium as
6 possible out of the waste sites that we're discussing
7 tonight. Not diluting it with fresh soil. Get it out
8 surgically if you have to and get it off the site into a
9 deep geological repository where it would be positively
10 protective of human health and the environment.

11 They have also advised that remedial design for
12 cleaning up technetium and nitrates in waste sites be based
13 on increased characterization and sampling in order to get
14 the right numbers and the right data to determine what you
15 need to do. The DOE will -- that will enable DOT to
16 determine the location and the extent of the contamination
17 so they can remediate as they go. We're not suggesting they
18 stop doing remediation but do these activities in parallel
19 as they're cleaning up these waste sites. We also advised
20 the agencies to hold public meetings and this is evidence
21 that they accepted our advice and we're very grateful for
22 that.

23 The Hanford Advisory Board provided the tri-party
24 agencies with two flowcharts and I've got copies of those
25 out there as well. One of them is the Central Plateau

1 Remedial Actions flowchart. Our default is always retreat,
2 treat -- retreat, treat, and dispose if practicable and if
3 possible. We stand by that and it's been a tenant of the
4 advisory board for more than 15 years. And this flowchart
5 helps the agencies look at where there are decision points.
6 And I would recommend that you take one of those if you're
7 interested.

8 We also provided them with the groundwater values
9 flowchart. And we're very grateful that the agencies do
10 look at these charts and I've seen them actually tacked up
11 on walls in agency offices so I do know that they are paying
12 attention to those things.

13 We simply aren't convinced that a cap over a waste
14 site will stand up for one hundred to thousands of years.
15 We're just not convinced that that's the very best
16 alternative for some of these waste sites. Strategic, even
17 surgical removal of those long-lived radionuclide
18 contaminates from these waste sites for disposal in deep
19 geological repository is a safer option. That's it. Thank
20 you.

21 **MS. SHOEMAKE:** Very good, very good. Thank you,
22 Susan. Okay. So as the facilitator this is the exciting
23 part of the meeting for me. So we're going to move into our
24 question-and-answer period. And so what I'm going to do is
25 just kind of open it up for anyone who has a question.

1 Again, I'll remind you that we do have just a roomful of
2 experts here so we are open to any question. So who would
3 like to start? In the very back. Let me see if I can get
4 the mic.

5 **MR. ENGSTROM:** Of course it's in the back. I've
6 got a voice that can kind of project forward.

7 I'm Dale Engstrom and I'm from Oregon. My
8 question is this. The proposed plan, first of all let me
9 congratulate DOE. There was a time when the entire plan was
10 to put caps over everything and that was a really bad idea
11 as Susan Leckband was saying. That was incredibly awful.
12 But now the plan is they're going to dig up around two feet
13 from the bottom of the worst two trenches, the high-salt
14 disposal areas. And that two feet is predicted to get
15 somewhere around 48 to 50 percent of the contaminant, the
16 plutonium mass that's sitting in the bottom of the trench.
17 But the point is if you're going to be already lifting out
18 the fill dirt that was already on top of it and going down
19 two feet then my question is has there been any thought
20 about going five feet deeper and getting more of that
21 contaminant mass while you're there?

22 **MR. DOWELL:** I think I can answer. And the answer
23 is well, there's two slides I want to bring up here that
24 kind of talks us through the decision-making process for
25 that. And I'll start with the first slide which is slide

1 30. If you just type in 30 it should come up. That one.

2 So when you look specifically at -- and this isn't
3 Z-1A tile field but this is a good example of what areas
4 we're talking about it. When we look at the two-foot depth
5 that we're treating to we are not trying to mitigate the
6 risk of that material from a standpoint of capturing as much
7 plutonium out of the ground as possible. Again, going back
8 to the decisions made in balancing criteria when you look at
9 a reduction of toxicity of that material you look at the
10 example of that placard back there at Z-9 where we think
11 that material is staying. I call it stable. Not immobile,
12 it's stable.

13 When we do the EIS analysis and modeling for that
14 material in the current tank closure and waste management
15 EIS, when I compare the modeling to that to the modeling
16 that we've done in other areas that material is staying
17 where it's at relatively for 10,000 years. It's not moving
18 according to our current analysis. That said, there are --
19 and I know Oregon, I know you guys have done a lot of
20 homework on this and Dirk is out there bringing that up and
21 I appreciate that. I think it's good to challenge us on
22 this. And that is is plutonium mobile. That's what it
23 comes down to, is plutonium mobile. Is plutonium going to
24 get into the water column. And the answer that we have at
25 DOE is no. We don't think it's going to get there.

1 So when we look at the knee curve and we look at
2 the effectiveness ratio and we look at the additional cost.
3 And you know, I'm talking about costs at risk because I know
4 you-all think that we just think of cost all the time and
5 that drives our decisions. It's not. It's the balanced
6 decision approach but we have to consider costs in our
7 current environment. We have to consider the best bang for
8 the dollar in remediating these sites. And in doing that
9 you know you evaluate the reduction of toxicity versus the
10 cost. And since this material is already, you're looking at
11 18 feet at the bottom -- 18 feet at the bottom of the thing
12 and then 20 feet is what you're talking about at 51 percent.
13 And these are all relative, right? I mean, we're probably
14 within some statistical analysis difference here.
15 We can go -- we looked at going to four different
16 areas. We looked at doing nothing. We looked at two feet.
17 We looked at roughly 18 feet. And we looked at something
18 greater than that and maybe Arlene can help me with that. We
19 were trying to figure it out before this. I think it's 36
20 feet, it might be deeper than that. It gets extremely more
21 expensive and you can see the constituency of plutonium as
22 we go to depth. If you want to capture 99 percent you've
23 got to go to 64 feet. You want to capture 96 it's 36b feet.
24 90 percent it's 26 feet. Some of you would say I'm a
25 project manager, right? I go to the curve of the knee.

1 That's going to be the place where optimization is made on
2 this. Not so when you look at it from a balancing case. I
3 think that's settled. We're here. We're not going there.
4 And the reason is because for us to do anymore than what
5 we're taking out of there and capturing 50 percent it's not
6 changing the reduction of that risk in general to human
7 health and the environment. So we're not making a
8 significant impact at additional cost to making any kind of
9 change to protecting you or the environment. That's what
10 I'm saying.

11 So, you know, we get through that decision
12 process. Is it optimized? We think it's optimized but we
13 did look at it. And I'll bring up the next slide and that
14 is I talked to you about how we did waste decisions. Please
15 bring up slide 27. And when you look at the matrix for this
16 -- I'm sorry, it's not the right one. Go -- I'm sorry, 28
17 maybe. Go back to 26. Oh, sure. I'm sorry. I was on the
18 right one.

19 So when we looked at these options, option A,
20 follow me here for a little while. This is a two-fold
21 option. This is the no action option, remove the structure.
22 This is -- or actually I'm not sure if I said that right. Is
23 that structure or is that just cap?

24 **MS. TORTOSA:** It's not a no action. Option B is
25 15 feet but two of the waste sites have a void space where

1 it really doesn't fly. Two of the waste (inaudible) 13
2 feet. We would be backfilling. The other two with the void
3 and putting a cap on the site.

4 **MR. DOWELL:** Yeah. Arlene, why don't you point to
5 that placard. When you say void space I got confused when
6 you say void space but it's basically the existing structure
7 is a void space.

8 **MS. TORTOSA:** Well, right. There's nothing
9 underneath. Like Z-9. That is with a cement cap over it.

10 **MS. SHOEMAKE:** Can everyone hear Arlene? I'm
11 sorry. You just have such a nice voice I'm guessing folks
12 can't hear you. Sorry to do this to you.

13 **MS. TORTOSA:** Can you hear me now?

14 **AUDIENCE MEMBER:** Yes.

15 **MS. TORTOSA:** Z-9 for example, has a cement
16 structure over the top. And below that there's void space
17 of about 15 feet or so. And so when you look at the remove
18 dispose option B for that waste site it doesn't really apply
19 so what you would be doing which is essentially backfilling
20 the cost is lower. There is no remove of removal relating
21 to that option.

22 **MR. DOWELL:** They don't remove the structure?

23 **MS. TORTOSA:** Well, they remove the structure but
24 there's no--

25 **MR. DOWELL:** It's just the structure, right.

1 **AUDIENCE MEMBER:** The block could be typically
2 guaranteed that 15 feet is being filled.

3 **MR. DOWELL:** So the structure is removed. No
4 ground soil is remediated underneath it.

5 **MS. TORTOSA:** Right.

6 **MR. DOWELL:** Option A has two feet removed. Option
7 C we talked about goes to about 18 feet?

8 **MS. TORTOSA:** About 30 feet.

9 **MR. DOWELL:** It's 18 feet below the structure.

10 **MS. TORTOSA:** Right.

11 **MR. DOWELL:** Right. And then this one goes 36
12 feet below the structure.

13 **MS. TORTOSA:** A total of 90 feet.

14 **MR. DOWELL:** Ninety feet below the structure.

15 Okay. I'll get that right some day. You can see the
16 variance in cost. We're at \$107 million for the preferred
17 option. We go to 600 -- we're 107 million. We go to 600
18 million roughly for an option that again by our standpoint,
19 by the criteria that we're using to assess the effect on
20 improving the human health and protection to human health
21 and the environment it doesn't bring us that value. So
22 that's how we made that decision.

23 **MS. SHOEMAKE:** Okay, are there any questions? Yes,
24 sir? Go ahead right there.

25 **MR. SMITH:** Just a short follow-up question. I

1 see all this up here but none of them really shows the cost
2 difference for going another two or three feet when you're
3 already going to 20.

4 **MR. DOWELL:** I would say you could do a linear
5 analysis on that. But there's another element to this,
6 right? And that element is predominant here. It's also
7 predominant in cesium-137. For me to get that material out
8 I've got to send people down there. I've got to get, you
9 know, a plan developed and it's going to be a significant
10 effort and risk exposure to the workers that are going to
11 extract that material. That's another consideration that we
12 made when we look at that material. So again, I hear what
13 you're saying. Why not go for the knee, right? Why not go
14 to 84 or 87 percent which is where that knee would be,
15 another two to three feet. It's a linear relationship,
16 pretty linear relationship from project base for us to take
17 more material. It doesn't add us value and it increases
18 that risk to the worker that's doing it and it doesn't --
19 you know, it doesn't really add the value of protecting
20 anything more than already is protected.

21 **MS. SHOEMAKE:** Okay. Are there other questions?
22 Okay, right here.

23 **MR. KLINGER:** Yeah. Can we go back to slide 30
24 for just a second?

25 **MR. DOWELL:** Sure.

1 **MR. KLINGER:** So that's just showing percentages.
2 What's the total mass of plutonium?

3 **MS. SHOEMAKE:** Can everybody hear?

