

Transcript of the Proceedings of:

**PUBLIC MEETING**

IN RE: DIABLO CANYON DECOMMISSIONING ENGAGEMENT PANEL

September 18, 2024



DIABLO CANYON DECOMMISSIONING ENGAGEMENT PANEL

PUBLIC MEETING

SEPTEMBER 18, 2024

MR. ANDERS: All right, welcome everyone. I want to welcome everyone to the 29th meeting of the Diablo Canyon Decommissioning Engagement Panel since its establishment in 2018. I want to -- this is an in-person and also webinar format, and I want to let everyone know that the agenda, the presentations after the meeting, and a lot of resource documents, including links to a number of previous meetings on spent fuel management are on the Diablo Canyon website, and that is Diablo Canyon Panel dot org, and you can go there and you can see the agenda and all the resource materials.

I'd like to turn it over to Linda Seeley, a panel member, to welcome everyone. Linda.

MS. SEELEY: Thank you, Chuck.

Welcome to all of you people who came down here to Grover Beach tonight and to all -- everyone who's watching online this evening. We are going to have a very interesting meeting tonight, because everybody's big concern in this community is about spent nuclear fuel. We have a lot of it at Diablo Canyon,

1 it's going to stay there for a while. We don't know  
2 where it's going to go, and so we're going to dig deep  
3 this evening into what the actual possibilities are for  
4 caring for the long-lived radioactive spent fuel. I  
5 would like Dylan George to please review our safety  
6 protocol.

7 MR. GEORGE: Thank you, Linda.

8 Good evening everybody. Thank you all for  
9 joining us tonight. Big thanks to the City of  
10 Grover Beach for hosting us. By way of a safety  
11 message, we have exits on each side, each of these, that  
12 door exits into a parking lot, this door over here exits  
13 into another parking lot, that door right there exits  
14 toward the police station, which may be an advantageous  
15 place to go.

16 We have two officers here, Officer Pulido and  
17 Officer Alsaed from the Grover Beach Police Department.  
18 We thank them for being here. In the need of -- the  
19 event of a medical emergency, Five Cities Fire  
20 Department is two doors down. Several of us from PG&E  
21 are CPR certified. There is also an AED right through  
22 that door that some of us are trained to use. And also  
23 the restrooms are right down the hall through that door  
24 should you need to avail yourselves of them. So thank  
25 you all for being here.

1 MS. SEELEY: Thank you, Dillon.

2 I'm going to defer reviewing our agenda,  
3 because I think everybody here has an agenda in hand,  
4 and in -- to save time, we would like to move this  
5 meeting along.

6 Our first -- let's see. Oh, right. Be sure  
7 to go to Diablo Canyon Panel dot org to -- after this  
8 meeting to find the resources that we've listed, there  
9 are many great resources, and to look at all the work  
10 that we've done. We're very proud of our work.  
11 Patrick Lemieux is going to introduce our first speaker.

12 MR. LEMIEUX: Good evening, everybody.

13 Chuck, presentation please.

14 As we're waiting for my one-slide  
15 presentation, I will very briefly, while it's coming up,  
16 tell you what's -- oh, there we go. Perfect.

17 So tonight's presentation is about spent  
18 nuclear fuel storage which started with the Atomic  
19 Energy Act of 1954, which mandated three different  
20 levels of storage. And I wanted to highlight this  
21 because we'll be using acronyms towards this evening  
22 that will become confusing if you're not intimately  
23 familiar with this world. And so the first level of  
24 spent fuel storage, the one that's currently being used  
25 at Diablo Canyon and at most nuclear plants across the

1 United States is called an Independent Spent Fuel  
2 Storage Installation, an acronym that you'll hear called  
3 ISFSI, and basically what it means is that the fuel is  
4 stored on site, it goes from a cooling pool on site to  
5 the ISFSI also on site. And that was meant to be the  
6 very primary first level of spent fuel storage for  
7 nuclear plants.