4 **MR. DOWELL:** The total mass of plutonium depends
5 on the site. For instance Z-9 I think is the largest site,
6 has 48 to 50 kilograms of material in Z-9.

7 **MR. KLINGER:** Okay. So if I were a very clever
8 person in a hundred years from now what would prevent me
9 from opening up a plutonium mine and mining plutonium?

10 **MR. DOWELL:** Where? In the inner area?

11 **MR. KLINGER:** Here.

12 **MR. DOWELL:** Oh, all right. So going back to that
13 I think I talked initially at the start about the inner
14 area, the custodianship that we're going to have there, the
15 Department of Energy, not other federal agencies. It will
16 be the Department of Energy that will have custody of those
17 ten square miles in the inner area. Long term. We will own
18 that area until we are finished with remedial actions in all
19 of those sites. When I say that I mean that any risk to
20 human health and public safety and the environment is
21 remediated.

22 So you know when I say institutional controls it
23 goes much beyond that. It's presence. There's going to be
24 security. There's going to be some kind of fence system.
25 You know, there will be people working on that site on a

1 daily basis, not only monitoring the effectiveness of all
2 these remediation actions that we're taking there but also
3 doing exactly that, providing a basis of security. I don't
4 know what that basis is but the way that we design these
5 things is so that, you know, you can't have somebody digging
6 in those areas from a basis of institutional controls to
7 protect that very thing. So from a proliferation
8 perspective when you say mining, I mean you're talking about
9 a full-blown mining operation because this material, we're
10 talking about leaving 25 kilograms of material. And you
11 know, you can go on Gerry Pollet's or Heart of America
12 website and figure out how many bombs that is, you know,
13 depending on what size bomb it is. That's my background in
14 the military was plutonium and weapons.

15 But to do that you're going to have to get it out
16 of the ground and soil. It's going to be in a
17 configuration. It's not -- you can't just put that material
18 together and go.

19 **MR. KLINGER:** Yes. But you're a very clever
20 person a hundred years from now.

21 **MR. DOWELL:** Yeah. I will call that a -- and I'm
22 not trying to offend you or anything. It's just not -- it's
23 a safety term. It's not a credible scenario. It's not
24 credible.

25 **MR. KLINGER:** I beg to differ. I have one more

1 follow-up question. Can we go to slide 21? When you say
2 remove sledge liquid from the tank why bother grouting the
3 tank? Why not just remove the tank after sludge and the
4 liquid contained have been removed?

5 **MR. DOWELL:** Because the brunt of the material at
6 risk is -- at risk is removed. What's left in the tank
7 that--

8 **MR. KLINGER:** Exactly. Then why not remove the
9 tank?

10 **MR. DOWELL:** There's no -- because the additional
11 cost is not worth the small benefit of risk to human health
12 and environmental safety. It's just not -- again it's a
13 trade-off of needs across whether or not you put the money
14 into it. Again, removal -- ideally removal would be
15 something we would want to do with all this material. But
16 you know, how far do you want to take. You know, when we're
17 as protective as we need to be by law how far do you take it
18 past that. And what is the criteria for making that
19 decision. That's what you're asking me I think. And that
20 decision gets very challenging when you look at what else
21 you need to do and how fast you want to do that when you're
22 trying to make decisions on what you're doing today. So
23 part of that, you know, it's -- how do I capture that and
24 explain it to you. It's looking at what we want to get done
25 in the immediate future, the resources that we're looking

1 at, and then balancing those resources according to human
2 need.

3 Now, here's an example of the hundred-year
4 question because, you know, when I say it's not credible,
5 it's not credible from a standpoint of a safety aspect of
6 getting a criticality mass from that material out of the
7 ground without either being noticed or drawing attention
8 from whatever controls we have in that area at that time. We
9 are there for the long term. I mean that's the premise for
10 the cesium-137. You know, ten half-lives is probably
11 cesium-137 safe. That's 350 years or so.

12 Our commitment is long term in that area. So
13 that's a fundamental precedent of this whole plan in the
14 inner area is that it's not going to be a river corridor.
15 It's not going to be an outer area. It's not going to be a
16 place where people can recreate. It's not going to a place
17 where fish and wildlife controls it. It's going to have
18 some measures of security. It's not going to be like a
19 plutonium finishing plant with guys in black uniforms and
20 Uzis and all that but it's going to have necessary measures
21 to ensure safety on proliferation as well as the ability for
22 any worker. Because I'm not so worried about a guy with the
23 mining thing coming in and doing it because there are easier
24 ways to get plutonium in the world. I'm more worried about
25 a guy that's digging out there for a utility company and we

1 don't see him. And that's why we want 15 feet above it
2 especially like in the cesium-137 columns and in these areas
3 where we're trying to remediate.

4 I know it's a struggle to accept that we're only
5 taking two feet and we're so close to the rest of it. But
6 if you look at the plume in Z-9 as an example that plume
7 goes down to 110 feet. And we cannot go down to 110 feet.
8 We don't have the resources to do that and it doesn't
9 protect us anymore than what we're doing today. And that's
10 the point I'm trying to make.

11 **MS. SHOEMAKE:** Actually I think we have another
12 question right here.

13 **MR. SMITH:** Yeah. I'm concerned a little bit
14 about--

15 **MS. SHOEMAKE:** I'm going to hand you a microphone.
16 I'm sorry.

17 **MR. SMITH:** I'm a little bit concerned about the
18 cost analysis presented here because they are sort of a
19 little bit here and a lot there. And it strikes me that
20 you're digging say two feet down to the bottom of this
21 thing. Taking this a third foot does not constitute a major
22 increase in cost or structures or devices or anything else.
23 And according to your curve on this one tile field if you
24 went three feet you would get 84 percent of it. That's a
25 significant improvement in just the view of the thing that

1 the public will have. You've got more than three-quarters
2 of it, that's pretty good. But you only took out 50
3 percent. That's hardly worth it. It's a public perception
4 problem, not necessarily a risk problem at all.

5 **MR. DOWELL:** And I'll agree with some of what
6 you're saying. Especially when I first looked at this I
7 was, you know, I was getting into this process of turning
8 over Central Plateau, trying to understand our remediation
9 strategy. I had to change my paradigm because I had to look
10 at it a different way than protection. It was exactly like
11 you say. It's more of a perception if you will. But I
12 don't like saying the work perception with plutonium. I
13 don't know about you but it leaves a bad taste in my mouth.
14 Here's an example of what I'm faced with in Central Plateau.
15 I'm looking at not hiring a GSSC worker so that I can have
16 more money to take plutonium finishing plant to ground by
17 2015. I'm in the decision basis now on tens of thousands of
18 dollars where I used to be in tens of millions of dollars
19 back in the day. It's a different world out here in budget,
20 guys. And I don't know how I communicate that any better
21 than I can.

22 When I look at these things I really look at them
23 from a standpoint of what is making us safe. My kids drink
24 out of this aqua filler. They're five end eight. You know,
25 I don't know. It's tough. It's a tough decision. It's a

1 tough decision what you take out of there. Where are you
2 going on that knee curve on this example. But again, when
3 we go back to protection I had to change the paradigm. It's
4 not about protection. It's about how much material we had.
5 And when I thought about the proliferation things because,
6 you know, I read what Gerry had and I read what you guys had
7 down at Oregon and I tried to understand what the
8 proliferation risk is.

9 Weapons are very complex things to make it and the
10 most complex part of it is making sure that plutonium does
11 what it's supposed to do. And in doing that it has to have
12 a curie level. And to get that much material out of the
13 footage we're talking about it's highly improbable that
14 that's going to be pulled off. So the proliferation risk to
15 me was like I said, not credible. But the knee curve part I
16 had to change my paradigm and do exactly that. Go back to
17 the balancing criteria in CERCLA and understand looking at
18 what I'm looking at with budgets and what else I want to get
19 done in Central Plateau.

20 You know, maybe what happens with this is we
21 remediate. We get down into our final rod and get to our
22 decision and we're looking at every five years. And we
23 either see it. You know, we either get updates that there
24 is higher risk and we have to do something else and we'll
25 have technology in place that will be more cost-effective. I

1 doubt we're ever going to need to do that because what we're
2 seeing today is that that plutonium is not going to move.
3 And that's based on our modeling. It's based on the
4 empirical data that we've got on Z-9. We've got a lot of
5 data from that. So we don't think it's going to ever be
6 about plutonium mobility. But we're going to revisit that
7 every five years just to make sure that it's safe. That's
8 the bottom line.

9 **MS. SHOEMAKE:** I think we've got a couple more
10 questions to go. We are kind of incringing on our formal
11 public comment discussion time but I think this is probably
12 worth our time. How many questions did we have left? I
13 think I saw two. Ma'am, you want to go ahead?

14 **MS. LARSEN:** So I just want to clarify that I'm
15 just speaking for myself and making some comments here, not
16 the people that I represent. This decision troubles me more
17 than the decisions that I've seen in 18 years of Hanford
18 cleanup. Just fundamentally it troubles me. The half-life
19 of cesium I'm pretty comfortable with. The stuff is going
20 to go away in a reasonable time frame that we can have some
21 confidence of institutional controls. The plutonium is not
22 going away. I don't care if you deal with it now or 10
23 years from now or 15 years from now when you've got the
24 money to do it right.

25 But when you take a look at threats in the world

1 we're not worried about digging up enough plutonium to make
2 a bomb. We're thinking about a dirty bomb and what the
3 consequences of that are. And we have what I characterize
4 as a plutonium mine out there for somebody to go after. And
5 not in our lifetime maybe but in some lifetime in the
6 future. I don't think we should be making this decision
7 based on budget. And if it's a budget decision then put it
8 off until a point in time. The PFP is your priority. I
9 absolutely support that. That's where we need to go right
10 now. Getting that done, getting it behind us is what we
11 need. But when I think about the evolution of what the bad
12 guys have been going after in the last ten years it's
13 changed so much. We were worried about people stealing
14 plutonium and making a bomb. Then we realized they didn't
15 need to steal it. They could do something with it right
16 there. And that changed our whole scenario. We had an
17 analysis where the bad guys got in and blew it up. Never
18 thought about that before. They thought they would steal
19 it.

20 So as we evolve in terms of the bad guys and what
21 they might want to do with this material we need to make the
22 most cautious, the most protected decision for us and future
23 generations. And you may not be in a position to do that
24 now. But I just think this is one of the most strategic,
25 one of the most important decisions on the Hanford site and

1 you need to go cautious. It scares me.

2 **MR. DOWELL:** And Joy and Pam I didn't see a
3 question in that so I think that's a good comment. And we
4 appreciate your comment, ma'am.

5 **MS. SHOEMAKE:** Absolutely. Last call for
6 questions before we move to official public comment. Yes,
7 sir.

8 **MR. MCCAIN:** I just have a quick one. How did
9 radium-56 get listed? It's on your CW-5.