8 The second level, once the ISFSI is filled,  
9 presumably, would be to send that spent fuel to a larger  
10 storage area that would be made up of multiple power  
11 plants called Consolidated Independent Interim Storage,  
12 Consolidated Interim Storage, or CIS. This was meant to  
13 be the second level of interim storage for nuclear fuel  
14 where it ultimately was meant to end in a national  
15 repository of all nuclear plant spent fuel. So  
16 tonight's discussion is where we stand with respect to  
17 these three different levels. And with no further ado,  
18 I'm going to introduce our first speaker, Steve Nesbit,  
19 who will tell us the history of these three levels of  
20 storage and a lot more information regarding it, so  
21 please enjoy.

22 MR. NESBIT: Okay, well, thanks, Patrick.

23 My name's Steve Nesbit, and I'm going to spend  
24 the next ten minutes giving you an overview of spent  
25 fuel management in the US, and I'm looking forward to

1 the interaction here. It's a lot of information, so  
2 I'll be running through it pretty quickly.

3 Yeah, that's the slide, please. So actually,  
4 you can go to the next slide now.

5 So this slide is another way of communicating  
6 information that Patrick talked about. On the left  
7 side, you see what happens today in this country, in the  
8 green boxes. You have reactors that use nuclear fuel  
9 assemblies to generate clean electricity, and once most  
10 of the energy in those fuel assemblies are used up,  
11 they're referred to as spent fuel or used fuel, and  
12 they're discharged out of the reactor during a refueling  
13 outage and into an on-site spent fuel pool. And they  
14 stay there for several years at least as they cool down,  
15 and then because most spent fuel pools are getting full  
16 at this point in the country, we transfer them into  
17 on-site dry storage. And what that means is we load a  
18 number of the spent fuel assemblies into a metal  
19 canister or metal cask, we dry it out, we back fill it  
20 with inert gas like helium, and then we put it out in  
21 the reactor out in the yard, inside the protected area  
22 of the reactor, and it stays there.

23 And that's what's going on at virtually all  
24 nuclear power plants around the country. Everything  
25 besides the green boxes is speculative at this point, it

1 hasn't happened. But ultimately, you see on the far  
2 right, the goal is to get spent fuel into a geologic  
3 disposal situation or a repository for permanent  
4 disposal. Possibly the fuel will be collected at one or  
5 a few consolidated storage facilities, or CIS's as  
6 Patrick mentioned, in between there, but that hasn't  
7 happened yet either. And I also put up a box for  
8 reprocessing, only because it often comes up in the  
9 context of spent fuel management, but here in the  
10 United States, we do not reprocess spent fuel from  
11 commercial reactors, and I think it's very unlikely that  
12 much if any of the spent fuels that have been generated  
13 to date will ever be reprocessed. Next slide, please.

14           So a little bit about geologic disposal. The  
15 idea here is that you take the spent fuel assemblies,  
16 you put a robust package around them, and you put them  
17 deep underground in a stable geologic formation, so that  
18 way the radionuclides there which pose a potential  
19 hazard to people will stay there and they won't get out  
20 to the environment for thousands and thousands of years,  
21 because some of these radionuclides stay radioactive for  
22 that kind of a time frame.

23           The concept on the left is a mine repository  
24 where you basically reverse mine, you drill down in  
25 tunnels and then place the material in tunnels down deep

1 below the surface. The second concept on the right is a  
2 borehole concept where you drill a deep borehole, a big  
3 borehole, and you put the fuel assemblies in there one  
4 by one and store them, you know, kilometers under the  
5 surface. Next slide, please.

6 A little perspective on geologic disposal.  
7 First of all, it is the consensus international  
8 approach, not just here in the US, I talked about mine  
9 and boreholes, even if you reprocess or recycle, which  
10 we don't in the United States, you still need geologic  
11 disposing, you still end up with radionuclides that are  
12 very long lived and have to be separated from the  
13 environment. Now, if you don't believe me, go to  
14 France, because in France, they do recycle their spent  
15 fuel, and they're also developing a repository.

16 You still need geologic disposal, if you have  
17 consolidated interim storage, interim storage is good  
18 for a long time, but it's near surface and it is not a  
19 permanent solution for spent fuel management. So for  
20 that reason, geologic disposal, I call it the linchpin  
21 of a viable nuclear fuel cycle back in. Next slide,  
22 please.

23 So here's a little history. In the 1950's, US  
24 was generating a lot of nuclear waste as a result of  
25 weapons production during the cold war, and more and



1 more of this material was building up in 1957, the  
2 National Academy of Sciences did a study on it. They  
3 found that the waste could be disposed of safely in a  
4 variety of ways and at a large number of sites in the  
5 United States. That was their conclusion in 1957, but  
6 it hasn't happened yet. After that point -- so the  
7 Atomic Energy Commission was responsible for all things  
8 nuclear in the country in that time, and they started  
9 doing research on disposal, and that carried on into the  
10 1970's. The focus was on disposing of high level waste  
11 from reprocessing, but we started to accumulate  
12 commercial spent fuel in the 1960's as commercial  
13 nuclear power plants came online, and there was a  
14 growing concern among various agencies and the public  
15 about the fact that nothing was really happening in this  
16 area. Next slide.

17 In the 1970's, in 1970, the Atomic Energy  
18 Commission, or AEC, made a designation of some salt  
19 formations near Lyons, Kansas, as the site for disposal  
20 of solidified high level radioactive waste from  
21 reprocess. However, the geologic investigations were  
22 still ongoing and they showed that maybe the site wasn't  
23 as good as people thought for isolating waste, the  
24 public and governmental relations weren't handled all  
25 that well, and the AEC shelved their plans for a Lyons

1 repository in 1972. In the mid 70's, the federal  
2 government terminated all plans for large scale  
3 commercial reprocessing of spent nuclear fuel in the US,  
4 and the implication of that was that now instead of  
5 disposing of high level radioactive waste from  
6 reprocessing, we changed our focus to dispose of spent  
7 fuel directly. Next slide, please.

8 In 1982, congress passed the Nuclear Waste  
9 Policy Act which is still, as it's been amended, the  
10 governing law in the country for managing nuclear waste.  
11 It established geologic disposal as US policy and said  
12 we're going to do at least two repositories for that  
13 purpose. It assigned the responsibility to the  
14 Department of Energy where it remains, and it started  
15 collecting money from nuclear power plant operators to  
16 pay for it, like PG&E. And there was a big fund and  
17 there's a lot of money there because not much has  
18 happened.

19 Nuclear Waste Policy Act amendments were  
20 passed in 1987 because the progress wasn't going as fast  
21 as some people wanted, so congress said instead of  
22 trying to figure out what the best side is, we're just  
23 going to say that the waste is going to go to  
24 Yucca Mountain, Nevada, as long as it turns out to be a  
25 decent enough site. And so that ended the work on a

1 second repository, and further, in 2002, the secretary  
2 of energy and the president formally selected  
3 Yucca Mountain as the site after further investigations  
4 into geology. There was a veto by the state of Nevada  
5 which was not happy with this development, but that was  
6 overridden by both houses of congress. Next slide,  
7 please.

8 That's a picture of Yucca Mountain, it's about  
9 90 miles from Las Vegas, it's in the Mojave Desert.  
10 It's adjacent to the Nevada test site where the US  
11 exploded about 900 nuclear weapons during the cold war,  
12 and as you can see, it doesn't look like a bad place to  
13 get rid of spent nuclear fuel. Next slide, please.

14 However, that's pretty much a moot point now.  
15 The Department of Energy submitted an application for  
16 Yucca Mountain repository in 2008 to the NRC, and the  
17 NRC began its safety review. However, DOE discontinued  
18 all work in 2010, finding that it was not a workable  
19 solution due to opposition in the state, and our safety  
20 review started back up again a few years later under a  
21 court order and actually came out with a favorable  
22 safety evaluation, but by then, the operation was a  
23 success but the patient had died.

24 Congress hasn't appropriated funds for  
25 Yucca Mountain since 2010, but it hasn't amended the

1 Nuclear Waste Policy Act, which leaves us in the curious  
2 situation that we have a national law on what we're  
3 supposed to do with nuclear waste, but congress won't  
4 allocate the money to carry it out. No administration  
5 has requested funding for Yucca Mountain since 2018, and  
6 we quit doing work on geologic disposal. Other  
7 countries are making great strides, Finland in  
8 particular is already constructing its repository, but  
9 we're basically not doing anything on geologic disposal.  
10 Next slide.