10 **MR. DOWELL:** I would have to look at the quantity
11 tables. I think I have those with me. It will take me a
12 little time. I'll be doing that while you take comments. Is
13 that all right?

14 **MR. MCCAIN:** Okay.

15 **MS. SHOEMAKE:** So who had a public comment they
16 would like to enter into the record? Let me remind you all
17 of the questions and all the questions up until now have
18 been recorded but I would like to open it up for any
19 official comment. Let's get you in the microphone. I know
20 you've got the voice but let's get it official.

21 **MR. ENGSTROM:** Once again I'm Dale Engstrom and
22 I'm from Oregon. And I'm not speaking for Oregon. I'm
23 speaking for myself. As a citizen of Oregon we worry about
24 what comes down the river and what comes down the river
25 comes from Hanford in terms of groundwater. And J. D. was

1 absolutely right that Dirk and I who work together do worry
2 a lot about the mobility of plutonium. And that's a
3 question that hasn't been answered very well and we need to
4 look some more at it and I'm going to provide you with a
5 citation list. But let's go to this project, this problem,
6 and talk about our concerns.

7 First of all it's divided basically into those
8 three groups that we talked about in the first place. And
9 the PW-3 which is the cesium sites and the PW-6 and the CW-5
10 are not really a concern because there's not a lot of
11 material there. There's not a lot of plutonium to worry
12 about. The real one to worry about is the high-salt
13 plutonium waste disposal sites. The reason they are a
14 problem is because a lot more plutonium ended up there. As
15 an example I see on the chart over here for the Z-1 field
16 that there's 57 kilograms of plutonium in there. And in the
17 Z-9 trench there's 48 kilograms of plutonium in there. And
18 Dirk tells me it only takes four to build a bomb. Now,
19 you're right, it has to be refined and it has to be made
20 into a better product ut there's the beginning of something
21 there just for an idea of what we're talking about.

22 So what I would like to propose, what I would like
23 to make a comment on is I don't think you're going far
24 enough. I again reiterate the idea that you're taking out
25 just two feet at the bottom of the trench. You're going to

1 get about 48 to 50 percent of what's in there but we're
2 talking about Z-9 in that case. And you can go just a few
3 more feet as Dick Smith was saying and you could get maybe
4 89 percent of what is in there. And while you're already
5 there this could be done with an observational approach. And
6 one of the problems you're going to run into with places
7 like Z-9 is when the water ran down the trench there was
8 places that plutonium was being deposited and there were
9 other places where it wasn't. And so it's going to be a
10 very almost mining sort of method moving through the trench
11 cleaning up the stuff that's in there. And as you run into
12 the stuff that you run into in terms of plutonium that would
13 be a good time to extract it and remove it.

14 One of the things that I would like to suggest to
15 you is the plutonium as Susan said is forever. It is one of
16 those really bad actors. You said we're going to be around
17 here for the long term. Well, the half-life of plutonium is
18 something like 24,000 years. You're going to be around for
19 240,000 years, sir? I don't think so. So one of the
20 problems is that you can't project that into the future.
21 You can't guarantee that that's going to happen as a
22 safeguard for human health. So the real safeguard is to get
23 it away from the surface. It's only 15 feet down. To put
24 it somewhere where it will be safe which is deep geologic
25 disposal and to get it out of where it is now. Thank you.

1 **MR. DOWELL:** Thank you. Real quick before we move
2 on to the next statement, sir, radium-26, I don't see it on
3 my master list. If one of my tech support, I don't know if
4 we have the information available to do that. Determine
5 where the radium-26 is.

6 **MR. KLINGER:** That's just a natural process.

7 **MR. DOWELL:** Yeah, but everything that we're
8 putting on here is constituents that came out of process so
9 it should be a process. If it was another form of radon or
10 radium I agree but we've got to figure out what the source
11 was for that slide.

12 **MR. KLINGER:** I think often in laboratory data
13 this is an artifact.

14 **MR. DOWELL:** Like a source?

15 **MR. KLINGER:** No. It's a shoulder that shows up
16 in that region of interest.

17 **MS. SHOEMAKE:** I'm hoping that we can answer some
18 of those questions as soon as we're completed here. So who
19 else has public comment they would like to give? No? Last
20 call. One more time. Okay. I figured there was one more
21 out there. Susan.

22 **MS. LECKBAND:** I don't think I need the
23 microphone. I've got a pretty loud voice. I'm speaking for
24 myself now, not the Hanford Advisory Board. I struggled
25 with the slide that J. D. presented with the curve. I

1 really struggled with that because it is predicated on the
2 assumption that plutonium isn't mobile. And I guess I'm not
3 a scientist and I'm not so convinced that that's absolute. I
4 absolutely believe that we need to go farther. I just think
5 there is a better risk reduction. There is more safety.
6 There's more permanence. The waste load on this site is
7 already extraordinary. And if we can get the plutonium
8 which does have a huge half-life, get it in a deep
9 geological repository I believe that's where it belongs.
10 Thank you.

11 **MS. SHOEMAKE:** Okay. One last final call. I
12 would like to remind you that on the back of your agenda if
13 you didn't feel comfortable raising your issue here tonight
14 you can go ahead and write your comment on the back of this.
15 Also, too, there are several other ways for you get your
16 comment looked at and reviewed by the agencies. All
17 comments will be responded to in a record response to
18 comment document after this. Are there any final closing
19 thoughts by either Emmie or J. D.?

20 **MS. LAIJA:** I just wanted to encourage any members
21 of the public who are here tonight we had a survey out on
22 the table as you entered. It's the public involvement
23 survey to help us understand how we can make these public
24 meetings better. If you could fill that out it would be
25 very much appreciated. It does impact how we hold our

1 public meetings. So if you have a minute we would really
2 appreciate you filling that out for us.

3 **MS. SHOEMAKE:** Excellent. J. D.?

4 **MR. DOWELL:** Same. The same goes with us. I'd
5 like to thank you all again for the input, for the
6 questions. If we did leave something unanswered we'll stick
7 around afterwards. I've got the technical folks from the
8 government side as well as our contractor here. Ecology is
9 here, EPA is here. We're here to serve you so thanks for
10 coming.

11 **MS. SHOEMAKE:** All right. Thanks everyone.

12 **MS. LECKBAND:** Thank you.

13 **(Whereupon the meeting was adjourned at 7:40 p.m.)**
14
15
16
17
18
19
20
21
22
23
24
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

CERTIFICATE

I, Kathleen M. McKee, do hereby certify that pursuant to the Rules of Civil Procedure, the witness named herein appeared before me at the time and place set forth in the caption herein; that at the said time and place, I reported in stenotype all testimony adduced and other oral proceedings had in the foregoing matter; and that the foregoing transcript pages constitute a full, true and correct record of such testimony adduced and oral had and of the whole thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 21st day of July, 2011.

/Signed _____ December 9, 2012
Kathleen M. McKee Commission Expiration

<p><u>§</u> \$107 35:16 \$65 8:9</p> <hr/> <p><u>1</u> 10 8:24 44:22 10,000 31:17 107 35:17 110 41:7 41:7 13 34:1 137 20:20 15 17:15 18:13 22:20 23:3 23:7 29:4 33:25 34:17 35:2 41:1 44:23 48:23 15-foot 26:2 1600 19:14 18 32:11 32:11 32:17 35:7 35:9 44:17 19 3:2 1965 10:15</p>	<p><u>2</u> 20 3:20 32:12 36:3 200 14:5 15:24 15:24 2008 13:7 21:13 2009 13:7 13:7 200-CW-5 14:3 16:24 200-PW-1 14:3 19:14 200-PW-3 14:4 22:23 200-PW-6 24:7 2011 3:2 2015 9:5 9:6 42:17 21 23:16 39:1 216 21:10 22 7:3 23:17 220 8:22 24,000</p>	<p>48:18 240,000 48:19 247 27:25 25 38:10 26 32:24 33:17 27 33:15 28 33:16 290 8:21</p> <hr/> <p><u>3</u> 3 5:11 19:14 21:14 30 23:1 31:1 31:1 35:8 36:23 30-day 5:3 31 26:23 350 40:11 36 32:19 35:11 36b 32:23</p> <hr/> <p><u>4</u> 40 20:16 4200 17:1 17:2 48 30:15 37:6 47:17 48:1</p>	<p><u>5</u> 50 30:15 33:5 37:6 42:2 48:1 51 32:12 57 47:16 586 8:16 5th 5:4 24:15</p> <hr/> <p><u>6</u> 6 5:11 14:3 14:25 19:14 20:9 21:15 6:28 3:3 600 35:17 35:17 64 32:23</p> <hr/> <p><u>7</u> 7:40 51:13 75 8:23</p> <hr/> <p><u>8</u> 84 26:14 36:14 41:24 87 36:14 89 48:4</p>	<p><u>9</u> 90 32:24 35:13 96 32:23 99 32:22</p> <hr/> <p><u>A</u> ability 40:21 able 7:12 11:17 12:6 23:12 23:14 absolute 50:3 absolutely 45:9 46:5 47:1 50:4 accept 41:4 accepted 28:21 according 24:3 31:18 40:1 41:23 achievable 18:22 acronym 20:24 across 26:5</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

39:13	add 4:21	28:24	20:23	5:14
action	36:17	29:5	21:18	30:22
13:21	36:19	29:9	25:25	30:22
17:19	additional	37:15	26:1	31:24
24:8	32:2	50:16	29:16	49:17
33:21	33:8	agency	alternativ	answered
33:24	39:10	25:6	es 7:8	47:3
actions	address	26:22	12:14	anymore
29:1	24:17	29:11	13:6	33:4
37:18	adjourned	agenda	13:10	41:9
38:2	51:13	3:13	13:18	anyone
activities	advice	4:20	17:19	29:25
7:7	26:21	6:23	18:11	anything
28:18	27:1	50:12	20:21	9:19
actors	27:6	ago 13:7	22:15	16:14
48:16	27:24	agreement	25:21	36:20
actual 3:6	28:1	13:19	26:6	38:22
4:10	28:3	ahead	am 25:9	41:22
13:12	28:4	3:5	America	Anytime
13:25	28:21	35:24	38:11	6:11
13:25	advised	44:13	americium	apiece 8:9
20:23	28:5	50:14	20:1	apparent
actually	28:11	air 21:3	20:16	19:4
4:4	28:19	already	americium-	applicable
4:6 4:20	advisory	3:15	241	7:6
4:21	26:16	23:3	17:17	apply
5:15 7:6	26:20	30:17	amount	34:18
10:20	26:20	30:18	19:12	appreciate
12:17	27:24	32:10	21:16	26:9
13:5	28:2	36:3	22:19	31:21
13:24	28:23	36:20	analysis	46:4
14:18	29:4	48:4	16:4	51:2
16:16	49:24	50:7	31:13	appreciate
18:9	afterwards	alternativ	31:18	d 50:25
22:3	51:7	e 6:21	32:14	approach
24:20	agencies	13:14	36:5	6:24
29:10	25:2	17:20	41:18	7:14
33:22	27:6	18:11	45:17	answer
41:11	28:20	19:2		