11 I'm going to shift gears for just a second and  
12 talk about consolidating interim storage, this is what  
13 you're probably going to hear more about during this  
14 session of your decommissioning engagement panel.  
15 Consolidated interim storage is, as Patrick described, a  
16 situation in which you transport spent fuel from reactor  
17 sites to one or more large storage facilities. They can  
18 be a big pool, they can be dry storage, but in the US  
19 concepts, typically we talk about dry storage for  
20 consolidated interim storage, because the fuel's mostly  
21 already in dry storage containers.

22 The Nuclear Waste Policy Act amendments in  
23 1987 provided for consolidated storage at government  
24 facility and a method of finding a site for that.  
25 However, the program was discontinued in the early

1 1990's without finding a site, primarily the problem was  
2 state opposition. In the meantime, there's been three  
3 private facilities actually licensed in the  
4 United States by the NRC for consolidated interim  
5 storage, one in Utah in 2006, one in Texas in 2021, and  
6 one in New Mexico in 2023. None of the construction --  
7 the Goshute facility in Utah is pretty much history at  
8 this point, and the others are stalled by state  
9 opposition and legal action. And the moral of the story  
10 is that while you may find a local community that's  
11 willing to host a consolidated interim storage facility,  
12 getting state approval is much more difficult. Next  
13 slide, please.

14           So in summary, a few points to reiterate.  
15 First of all, the US government is responsible by law  
16 for spent nuclear fuel management, and that includes  
17 taking the fuel away from reactor sites and ultimately  
18 disposing of it. Unfortunately, the government has done  
19 nothing productive since 2010 when it canceled the  
20 Yucca Mountain repository project for political reasons.  
21 Utilities continued to store spent nuclear fuel safely  
22 at reactor sites in spent fuel pools and dry storage  
23 systems. And speaking of dry storage in particular, it  
24 is a proven technology that can work indefinite, if  
25 needed, but it's not a permanent solution for the

1 problem.

2 So I'm going to stop there, and I don't think  
3 we're going to take questions now, but I'll stick around  
4 for a while if there are questions that come up later.  
5 I'm not going to stick around until the end of the  
6 meeting because I'm on the east coast, but thanks for  
7 the opportunity to address now.

8 MR. LEMIEUX: Thank you, Steve. I really  
9 appreciate your talk. And I should emphasize that Steve  
10 is a past president of the American Nuclear Society,  
11 that makes him a prominent expert on the topic that he  
12 talked about.

13 Back to you, Linda.

14 MS. SEELEY: Thank you, Steve, and thanks,  
15 Patrick.

16 Next, we are going to have an overview. I  
17 know that every -- all of our people who live here and  
18 are interested in this topic are mostly interested in  
19 our local nuclear waste, how much is it, how much do we  
20 have, how is it stored, and what are the plans for it,  
21 and Al Bates of PG&E is going to give us the low down on  
22 that.

23 MR. BATES: Thank you for that introduction.  
24 Can you hear me okay? Okay, very good. Thanks for that  
25 introduction. I'm just going to index here. We can go

1 to the next slide, please. Oh, great, okay. Next.

2 Okay, let's stick on that slide a minute.

3           Importantly, there's two facilities where  
4 spent or used nuclear fuel is stored. One is in the  
5 fuel handling building, which by the arrow, as you can  
6 see, it's kind of like east of the twin domes, which are  
7 the containment buildings. And then a second storage  
8 location is what we call the ISFSI, and we'll talk about  
9 what that acronym means in a minute, and that's up the  
10 hill and to the east of the plant, so that's to kind of  
11 orient yourself. Next slide, please.

12           Okay, we're there already, sorry, go back one.  
13 Very good. So let's talk about the wet storage and the  
14 spent fuel pool. So Steve Nesbit, our earlier speaker,  
15 talked about, you know, how fuel is stored and talked  
16 about the wet storage and the dry storage, so this is  
17 actually one of the pools at Diablo Canyon. What you're  
18 seeing there on the left-hand side in the picture is  
19 approximately 20 feet of ultrapure water, and then below  
20 that are these things that kind of look like egg crates,  
21 those are actually the racks where the spent fuel is  
22 stored and -- thank you -- and kind of towards the  
23 center of the picture into the bottom, you see kind of a  
24 big round kind of like almost looks like white ring, and  
25 then there's, again, an egg-crate structure. That is

1 actually a multi-purpose canister, it's the dry fuel  
2 storage canister which will become dry later, and I'll  
3 show you how that process works. And then kind of  
4 hovering above, it's actually being suspended by a  
5 crane, it's actually a spent -- or used nuclear fuel  
6 assembly. That assembly is about 12 feet long, it's  
7 about 10 inches by 10 inches, so that kind of gives you  
8 some idea of scale there. Again, you're looking through  
9 20 feet of ultrapure water, and the workers are  
10 obviously safe where they are, above there, handling  
11 that spent nuclear fuel, because the water provides  
12 shielding from the radiation.

13 So we have 20 years -- enough space in these  
14 pools for 20 years worth of the used nuclear fuel, and  
15 periodically, we move some of that fuel out of the pools  
16 and into dry storage, and I'll talk about that in a  
17 minute. And this allows us to free up some space in the  
18 pools to be able to do what's called a full core  
19 offload, which is being able to remove all the fuel from  
20 the reactor core and putting it into the spent fuel pool  
21 and still having plenty of room for the additional fuel  
22 that's stored in there.

23 Okay, so let's see, I'm going to try this  
24 myself. There we go, okay, I'm flying. Very good.

25 So this is the ISFSI, and of course, nuclear



1 folks love using acronyms, so it's the Independent Spent  
2 Fuel Storage Installation, and this is what we called  
3 earlier dry storage. So I wanted to point out a couple  
4 things in the picture before I go through the words. So  
5 in the picture, you see up at the top a big blue pool,  
6 it's actually a pool of water, it has nothing to do with  
7 the ISFSI. The ISFSI is dry storage and it doesn't --  
8 it's not reliant on any type of pumps, valves, any type  
9 of mechanism whatsoever. The fuel is stored in a dry  
10 condition, and heat is removed from the fuel by just  
11 natural convection, just like a chimney works.

12 MR. JONES: And if I could just add, I don't  
13 want people to confuse that with the spent fuel pool  
14 either that's in a separate structure.

15 MR. BATES: Yes, good, that is not -- there is  
16 no spent fuel in there; that is just a pool for raw  
17 water storage.

18 So in there, you see a bunch of -- kind of to  
19 the upper right-hand corner, starting, you see a bunch  
20 of little dots. Each one of those dots is actually  
21 where a dry storage multipurpose canister resides, which  
22 is inside a fairly massive shielded container called a  
23 HI-STORM. I'm not going to go through the acronym on  
24 that because it's not important, it's just a big  
25 shielded container. Right now, we've -- and again,

1 the -- the ISFSI itself has enough storage for the total  
2 40 years worth of storage, and right now, we're coming  
3 up on about half full. So we've safely moved dry  
4 storage canisters to the ISFSI, seven loading campaigns,  
5 we're actually on our eighth loading campaign right now,  
6 and as of today, we have 65 storage casks, which  
7 includes the seven casks from the ongoing campaign we  
8 are in right now. And that's a total of a little bit  
9 over 2,000 used fuel assemblies being safely stored up  
10 at the ISFSI.

11 So right now, we're involved with a campaign  
12 to move a total of 12 casks up to the ISFSI from the  
13 spent fuel pools, that picture I just showed you, and  
14 that's going to be a total of 384 used fuel assemblies.  
15 And right now, we have five more casks to go. So at the  
16 end of the campaign, the ISFSI -- so in a few months,  
17 the ISFSI will contain a total of 70 casks, which is  
18 about 2,240 used fuel assemblies, and as I said earlier,  
19 that's half full, so there's another 70 positions that  
20 are vacant right now by those little round dots you see  
21 there. Okay, I'm going to move forward.

22 Okay, so now here's how the used nuclear fuel  
23 gets up to the ISFSI into dry storage, it's a fairly  
24 complex process, it takes us about six days to move one  
25 canister of fuel from the pool to the ISFSI. It starts

1 off with the -- as we saw in the earlier picture, it  
2 starts off with the multipurpose canister being  
3 installed into the pool, so from there, we can then  
4 install the used fuel assemblies. And the picture on  
5 the left-hand side shows, actually, the multipurpose  
6 canister, it looks like a little grid or a matrix of  
7 holes, and then there's kind of like a white circle, and  
8 then hovering above that, attached to the crane, is  
9 actually the lid for that multipurpose canister. So the  
10 lid is being installed in the water, again, we're  
11 looking through 20 feet of water here.