11:4	11:11	14:24	attention	45:11
11:11	11:22	15:3	29:12	45:17
26:2	14:4	15:6	40:7	45:20
32:6	14:4	15:11	audience	48:16
48:5	14:6	15:20	3:25	balanced
appropriat	14:11	16:22	20:12	32:5
ely	15:1	30:14	26:10	balancing
23:20	15:2	31:3	34:14	18:19
23:21	15:24	31:16	35:1	31:8
approximat	16:1	32:16	August 5:4	33:2
ely	16:1	38:6	24:15	40:1
18:13	18:7	41:2	available	43:17
aqua 42:24	21:10	aren't	4:14	bang 32:7
aqueous	21:14	17:23	4:15 8:2	barrier
19:25	22:8	19:22	26:11	17:25
arching	22:24	26:19	49:4	18:1
8:4	23:4	29:13	away 44:20	18:4
area	23:8	Arlene	44:22	22:9
8:17	23:13	5:22	48:23	22:10
8:18	23:14	32:18	awful	22:18
8:20	37:10	34:4	30:11	22:21
8:21	37:14	34:10	awhile 6:7	barriers
8:21	37:17	arranged	_____	17:25
8:21	37:18	15:15	B	20:25
8:24 9:2	40:8	artifact	backfill	base 21:16
9:5	40:12	49:13	22:7	36:16
9:6	40:14	aspect	backfillin	based 19:8
9:9 9:11	40:15	40:5	g 34:2	24:23
9:13	areas	assess	34:19	28:12
9:14	8:1 8:19	35:19	background	44:3
9:20	9:4 9:10	assessment	7:7	44:3
9:23	9:14	12:18	8:5	45:7
9:25	10:21	associated	12:18	basic
10:3	10:21	21:25	38:13	27:10
10:8	10:25	assumption	bad	basically
10:9	11:14	50:2	10:21	6:15
10:12	11:25	attendance	30:10	9:10
11:5	12:19	25:17	42:13	9:21
11:6	14:15			
11:9	14:18			
	14:23			

11:14	14:20	38:12	9:13	39:23
13:7	19:1	bother	19:19	capturing
14:24	29:15	39:2	brown 8:20	31:6
16:24	32:7	bottom	14:15	33:5
21:4	better	17:9	14:15	carbon
21:21	42:20	30:13	brunt 39:5	20:16
21:25	47:20	30:16	Bryant	20:16
22:17	50:5	32:11	5:20	21:3
22:20	50:24	32:11	budget	care 44:22
23:19	beyond	41:20	42:19	case
24:13	37:23	44:8	45:7	33:2
34:6	bit 3:21	47:25	45:7	48:2
47:7	41:13	boundary	budgets	category
basis 38:1	41:17	14:19	43:18	19:22
38:3	41:19	bowl 14:12	build	cautious
38:4	black	14:13	47:18	45:22
38:6	40:19	break	busy 5:9	46:1
42:17	blew 45:17	9:9	<hr/>	cement
bear 7:1	block 35:1	15:11	C	22:3
become	board 26:5	breaks	Cameron	34:9
20:6	26:16	9:12	25:9	34:15
bed	26:20	brief 6:24	25:9	Center 5:1
16:12	26:21	7:3	cap 22:3	Central
16:17	27:4	7:4	22:10	3:9 7:16
beg 38:25	27:8	15:23	29:13	8:3 8:20
beginning	27:9	brilliant	33:23	8:23 9:9
47:20	27:20	4:21	34:3	23:12
behind	27:24	bring 9:20	34:9	23:14
45:10	28:2	10:7	capped	28:25
believe	28:23	11:15	24:19	42:8
50:4	29:4	30:23	caps 27:21	42:14
50:9	49:24	33:13	30:10	43:19
belongs	bomb 38:13	33:15	captive	CERC 11:20
50:9	45:2	35:21	3:25	CERCLA
benefit	45:2	bringing	capture	11:14
39:11	45:14	31:20	32:22	12:1
best 6:20	47:18	broken	32:23	12:11
	bombs	9:10		12:12

12:13	33:9	26:20	15:20	44:11
13:11	42:9	clarify	color-	46:3
13:22	43:3	26:6	coded	46:4
43:17	43:16	44:14	14:10	46:6
cesium	changed	clarifying	Columbia	46:15
19:24	45:13	-type	9:3	46:19
20:19	45:16	3:23	27:11	47:23
25:25	changes	clean 22:8	column	49:19
27:18	13:18	cleaning	31:24	50:14
44:19	changing	25:16	columns	50:16
47:9	33:6	28:12	41:2	50:18
cesium-137	characteri	28:19	combinatio	comments
17:18	zation	48:11	n 18:10	4:18
19:21	28:13	cleanup	comes	13:15
19:22	characteri	3:8 6:21	31:23	24:15
22:23	ze 45:3	6:24	46:24	24:17
22:25	charge	7:14	46:24	24:18
23:1	18:8	7:22	46:25	24:25
36:7	chart	7:24	comfortabl	25:2
40:10	47:15	7:25 8:3	e	25:17
40:11	Charta	8:7 8:14	44:19	44:15
41:2	5:20	8:25 9:2	50:13	46:12
cetera	5:20	11:3	coming	50:17
10:17	charts	44:18	4:25 6:7	commitment
CH-2 5:24	29:10	clearly	23:17	11:7
chair	choice	15:25	25:14	11:12
26:13	23:6	18:24	40:23	11:21
challenge	CHPRC 6:2	clever	51:10	12:1
31:21	CHS 6:1	37:7	commence	40:12
challenges	circle	38:19	13:21	communicat
7:25	14:24	close 41:5	comment	e 42:20
challengin	citation	closing	4:2	company
g 39:20	47:5	50:18	4:5	40:25
chance	citizen	closure	4:7 4:10	compare
6:11	46:23	31:14	4:20	13:17
6:18	citizen's	code 15:20	4:22 5:3	19:3
15:4		color	5:3	31:15
change			24:14	completed
				49:18

completion 7:22 8:3	44:21	22:8	51:8	33:8
complex 43:9 43:10	configurat ion 19:24 38:17	contained 39:4	contractor s 5:13	34:20 35:16 36:1
complicate d 20:4 20:5	confused 34:5	containing 27:18	control 11:8 11:9	39:11 41:18 41:22
comprehens ive 11:12	congratula te 30:9	contaminan t 30:15 30:21	controls 17:22 23:10 37:22 38:6 40:8 40:17 44:21	cost- effectiv e 12:8 43:25
concentrat ion 21:20	consensus 26:25 27:7	contaminan ts 9:16	40:8 40:17 44:21	cost- effectiv eness 18:21
concentrat ions 24:10	consequenc es 45:3	contaminat ed 3:8 18:13 21:21 27:13	convinced 27:21 29:13 29:15 50:3	costs 8:9 32:3 32:6
concern 9:3 47:10	consider 25:2 32:6 32:7	contaminat es 29:18	cooling 15:18 17:7	couple 3:12 4:16 4:24 44:9
concerned 27:9 27:17 41:13 41:17	considerat ion 36:11	contaminat ion 17:9 17:11 18:3 22:17 27:13 28:16	copies 28:1 28:24 copy 8:9	course 9:2 15:16 20:19 22:5 30:5
concerns 47:6	consistent 11:13	contaminat ions 11:19	corners 18:7	court 4:3
concrete 16:16	consolidat e 9:6	contaminat ions 11:19	corridor 8:18 8:23 9:5 9:21 23:13 40:14	cover 17:21 20:24 23:2 26:2
condensate 15:18 17:7	constituen t 19:25	continuat ion 24:13	cost 32:2 32:4 32:10	covered 23:3
conduct 9:2	constituen ts 16:4 49:8	continue 25:20		coworkers 25:8
conducted 21:13	constitute 41:21	continued 6:11		
confidence	construct	continuing 21:18		
		contractor		

Craig 25:8	10:25	19:12	44:17	37:16
25:9	11:22	21:16	45:25	depending
credible	12:4	22:25	deep 17:13	24:23
38:23	custodians	24:23	17:13	38:13
38:24	hip	25:3	28:9	depends
40:4	37:14	25:16	29:18	37:4
40:5	custody	29:5	48:24	deposited
43:15	37:16	32:6	50:8	48:8
crib 16:13	CW-5	33:11	deeper	depth 26:2
cribs 16:8	5:11	35:22	19:7	31:4
16:9	5:19	39:19	30:20	32:22
16:9	14:24	39:20	32:20	depths
criteria	15:13	42:17	default	20:3
11:15	15:13	42:25	29:1	desiccatin
12:13	25:10	43:1	define	g 21:4
18:19	25:10	43:22	10:12	design
31:8	46:9	44:16	defined	28:11
35:19	47:9	45:6	14:17	38:4
39:18	<hr/>	45:7	14:18	designed
43:17	D	45:22	defining	6:14
criticalit	daily 38:1	decision-	10:13	19:16
y 40:6	Dale 6:2	making	definitely	22:11
curie	30:7	30:24	3:25	detail
43:12	46:21	decisions	definition	15:20
current	dark 14:15	10:6	14:11	15:22
31:14	data 12:23	10:13	demarcatio	details
31:18	13:2	10:18	n 10:11	8:6
32:7	21:16	11:13	Dennis	determine
curve 32:1	28:14	11:24	25:11	12:18
32:25	44:4	14:17	Department	13:17
41:23	44:5	14:17	3:18 5:7	27:5
43:2	49:12	19:8	5:12	28:14
43:15	day	19:10	7:15	28:16
49:25	35:15	19:18	7:18 8:8	49:4
custodial	42:19	23:6	26:21	determined
13:23	deal 44:22	24:18	26:23	13:4
custodians	decision	25:19	37:15	develop
10:24	13:5	31:8		
	13:19	32:5		
	13:20	33:14		
		39:22		