12           So the lid's being installed, ultimately when  
13 that crane lowers, that kind of silver disk that's in  
14 the water will be all the way down and on top of that  
15 egg crate looking thing that's in the round circle.  
16 Now, on the right-hand side, you see that -- that the  
17 multipurpose canister with the shielded container with  
18 the lid on is being removed from the water. Right now  
19 it's about one-third of the way out, and as you can see,  
20 the workers are all safe because the shielded container  
21 is massive, it's a massive steel container that provides  
22 all of the shielding needed to keep the workers safe.  
23 They're actually hosing down the container to get pure  
24 water and ensure if there were any contamination on the  
25 canister that it would all be washed off before they

1 bring it out. And they take great pain to survey the  
2 canister and make sure there's no residual radioactive  
3 particles on it. Okay, so one canister is six days  
4 total from start to finish. So there's -- there's 31  
5 fuel assemblies inside the multipurpose canister.

6           So now, the canister has been fully removed  
7 from the water, and it's brought over to what we call  
8 the cask wash-down area. So it's in a seismic  
9 restraint, so there's actually a big band around it  
10 that's anchored to the wall so it can't fall over or  
11 anything, and in the picture on the left, you can see  
12 the cylindrical shape of the -- what's called the high  
13 track, which is the shielded container. Inside that is  
14 the multipurpose canister, and attached to the  
15 multipurpose canister are hoses, one is an input, one is  
16 an output. Through those hoses, helium gas is -- is  
17 injected and removed and we -- actually, the process  
18 heats up to the point where any water that could be --  
19 remain inside the multipurpose canister is dehydrated  
20 and dried, and then we have a wait time to ensure that  
21 all -- any residual water is completely removed. So at  
22 this point, the canister is truly dry, okay.

23           The picture on the right-hand side shows what  
24 we call the weld head. The canisters -- the lid is  
25 placed in the pool, it's obviously not welded at that

1 point, but at this point, we're welding up the canister  
2 and the canister is completely seal welded, every  
3 opening and even the -- where the hoses were connected  
4 to is sealed up and welded up, so there's no possibility  
5 of any interaction between what's inside the canister,  
6 which are 31 fuel assemblies, which are very large  
7 structures, and the outside environment. All right,  
8 we're moving on.

9 It is very interesting, you know, and it's a  
10 fascinating process.

11 So, now, this is the final step, so before I  
12 talked about that shielded container coming out of the  
13 pool, up at the ISFSI pad itself, we have a transfer  
14 facility where we transfer the multipurpose canister,  
15 which is containing the spent nuclear fuel, the used  
16 nuclear fuel, we transfer it from the temporary shielded  
17 container to the permanent shielded container which is  
18 called a HI-STORM. What you see in the picture is a  
19 whole array of HI-STORMs. These are those little gray  
20 dots that you could see earlier when we saw the overview  
21 of the ISFSI itself.

22 Now, here's one being put into its final  
23 place, and if you look closely down the bottom of this  
24 picture where the workers are standing, you can see what  
25 looks like big circles with -- well, they're actually

1 massive bolts that are sticking out of the concrete,  
2 they're bolt hole locations. And when this HI-STORM  
3 containing the spent nuclear fuel is bolted into this  
4 location, it's completely bolted all the way around,  
5 it's secured and tensioned, so it's impervious from  
6 earthquakes or any type of other disturbances. This is  
7 fairly unique to Diablo Canyon. Other sites actually  
8 just store them, have them sitting on the pad. In this  
9 case, we, with our seismic environment, we take nothing  
10 to chance and all of our storage containers are bolted.

11 So let's talk again, a little bit about --  
12 okay, I've got to move it. Okay, so let's talk a little  
13 bit about used fuel storage. Again, we have wet storage  
14 in the pools, we have dry storage at the ISFSI, and in  
15 the future, as was discussed a little bit earlier by  
16 Steve, we have the possibility of the DOE at some point  
17 taking our spent nuclear fuel. I got to move one and  
18 two. Okay.