10:9	45:1	22:17	documented	doubt 44:1
13:5	diluting	23:21	12:21	Dowell 5:6
developed	28:7	24:3	13:12	5:8 5:24
13:9	dinner	24:3	documents	6:6
36:9	27:3	29:2	4:16	20:14
developmen	Dirk 31:20	34:18	7:15	30:22
t 10:5	47:1	disposed	7:17	34:4
devices	47:18	16:8	7:19	34:22
41:22	dirt 16:14	19:24	7:19	34:25
dialogue	17:5	distinct	7:19	35:3
3:15	30:18	9:14	DOE 5:18	35:6
Dick 48:3	dirty 45:2	distribute	11:8	35:9
dictated	discuss	s 16:20	11:9	35:11
13:11	3:24	distributi	19:2	35:14
differ	discussed	ng 16:11	28:5	36:4
38:25	7:9	ditch	28:15	36:25
difference	discussing	16:14	30:9	37:4
20:21	28:6	16:14	31:25	37:10
24:18	discussion	16:16	dollar	37:12
25:15	44:11	ditches	32:8	38:21
25:15	disposal	16:25	dollars	39:5
32:14	10:16	17:1	42:18	39:10
36:2	10:17	17:1	42:18	42:5
different	10:17	17:3	done	46:2
8:1 10:5	11:18	17:4	6:17	46:10
15:7	14:15	17:5	12:6	49:1
20:2	20:8	diverse	12:18	49:7
22:12	29:18	26:24	13:19	49:14
27:15	30:14	divided	16:22	51:4
32:15	47:13	47:7	19:6	drain
42:10	48:25	document	21:11	16:18
42:19	dispose	7:22 8:9	23:17	24:8
dig 19:7	17:23	9:12	31:16	drainage
30:12	18:12	50:18	31:19	15:7
digging	18:15	documentat	39:24	17:6
38:5	21:1	ion	43:19	drawing
40:25	21:21	12:21	45:10	40:7
41:20	21:23		48:5	drill 8:15
	21:24		DOT 28:15	14:6

drilled	15:24	EIS	28:15	enter
16:19	15:24	31:13	encourage	46:16
drilling	easy 27:7	31:15	50:20	entered
16:2	eat 27:3	either	Energy	50:22
drink	echo 5:8	16:16	3:18 5:7	entire
42:23	Ecology	23:23	5:12	30:9
drinking	7:19	40:7	7:15	environmen
9:22	10:15	43:23	7:18 8:8	t 11:2
9:23	13:17	43:23	26:21	11:20
drive 18:2	14:12	50:19	37:15	11:20
18:3	26:11	electrical	37:16	12:9
22:13	26:23	18:8	engineered	18:25
driver	51:8	electrodes	15:7	19:13
18:24	effect	18:7	16:16	25:21
22:25	35:19	electronic	16:18	28:10
drivers	effective	ally	17:12	32:7
20:7	12:6	8:11	17:24	33:7
drives	21:6	element	17:25	33:9
32:5	27:6	36:5	18:4	35:21
driving	effectiven	36:6	19:15	37:20
20:18	ess 12:2	else 39:20	19:15	environmen
dumping	18:20	41:22	20:25	tal
15:17	18:20	43:18	22:10	6:1
15:17	32:2	43:24	engineerin	6:3 25:6
during	38:1	49:19	g 18:1	26:22
3:15 4:9	efficienci	e-mail	Engstrom	39:12
DVDs 4:14	es 14:21	4:23	30:5	EPA 3:18
<hr/>	efficient	24:16	30:7	7:19
E	15:21	Emmie 25:4	46:21	13:16
earlier	effluent	25:5	46:21	14:12
6:6	16:15	26:8	enhance	25:20
14:14	effort	50:19	20:24	26:3
easier	9:12	emphasized	23:2	51:9
40:23	9:13	24:13	26:1	equipment
east	36:10	empirical	ensure	9:18
14:5	eight	44:4	12:9	ERDF 23:24
14:5	42:24	enable	22:13	especially
			23:7	41:2
			40:21	42:6

essentiall	37:3	exceed	20:14	26:19
y 34:19	everyone	17:15	21:2	farms
estimate	7:2 24:2	excellent	21:2	14:16
11:6	25:5	6:17	21:19	farther
et 10:17	25:13	6:18 8:5	extraordin	50:4
evacuated	34:10	51:3	ary 50:7	fast 39:21
22:8	51:11	exciting	extravagan	Faulk
evaluate	everything	12:3	t 22:5	25:11
11:14	4:4	29:22	extremely	fax 4:23
12:5	12:20	existing	32:20	feasibilit
32:9	30:10	17:21	<hr/>	y 13:2
evaluated	49:7	20:24	F	13:3
13:3	evidence	23:2	face 7:25	fed 13:1
20:2	28:20	26:1	faced	federal
evaluating	evolution	34:6	42:14	5:20
20:3	45:11	exit 3:11	facilitato	37:15
evaluation	evolve	expect	r 29:22	feel 50:13
12:13	45:20	25:2	facility	feels
12:24	exactly	expensive	17:14	25:24
19:6	7:23	32:21	20:13	27:20
evaporate	16:21	experts	20:14	feet
22:11	38:3	3:24	facing	17:1
evaporatio	39:8	30:2	13:3	17:2
n 21:19	42:10	explain	fact	17:13
evapotrans	43:16	39:24	4:15	17:16
piration	example	exposure	17:11	18:13
22:9	31:3	36:10	21:12	21:22
22:9	31:10	extent	factor	22:20
22:18	34:15	28:16	20:15	23:3
evenly	40:3	extract	factors	23:7
16:19	41:6	24:21	17:17	30:12
everybody	42:14	36:11	facts 4:12	30:14
3:5 8:10	43:2	48:13	24:4	30:19
23:17	47:15	extracting	fairly	30:20
24:1	examples	21:7	18:6	32:11
26:15	21:12	extraction	familiar	32:11
	excavate	20:12		32:12
	21:20			32:16

32:17	figure	fish 40:17	43:13	fundamenta
32:20	32:19	fits 18:17	footprint	l 40:13
32:23	38:12	five 19:17	8:14	fundamenta
32:23	49:10	30:20	10:13	lly
32:24	figured	42:24	11:3	44:18
33:25	49:20	43:22	11:5	future
34:2	file	44:7	14:19	12:5
34:17	16:9	five-	14:22	12:7
35:2	25:10	year	force 18:3	23:6
35:6	fill 30:18	12:1	forever	39:25
35:7	50:24	13:22	27:20	45:6
35:8	filled	flight	48:15	45:22
35:9	35:2	3:10	form 14:11	48:20
35:12	filler	flow 12:22	49:9	<hr/>
35:13	42:24	16:15	formal 4:2	G
35:14	filling	flowchart	4:5 4:10	general
36:2	10:19	29:1	44:10	16:6
36:15	51:2	29:4	forms	17:14
41:1	final	29:9	19:25	33:6
41:5	18:11	flowcharts	forward	generation
41:7	43:21	28:24	30:6	s 45:23
41:7	50:11	flows	frame	geographic
41:20	50:18	27:12	44:20	10:10
41:24	finished	27:14	framed	19:23
47:25	37:18	fly 34:1	11:4	geologic
48:3	finishing	focus 9:10	framework	48:24
48:23	15:9	focused	7:22 8:4	geological
felt 19:11	17:8	21:18	French	28:9
fence	20:10	folks	16:18	29:19
37:24	40:19	34:11	24:8	50:9
field 17:3	42:16	51:7	fresh 28:7	geometry
17:11	first 7:21	follow-	front 4:17	10:8
18:2	18:18	up 35:25	11:15	14:16
31:3	30:8	39:1	full 3:24	Gerry
41:23	30:25	foot 41:21	full-blown	38:11
47:15	42:6	footage	38:9	43:6
fields	47:7			gets 9:19
16:8	47:8			
16:9				
17:11				

20:4	26:17	19:20		48:21
32:20	26:17	19:20	H	happens
39:20	greater	21:8	half-	43:20
getting	32:18	22:16	life	hard
9:24	green 8:17	22:20	23:1	15:3
9:25	14:16	22:23	44:18	21:11
14:21	Greg	23:18	48:17	hardly
15:2	5:17	26:24	50:8	42:3
15:8	5:18	groups	half-lives	haul 27:22
16:2	11:15	19:18	40:10	HAV
30:20	ground	19:19	hand 8:9	26:13
40:6	5:21	24:8	17:24	27:10
42:7	15:8	47:8	26:16	haven't
45:10	16:11	grout 24:5	41:15	7:17
45:10	16:20	grouting	handouts	having
given 28:3	17:14	39:2	4:12	16:12
gives 4:12	18:6	GSSC 42:15	Hanford	26:2
15:14	19:14	guarantee	6:8 6:24	heads
16:6	19:17	48:21	7:21	25:11
glassifyin	20:19	guaranteed	7:24	health
g 18:6	21:3	35:2	8:14	11:1
18:9	23:8	guess 50:2	8:17	11:19
goal 7:5	27:14	guessing	8:22	11:20
goals 7:24	31:7	34:11	20:7	12:9
government	35:4	guidelines	25:12	18:25
10:22	38:16	7:20	25:16	19:13
51:8	40:7	guy	26:16	19:13
graph 10:4	42:16	40:22	26:20	28:10
graphic	groundwater	40:25	27:14	33:7
10:4	r 9:13	guys 31:19	27:24	35:20
grateful	9:14	40:19	28:2	35:20
28:21	9:17	42:20	28:23	37:20
29:9	9:19	43:6	44:17	39:11
gravel	9:22	45:12	45:25	48:22
16:12	9:25	45:17	46:25	hear 34:10
16:17	27:12	45:20	49:24	34:12
great	29:8		Hanford's	34:13
	46:25		11:3	36:12
	group		happen	

37:3	12:20	40:3	8:15	50:3
hearing	hold	hung 17:13	9:25	image 27:2
3:1 5:10	18:9	_____	11:10	immediate
26:4	28:20	I	15:12	39:25
26:5	50:25	I'd 5:11	20:7	immobile
Heart	holes	8:9 25:6	23:16	31:11
38:11	16:19	51:4	25:9	impact
Hello 25:5	homework	idea 9:2	29:24	25:18
help 32:18	31:20	16:6	30:7	33:8
50:23	Hood 5:1	30:10	32:3	50:25
helping	hopefully	47:21	32:24	implementa
25:20	3:13	47:24	33:10	bility
helps 29:5	7:12	ideally	33:16	18:21
here's	15:4	39:14	33:17	important
14:1	hoping	identified	33:22	7:10
40:3	49:17	13:13	34:10	7:16
42:14	house 3:16	25:22	34:11	19:18
High 19:25	huge 50:8	I'll 5:5	38:21	20:17
higher	human 11:1	5:6 5:17	40:22	25:1
43:24	11:19	7:4 10:1	40:24	25:14
highest	11:20	11:9	41:10	45:25
21:20	12:9	12:14	41:13	improbable
highly 8:6	18:24	25:4	41:15	43:13
21:5	19:13	25:23	41:16	improvement
43:13	28:10	30:1	41:17	t 41:25
high-	33:6	30:25	42:14	improving
salt	35:20	33:13	42:15	35:20
19:19	35:20	35:15	42:17	inaudible
21:8	37:20	42:5	43:18	34:1
30:13	39:11	46:12	44:14	increase
47:12	40:1	I'm 3:16	44:19	41:22
hiring	48:22	4:14	46:21	increased
42:15	hundred	5:18	46:22	28:13
historic	29:14	5:18	46:22	increases
12:19	37:8	5:22	47:4	36:17
history	38:20	5:25 6:4	49:17	incredibly
	hundred-	6:4 6:22	49:23	
	year	6:23	50:2	
		7:16		

30:11	7:11	on 5:12	22:2	38:23
incringing	13:8	intuitive	22:2	38:23
44:10	13:9	8:25	22:3	39:12
individual	51:5	20:6	22:4	39:12
s 26:25	inside	investigat	22:5	39:23
influence	23:14	ion	22:10	39:24
25:19	inspection	12:25	23:3	40:4
informatio	s 12:17	13:1	23:20	40:5
n 13:4	instance	involvemen	23:23	40:14
19:7	37:5	t	23:24	40:15
19:9	instead	25:14	24:12	40:15
19:12	10:19	50:22	24:25	40:16
49:4	institutio	isn't 31:2	26:3	40:17
initially	nal	50:2	26:23	40:18
37:13	17:22	issue	29:3	40:20
injection	23:10	50:13	30:5	41:4
24:9	37:22	issues	31:12	42:3
inner 8:21	38:6	27:5	31:17	42:11
8:24 9:1	44:21	it's	31:17	42:19
9:6 9:14	interest	3:20	31:21	42:25
9:25	49:16	6:13	31:25	42:25
10:3	interested	6:14	32:5	42:25
10:8	4:17	6:15	32:5	43:3
10:12	25:24	6:17 7:2	32:19	43:4
10:21	26:3	7:12	32:23	43:11
11:4	26:5	7:21	32:24	43:13
11:11	29:7	9:10	33:5	44:3
14:4	interests	11:4	33:12	44:5
14:6	26:24	14:10	33:16	44:7
14:11	interim	14:20	33:24	45:7
16:1	10:5	14:22	34:6	45:12
23:8	11:4	15:21	34:25	46:9
23:14	introduce	17:13	35:9	47:7
37:10	5:17	18:10	36:6	48:9
37:13	25:7	18:23	36:9	48:23
37:17	25:8	19:4	36:15	49:15
40:14	introducti	21:5	37:23	50:22
input 6:20		21:6	38:16	I've
6:22 7:9		22:1	38:17	17:2
			38:22	21:12
			38:22	27:9

28:24	37:11	lastly 7:9	7:3	41:13
29:10	38:19	24:7	8:4	41:17
30:5	38:25	later 5:14	43:12	41:19
36:8	39:8	11:10	levels	46:12
36:8	49:6	20:17	27:18	load 50:6
44:17	49:12	26:12	leverage	local 3:19
49:23	49:15	law 39:17	12:7	located
51:7	knee	layers	lifetime	15:9
	32:1	22:11	45:5	17:9
<hr/> J <hr/>	32:25	layout	45:5	25:12
J.D 5:6	36:13	15:14	lifting	location
Jaraysi	36:14	lead	30:17	28:16
5:25	43:2	5:23	line 44:8	long
5:25	43:15	22:4	linear	7:17
job 4:21	known 9:16	least 23:7	36:4	10:23
John 26:10	16:25	leave	36:15	10:24
26:11		4:9 11:9	36:16	10:25
Joy 7:8	<hr/> L <hr/>	51:6	lines	11:22
24:13	LA 11:20	leaves	10:11	17:1
46:2	laboratory	42:13	link 8:10	17:2
Joy's 5:8	49:12	leaving	liquid	17:4
July 3:2	laid 16:16	38:10	23:19	21:11
5:4	16:17	Leckband	39:2	23:9
	Laija 25:5	26:14	39:4	27:22
<hr/> K <hr/>	25:6	30:11	list	27:22
kick 5:5	25:11	49:22	47:5	37:17
kids 42:23	50:20	51:12	49:3	40:9
kilograms	largest	Leckbank	listed	40:12
37:6	37:5	26:13	46:9	48:17
38:10	LARSEN	let's 3:11	listen	longer
47:16	44:14	10:20	5:10	3:21
47:17	last	18:15	listened	long-lived
kinds	3:21 4:9	26:12	24:24	29:17
22:12	24:12	46:19	little	long-
KLINGER	45:12	46:20	3:21	term
36:23	46:5	47:5	20:4	11:8
37:1	49:19	level	33:20	12:4
37:7	50:11			13:23

18:20	20:23	23:4	43:20	member
lot 15:6	23:2	23:10	45:5	20:12
15:6	26:1	24:1	48:3	26:16
19:6	maintainin	24:21	MCCAIN	34:14
22:6	g 17:21	24:22	46:8	35:1
23:4	major	31:6	46:14	members
23:4	41:21	31:9	McKinney	50:20
31:19	manage	31:11	6:2 6:2	mentioned
41:19	5:25	31:14	mean	25:15
44:4	managed	31:16	24:4	message
47:2	13:9	32:10	32:13	27:24
47:10	management	36:7	37:19	meters
47:11	11:8	36:11	38:8	17:13
47:14	31:14	36:12	40:9	method
loud 49:23	manager	36:17	means 9:24	48:10
low 17:5	5:19	37:6	21:2	mic 5:6
17:7	5:21	38:9	23:23	30:4
19:25	7:16	38:10	23:25	microphone
lower	25:10	38:17	measures	4:6
34:20	32:25	39:5	12:2	41:15
low-	mass 30:16	39:15	40:18	46:19
level	30:21	40:6	40:20	49:23
10:16	37:2	43:4	meat 14:1	mile 8:17
low-salt	37:4	43:12	mechanism	miles 8:22
19:20	40:6	45:21	20:18	11:6
22:15	master	47:11	meeting	27:17
22:20	49:3	materials	3:7 3:10	37:17
<hr/>	material	22:12	3:11	military
M	10:25	matrix	3:17 4:3	38:14
ma'am	13:4	19:3	4:5 4:19	million
44:13	18:9	33:15	5:5	35:16
46:4	21:5	matter	29:23	35:17
mac 9:1	21:7	24:25	51:13	35:18
macroscopi	21:22	may 26:7	meetings	millions
c 8:16	21:23	45:23	4:25	42:18
main 25:20	22:19	maybe	28:20	mine 37:9
maintain	22:19	11:16	50:24	
11:1	23:3	16:12	51:1	
		32:18		
		33:17		

45:4	8:22 9:4	nine 11:14	46:6	38:9
mining	Moses 5:25	Ninety	46:19	operations
37:9	mostly	35:14	46:20	20:7
38:8	17:6	nitrates	officially	opportunit
38:9	motivating	28:12	16:19	ies 4:24
40:23	18:3	non-	Oh 33:17	opportunit
48:10	mouth	aqueous	37:12	y 3:22
minute 7:4	42:13	20:1	Okay 6:6	4:1 4:18
51:1	move 29:23	none 36:1	29:22	6:13
minutes	44:2	normally	35:15	optimizati
3:20	46:6	10:10	35:23	on 33:1
mission	49:1	note 8:8	36:21	optimized
25:20	moving	notes	36:22	33:12
mitigate	31:17	13:17	37:7	33:12
31:5	48:10	nothing	46:14	option
mobile	myself	32:16	49:20	29:19
31:22	44:15	34:8	50:11	33:19
31:23	46:23	notice	old 20:9	33:21
50:2	49:24	27:25	ones 15:13	33:21
mobility	<hr/> N <hr/>	noticed	open	33:24
21:12	National	40:7	3:16	34:18
21:14	8:17	nuclear	16:25	34:21
44:6	8:22 9:4	10:17	29:25	35:6
47:2	natural	<hr/> O <hr/>	30:2	35:6
modeling	10:10	objective	46:18	35:17
31:13	49:6	18:12	opening	35:18
31:15	necessaril	observatio	37:9	options
31:15	y 14:8	nal 48:5	operable	33:19
44:3	24:22	offend	16:24	order
money	42:4	38:22	19:14	27:11
39:13	necessary	office	operate	28:13
42:16	18:14	25:12	21:18	Oregon
44:24	40:20	offices	operating	30:7
monitoring	nice	29:11	13:25	31:19
38:1	4:21	official	14:4	43:7
Monument	34:11		19:9	46:22
8:17			operation	46:22
				46:23

organized 19:17	27:7 27:21	perception 42:3	16:18	40:19
others 21:10	party 25:1	42:11	placard 12:12	plants 12:23
outer 8:21 9:5 9:13 9:20 9:23 23:13 40:15	past 39:18 path 13:12 18:22	period 4:6 5:3 5:3 5:14	15:23 31:10 34:5	15:15 15:16
outreach 6:11	paths 12:22	24:14 29:24	placards 6:8 15:4	Plateau 3:9 7:16
overall 8:4	pathway 16:17	permanence 50:6	places 48:6 48:8 48:9	8:3 8:20 8:23 9:9 23:13 23:14 28:25
overview 3:18 4:13 6:24 7:23	paying 29:11	person 37:8 38:20	placing 18:7	42:8 42:14 43:19
<hr/> P <hr/>	penetrate 18:2	perspectiv e 3:19 7:14 8:12 38:8	plan 3:8 3:18 4:13 4:15 6:20 13:9 28:5 30:8 30:9 30:12 36:9 40:13	play 23:24 please 8:13 9:8 10:2 11:15 13:23 15:1 16:5 16:23 20:20 21:7 22:14 26:17 33:14
p.m 3:3 51:13	penetratio n 20:3	PFP 12:22 20:9 45:8	28:5 30:8 30:9 30:12 36:9 40:13	15:1 16:5 16:23 20:20 21:7 22:14 26:17 33:14
Pam 46:2	people 7:1 11:17 23:11 36:8 37:25 40:16 44:16 45:13	phase 4:2	30:9 30:12 36:9 40:13	15:1 16:5 16:23 20:20 21:7 22:14 26:17 33:14
paradigm 42:9 43:3 43:16	percent 30:15 32:12 32:22 32:24 33:5 36:14 41:24 42:3 48:1 48:4	physical 15:14 22:2	planned 27:19	16:5 16:23 20:20 21:7 22:14 26:17 33:14
parallel 28:18	picture 6:13 7:5 8:16 9:7	pick 27:3	planning 24:5	16:23 20:20 21:7 22:14 26:17 33:14
participat ion 26:17	pieces 28:4	pile 16:8	plant 12:22 15:9 15:9 17:8 17:8 20:9 20:9 20:10	16:23 20:20 21:7 22:14 26:17 33:14
particular 28:4	percentage s 37:1	pipe 16:10 16:18	planned 27:19	16:23 20:20 21:7 22:14 26:17 33:14
particular ly 25:24		pipes	planning 24:5	16:23 20:20 21:7 22:14 26:17 33:14

17:8	47:16	31:7	25:25	20:15
20:1	47:17	posters	26:6	priority
20:1	48:8	3:14	35:16	45:8
20:8	48:12	potatoes	premise	probably
20:10	48:15	14:2	40:9	12:7
20:11	48:17	potential	presence	32:13
20:12	50:2	27:16	10:22	40:10
20:18	50:7	potentiall	37:23	44:11
21:12	plutonium-	y 26:3	present	problem
21:14	239	practicabl	13:6	42:4
22:24	17:18	e 29:2	presentati	42:4
24:1	20:15	precedent	ons 5:15	47:5
27:18	PNNL 21:11	12:19	presented	47:14
27:19	21:13	40:13	41:18	problems
28:5	point 23:6	predicated	49:25	48:6
30:16	30:17	50:1	pretty	48:20
31:7	34:4	predicted	4:21	process
31:22	41:10	30:14	36:16	7:2
31:23	45:8	predominan	42:2	11:24
32:21	points	t 36:6	44:19	12:11
37:2	29:5	36:7	49:23	12:12
37:4	Pollet's	predominan	prevent	12:15
37:9	38:11	21:9	9:24	12:21
37:9	portions	tly 21:9	23:11	13:14
38:14	22:16	predominat	37:8	13:22
40:19	Portland	ely	previous	15:18
40:24	5:2	15:25	14:1	18:17
42:12	position	20:8	14:17	19:4
42:16	45:23	prefer	20:22	23:20
43:10	positively	8:11	Price	27:7
44:2	28:9	preferred	26:10	30:24
44:6	possible	6:21 7:7	primarily	33:12
44:21	10:12	12:14	17:9	42:7
45:1	11:5	13:12	primary	49:6
45:4	14:20	13:13	9:3	49:8
45:14	14:22	22:15	17:17	49:9
47:2	28:6	25:21	20:6	processed
47:11	29:3	25:25		16:7
47:13				processes
47:14				

16:22	27:11	38:3	16:1	and-
product	38:7	proximity	20:10	answer
47:20	41:9	15:16	purpose	29:24
program	protected	public 3:1	6:19	questions
6:1	27:13	3:6	putting	3:15
25:10	36:20	4:2 4:10	18:8	3:22
programs	45:22	4:18	27:21	3:23
6:3	protecting	4:25 5:3	34:3	26:7
progress	33:9	5:10	49:8	26:12
6:9 6:16	36:19	6:12 8:2	PW-1	35:23
project	protection	11:1	5:11	36:21
5:19	25:6	13:6	14:25	44:10
5:20	26:22	13:14	15:13	44:12
5:22	27:11	24:14	20:9	46:6
25:9	35:20	25:14	21:9	46:17
25:12	42:10	25:24	21:14	46:17
30:6	43:3	26:25	PW-3 14:25	49:18
32:25	43:4	28:20	20:10	51:6
36:16	protective	37:20	20:20	quick 5:12
47:5	11:19	42:1	47:9	18:17
48:20	25:23	42:3	PW-6 15:13	46:8
proliferat	27:22	44:11	47:9	49:1
ion 38:7	28:10	46:6		quickly
40:21	39:17	46:15	<u>Q</u>	5:16
43:5	provide	49:19	quantity	19:17
43:8	7:9	50:21	46:10	21:6
43:14	24:15	50:22	question	quite 7:18
propose	24:17	51:1	5:14	<u>R</u>
47:22	26:25	pulled	29:25	R2d 22:17
proposed	47:4	43:14	30:2	radioactiv
3:8 4:15	provided	pulling	30:8	e 10:16
13:9	28:23	21:4	30:19	radionucli
28:5	29:8	pump 9:15	35:25	de 29:17
30:8	provides	pumping	39:1	radium
protect	7:23	21:3	40:4	49:10
9:3	26:21	pure 24:22	41:12	radium-226
11:21	providing	Purex	46:3	17:18
19:12	27:6	12:22	47:3	
			question-	

radium-26	45:14	10:18	26:20	remediated
49:2	really	record 4:7	reiterate	23:21
49:5	3:25 4:8	13:20	47:24	27:13
radium-56 46:9	6:17	25:3	relating	35:4
radon 49:9	6:19	46:16	34:20	37:21
raise	9:12	50:17	relationsh	remediating
17:24	17:1	recorded	ip 36:15	g 32:8
26:16	17:1	4:7	36:16	remediation
raising	21:10	46:18	relationsh	n 6:22
50:13	21:16	recover	ips 7:25	10:5
ran 48:7	30:10	21:5	relative	10:6
range	34:1	21:23	32:13	10:14
24:10	34:18	recreate	relatively	11:24
ratio 32:2	36:1	40:16	31:17	12:3
reach 8:17	36:19	red	release	14:1
8:22	42:22	14:23	17:3	14:18
9:22	47:10	14:24	remain	18:23
9:23	48:16	reduce	11:9	23:5
reaches	50:1	18:23	remaining	24:11
27:14	51:1	reduction	11:8	28:18
reaching	reason	31:9	remedial	38:2
9:16	33:4	32:9	7:7	42:8
9:17	47:13	33:6	12:25	remind
reach-	reasonable	50:5	13:1	30:1
out 7:10	44:20	reevaluati	13:21	46:16
reactor	receive	ng 12:2	17:19	50:12
10:17	13:8	refer 7:18	28:11	reminder
readily	received	refined	29:1	23:8
15:8	17:7	47:19	37:18	removal
real 18:17	recently	refraction	remediate	29:17
47:12	21:13	20:11	8:1 8:18	34:20
48:22	recognize	regarded	9:4 9:15	39:14
49:1	26:10	8:6	9:19	39:14
realized	recommend	region	12:9	remove
	29:6	49:16	28:17	17:22
	recommenda	regional	41:3	18:12
	tions		43:21	18:13
	10:7			21:1
				21:24

22:7	24:8	32:3	roughly	11:6
22:16	residual	33:6	32:17	44:13
23:19	11:19	36:10	35:18	scares
33:21	resources	36:18	run 48:6	46:1
34:17	39:25	37:19	48:11	scenario
34:20	40:1	39:6	48:12	38:23
34:22	41:8	39:6	running	45:16
34:23	responded	39:11	6:8	schedules
39:2	50:17	42:4	16:11	5:10
39:3	response	43:8	_____	scientist
39:8	50:17	43:14	S	50:3
48:13	rest 41:5	43:24	safe 40:11	seat 3:6
removed	retreat	50:5	42:23	seats
35:3	29:1	risk-based	44:7	26:23
35:6	29:2	11:13	48:24	Seattle
39:4	retrieval	risks 16:4	safeguard	5:1
39:6	27:19	river	48:22	second 8:2
reporter	reversal	5:1 8:18	48:22	15:14
4:3	24:9	8:23 9:3	safer	25:7
repository	review	9:5 9:21	29:19	25:13
28:9	13:22	9:25	safety	36:24
29:19	reviewed	23:13	11:1	section
50:9	50:16	27:11	11:2	4:9 4:9
represent	reviews	27:12	18:25	security
44:16	12:1	27:12	37:20	37:24
representa	revisit	27:15	38:23	38:3
tives	44:6	40:14	39:12	40:18
3:17	Richland	46:24	40:5	sediment
representi	25:12	46:24	40:21	22:11
ng 26:24	risk	rivers	50:5	seeing
require	13:3	10:10	salt 19:25	44:2
23:5	17:17	rock 17:12	19:25	seen 29:10
24:11	20:7	rod 43:21	samples	44:17
required	20:15	Rohay	12:24	segregate
17:20	24:10	6:4 6:4	sampling	10:21
18:15	24:22	room 3:24	28:13	selecting
21:21	31:6	roomful	save 10:1	
21:24		30:1	saw 4:19	
23:22				

19:1	3:5 26:8	22:16	37:5	size 38:13
selection	29:21	22:19	37:25	sledge
19:4	34:10	22:24	45:25	39:2
send 36:8	35:23	33:8	50:6	slide
separately	36:21	36:9	sites	7:5 11:2
20:2	37:3	41:25	3:9	12:10
September	41:11	similar	12:21	14:7
25:3	41:15	22:10	14:2	14:9
septic	44:9	23:5	15:12	15:1
16:10	46:5	simply	16:1	15:23
serve 51:9	46:15	18:1	16:7	15:24
session	49:17	29:13	19:15	16:5
3:19	50:11	Sinton	19:15	20:20
settled	51:3	5:18	19:16	20:22
33:3	51:11	5:18	19:21	21:7
settlement	short	sir	22:5	23:15
23:18	35:25	35:24	23:5	23:16
settling	short-term	46:7	23:7	23:16
19:20	18:20	48:19	25:25	24:12
19:23	shoulder	49:2	27:8	24:12
19:23	49:15	site	27:16	30:25
several	showed 6:9	6:10	28:6	30:25
4:11	6:9	7:21	28:12	33:13
50:15	showing	7:24	28:19	33:15
shallow	37:1	10:16	29:16	36:23
16:25	shows 14:2	10:19	29:18	39:1
17:10	15:24	12:17	32:8	49:11
17:10	16:21	17:4	33:25	49:25
shape	36:1	20:7	37:19	slides 6:9
10:19	49:15	22:5	47:9	7:4
sheet 4:12	shrink	24:7	47:13	26:14
4:15	11:18	24:16	sitting	26:15
4:20	shrinking	24:16	4:3	30:23
sheeting	9:4	25:16	30:16	sludge
22:12	sign 12:16	27:14	situ	23:19
SHOEMAKE	13:20	28:8	18:5	39:3
	significan	29:14	20:25	small
	t	34:3	six	10:12
		34:18	12:12	11:5
		37:5	17:13	14:19

39:11	45:4	46:23	start	stop 11:25
smallest	someone	49:23	3:6 5:17	28:18
14:22	4:17	specific	6:23	story 6:8
Smith	10:8	9:18	6:23	straight
35:25	somewhere	15:20	11:24	16:14
41:13	30:15	16:3	30:3	strategic
41:17	48:24	28:4	30:25	29:16
48:3	Sonya 4:14	specifically	37:13	45:24
soften	sophistica	ly 21:15	started	strategies
6:15	ted 18:6	31:2	12:25	10:6
soil	sorry	spend 7:4	13:5	10:14
5:21	5:4 20:7	square	13:6	strategy
9:16	33:16	8:16	13:8	7:20 8:3
9:17	33:16	8:21	starts	8:7
17:21	33:17	11:5	13:24	9:7 9:11
18:13	34:11	37:17	State 5:2	10:5
20:4	34:12	stable	statement	13:23
20:24	41:16	31:11	49:2	14:1
21:1	sort 41:18	31:12	statistica	42:9
21:2	48:10	stage	l 32:14	strikes
21:18	soup 14:12	7:2	stay 20:5	41:19
21:19	14:13	24:12	staying	structure
21:21	source	25:4	31:11	18:14
22:8	16:1	stairs	31:16	21:23
23:2	22:13	22:3	steal	21:25
26:1	49:10	stand 29:3	45:15	22:2
28:7	49:14	29:14	45:18	22:6
35:4	sources	standards	stealing	33:21
38:16	27:15	9:20	45:13	33:23
solicitati	space	9:21	steam	34:6
on 13:15	33:25	9:22	15:17	34:16
solid	34:5	9:24	17:7	34:22
19:12	34:6	standpoint	step 8:4	34:23
solution	34:7	12:11	steps	34:25
22:22	34:16	31:6	12:12	35:3
23:1	speaking	35:18	stick 51:6	35:9
somebody	44:15	40:5		35:12
38:5	46:22	42:23		35:14
				structures

21:25	11:10	50:22	15:5	team 5:12
41:22	19:1	tables	18:18	tech
struggle	33:17	46:11	19:11	17:7
41:4	33:22	tacked	31:4	49:3
struggled	36:25	29:10	32:3	technetium
49:24	43:10	taking 5:9	32:12	28:12
50:1	44:7	14:14	38:8	technical
studied	surface	22:20	38:10	6:5 27:5
21:10	17:25	33:5	43:13	51:7
studies	17:25	38:2	47:21	technologi
21:11	18:4	41:5	48:2	es
21:13	18:14	41:21	talks	12:5
stuff	20:25	47:24	30:24	12:7
19:16	48:23	talk 3:7	tank 14:16	technology
44:19	surgical	5:15	16:11	17:5
48:11	29:17	10:1	16:13	43:25
48:12	surgically	11:10	16:13	ten 11:5
submit	28:8	11:17	19:23	37:17
25:18	survey	12:13	19:23	40:10
subset 8:5	50:21	12:14	22:1	45:12
successful	50:23	16:3	22:1	tenant
18:22	Susan	20:17	31:14	29:3
suggest	26:13	24:23	39:2	tens 42:17
28:1	29:22	47:6	39:3	42:18
48:14	30:11	talked	39:3	term 11:22
suggesting	48:15	13:22	39:6	15:2
28:17	49:21	15:19	39:9	23:9
support	system	17:6	tanks 16:9	37:17
5:13 6:5	16:10	19:15	16:10	38:23
45:9	21:19	20:19	19:21	40:9
49:3	21:19	23:25	23:18	40:12
supposed	37:24	33:14	23:20	48:17
19:5	systems	35:7	24:6	terms
43:11	15:7	37:13	target	14:20
sure	15:7	47:8	10:9	45:20
6:15	<hr/>	talking	targeting	46:25
7:10	T	13:25	9:18	48:12
	table 4:11	14:3	taste	tetrachlor
	4:17	14:23	42:13	

ide	24:4	24:10	19:17	4:22 5:9
20:16	24:22	there's	28:19	5:13 6:6
20:17	26:2	4:11	30:12	6:19
tetrochlor	26:7	4:12	42:24	7:10
ide 21:3	27:4	4:13	third	13:13
thank	29:15	4:20 5:1	41:21	13:16
5:9	29:19	5:2 6:16	thorough	19:9
20:14	30:16	7:3 8:21	12:17	25:22
20:15	31:22	10:4	thoughts	26:17
25:3	33:1	12:4	50:19	28:7
25:13	33:3	19:5	thousand	50:13
26:15	33:9	19:7	6:13	50:21
26:18	35:22	19:19	thousands	top 18:1
29:19	36:11	19:20	29:14	22:3
29:21	36:18	19:20	42:17	22:9
48:25	37:1	19:21	threats	22:22
49:1	38:13	19:21	44:25	30:18
50:10	39:19	22:6	three-	34:16
51:5	40:9	22:23	quarters	Tortosa
51:12	40:11	24:8	42:1	5:22
thanks	40:13	24:16	throughout	5:22
26:8	40:25	30:23	11:23	33:24
51:9	41:1	34:8	Thursday	34:8
51:11	41:9	34:16	4:25	34:13
that's	41:24	34:24	tile	34:15
3:21	42:2	36:5	17:3	34:23
3:25	42:3	37:23	31:3	35:5
4:16 5:4	43:14	37:24	41:23	35:8
6:10 7:5	44:3	39:10	today 10:7	35:10
7:9	44:7	47:10	12:8	35:13
9:7 11:6	45:9	47:11	12:16	total 8:23
11:21	46:3	47:16	39:22	35:13
13:12	47:2	47:17	41:9	37:2
13:15	48:11	47:20	44:2	37:4
13:19	48:21	50:6	tonight	tough
14:13	49:6	they're	3:7 3:11	42:25
14:24	50:3	7:19	4:18	42:25
15:25	50:9	7:20	toxicity	43:1
16:12	theme 9:7	15:3		
16:20	therefore	15:3		
		15:16		18:24

31:9	troubles	typically	19:14	varying
32:9	44:16	35:1	University	27:18
trade-	44:18	<hr/>	5:2	verbal
off	try 9:18	<hr/> U <hr/>	unless	24:15
39:13	9:22	unanswered	19:11	verbatim
transcribi	12:8	51:6	unplanned	4:7
ng 4:4	14:19	underneath	17:3	versus
transpirat	21:4	16:12	updates	32:9
ion	trying 8:1	17:15	43:23	view
22:21	8:12 9:1	21:22	uranium	16:6
treat 9:15	9:6 9:15	34:9	20:11	41:25
17:22	9:20	35:4	20:12	viewing
18:12	10:9	understand	ut 47:20	22:4
18:14	10:11	6:16	utility	Virginia
21:1	10:20	7:11	40:25	6:4
29:2	31:5	42:8	Uzis 40:20	visit 28:2
29:2	32:19	43:7	<hr/>	vitricat
treating	38:22	43:17	<hr/> V <hr/>	ion 18:5
31:5	39:22	50:23	value	21:1
trench	41:3	understand	35:21	vitricied
30:16	41:10	able	36:17	18:8
47:17	42:8	17:24	36:19	voice 30:6
47:25	Tuesday	understand	valued	34:11
48:7	3:2 5:1	ing	7:12	46:20
48:10	tune 13:18	7:3 8:7	values	49:23
trenches	turn	understand	27:10	void 33:25
15:6	4:22 5:6	s 27:20	29:8	34:2
16:9	26:12	uniforms	vapor 21:1	34:5
17:10	turning	40:19	21:2	34:6
27:17	42:7	unique	21:6	34:7
30:13	two-fold	26:2	21:19	34:16
tri 25:1	20:22	unit	variance	volatile
tried 43:7	33:20	14:5	35:16	21:5
tri-	two-foot	16:24	various	<hr/>
party	31:4	units	15:11	<hr/> W <hr/>
13:19	type 31:1	7:6	22:11	wake 23:17
28:23	types 15:7	13:25		walls
	23:5	19:9		

29:11	27:19	5:14	15:5	33:5
Washington	watching	5:14 7:6	15:9	33:7
26:22	23:9	12:6	16:2	35:16
wasn't	27:21	13:16	18:18	35:17
48:9	water 5:21	13:17	18:19	35:19
waste	9:22	13:17	19:1	37:14
3:9	9:23	13:18	21:20	38:2
10:16	16:20	15:13	21:21	38:9
11:18	17:7	16:3	21:24	39:16
15:8	18:2	20:17	22:6	39:25
15:17	20:8	22:7	22:16	41:3
16:7	22:11	23:12	22:18	41:4
19:17	22:13	23:21	22:20	41:5
19:19	23:11	43:24	22:21	41:9
19:19	27:14	51:6	23:9	43:13
19:20	31:24	we're	23:9	43:22
20:8	48:7	3:6	23:10	44:1
21:8	ways 40:24	3:7 3:17	23:17	44:1
22:16	50:15	4:5 5:16	23:18	44:6
22:20	weapons	6:10	23:20	45:1
22:23	38:14	6:12	24:2	45:2
23:7	43:9	8:11	24:5	47:21
23:18	web	8:18	24:5	48:1
24:7	24:16	8:19 9:1	24:20	48:16
27:8	24:16	9:4 9:20	24:21	49:7
27:16	website	10:13	25:19	49:18
28:6	4:23	10:24	26:4	51:9
28:12	8:10	10:24	27:9	west
28:19	28:2	10:25	27:17	14:4
29:13	38:12	11:13	27:20	14:5
29:16	Wednesday	11:18	28:6	15:1
29:18	5:2	11:21	28:17	15:2
31:14	welcome	12:4	28:21	we've 12:6
33:14	3:16 5:8	12:6	29:9	13:13
33:25	welcoming	12:16	29:15	14:13
34:1	3:16	13:12	29:23	21:10
34:18	we'll 3:19	13:14	31:4	26:17
47:13	3:19	13:15	31:5	28:3
50:6	3:19	14:3	32:13	31:16
wastes	3:19	14:6	33:3	44:4
		14:23	33:3	44:4

44:9	40:24	18:22		
49:10	42:19	yourself		
whatever	44:25	25:8		
40:8	worried	you've		
whereas	40:22	3:24		
19:24	40:24	32:22		
Whereupon	45:1	42:1		
51:13	45:13	44:23		
whether	worry	46:20		
13:4	46:23			
13:17	47:1	<hr/>		
39:13	47:11	Z		
whole	47:12	Z-1 47:15		
40:13	worst	Z-10 24:9		
45:16	30:13	Z-1A 31:3		
wildlife	worth	Z-8 24:9		
40:17	39:11	Z-9		
window	42:3	21:10		
22:4	44:12	21:15		
work	write 4:22	21:15		
6:17	50:14	24:19		
6:22	wrong 3:10	31:10		
6:25	WTP	34:9		
12:18	23:24	34:15		
25:6	24:2	37:5		
42:12	www.	37:6		
47:1	hanford.	41:6		
worker	gov 28:2	44:4		
36:18		47:17		
40:22	<hr/>	48:2		
42:15	Y	48:7		
workers	yellow	zero 26:14		
36:10	8:19			
working	you-all			
23:11	8:6 32:4			
37:25	you'll			
world	3:10			
	7:12			
	14:15			

CORRECTION SHEET

Deposition of: Public Meeting Date: 07/19/11

Regarding: Proposed Cleanup Actions of Hanford

Waste Sites

Court Reporter: Kathleen McKee

Please make all corrections, changes or clarifications to the testimony on this sheet, showing page and line number. If there are no changes, write "none" across the page. Sign this sheet on the line provided.

Page	Line	Reason for Change
5	20	misspelled name; Briant Char boneal
6	1	incorrect acronym; CH
6	2	misspelled name; Mckenney
9	1	wrong word; map
13	19	needs capitalization; Tri-Party Agreement
25	1	" " ; Tri-Party
25	4,5	misspelled name; Emy
26	8	" " ; Emy
26	13	" " ; Leckband
26	13	wrong acronym; HAB
27	10	" " ; HAB
28	23	needs capitalization; Tri-Party
		Signature <u>Lynn Jegeler</u>
		Representative

42 14 needs capitalization; Plutonium Finishing Plant

42 24 wrong word; aquifer

47 20 wrong word; but

50 19 misspelled name; Emy