19 So we have a total of 60 years worth of fuel  
20 storage locations. We have 20 years in the pools, and  
21 we have 40 years on the pad. And as I mentioned  
22 earlier, we've only used 20 years worth on the pad right  
23 now. So each refueling, we place used fuel into wet  
24 storage, it comes right out of the reactor and goes into  
25 the spent fuel pool, and that's where it resides for a

1 while. There's a cooling-off period of several years.  
2 Used fuel will start being removed approximately two and  
3 a half years after we enter decommissioning, and as I  
4 mentioned earlier, each pool holds 20 years worth.

5 In dry storage, every 3 years or so, and this  
6 happens to be one of those 3 years, we move 8 to 12  
7 canisters, multipurpose canisters, to dry storage, and  
8 it holds up to 40 years worth of used fuel. So  
9 incidentally, the reason why we call them multipurpose  
10 canisters is kind of interesting. Multipurpose  
11 canisters were an industry effort several decades ago  
12 which allowed the industry to get together and figure  
13 out what is the best way to -- to store our spent  
14 nuclear fuel so they could be immediately transferred to  
15 a DOE facility, so hence the term multipurpose canister,  
16 it's one, it'll be stored here, but then it can also be  
17 stored at a DOE facility if the DOE chooses to store our  
18 fuel in that manner. In other words, there would be no  
19 reason to un-can it and put it into another storage  
20 system, although it could be enveloped into another  
21 storage system.

22 So the future options, for the sake of time,  
23 I'm not going to talk about too much, because we will  
24 hear about this a little later, but there is some pretty  
25 strong bipartisan movement forward on the consolidated

1 storage. In my career, this is probably more movement  
2 than I've seen in quite a few years. And a lot of  
3 people say well, how are you going to get it there? And  
4 used fuel is routinely transported across the country,  
5 mostly defense fuel, but certainly, commercial fuel has  
6 been in the past transported across the country, and so  
7 this is not a new thing, and it can be done safely, and  
8 there will be a demonstration project in 2027 to  
9 actually demonstrate being able to transport high  
10 burn-up fuel from one location to another, and this will  
11 prove that high burn-up fuel can be safely transported  
12 which has been, you know, an industry question for a  
13 while. So last slide.

14 So I wanted to touch on three scenarios. The  
15 first is if we enter decommission, you know, essentially  
16 next year. So we would take the fuel from the reactor  
17 and put it in the spent fuel pool and let it cool down,  
18 we would then start unloading fuel from the spent fuel  
19 pool, those fuel assemblies that are capable of being  
20 removed. And then at about two and a half years, we  
21 would remove the rest of the fuel and put it into  
22 storage. It's a fairly long process, as I said before,  
23 remember I said about every six days, we could do a fuel  
24 assembly, so it will take a while.

25 So if we entered decommissioning in 2030 with



1 license extension, we'd really just continue doing what  
2 we're doing, it's a status quo. And then we'll continue  
3 to review and assess our storage options for  
4 post-decommissioning period, because at this point, no  
5 actual action is needed on our part. We know that in  
6 the future, we will be making decisions relative to  
7 storage, but until we're closer to the decommissioning  
8 date, we can -- we have the -- we're afforded time in  
9 order to make assessments of how we would store all of  
10 the fuel coming out of the pools.

11 And then, you know, scenario C is  
12 hypothetical, because we don't have license extension  
13 beyond 2030. But as was discussed earlier by Steve,  
14 there is a potential for moving fuel from a lot of  
15 nuclear facilities off site into a DOE CIS. And that's  
16 my presentation. So questions later.

17 MR. ANDERS: Do the panel members have any  
18 questions? Patrick, and then Michael, then Linda.

19 MR. LEMIEUX: Thank you, Al, for the  
20 presentation. I have a couple of -- I have two  
21 questions and I'm going to ask them to you at the same  
22 time to save time. First, you mentioned high burn-up  
23 fuel, but that's not really defined. I'm wondering if  
24 there's such a thing as low burn-up fuel in contrast to  
25 it and how that compares to Steve Nesbit's presentation

1 of high level waste, are those both one and the same?  
2 And second, we know that a little over a year ago, PG&E  
3 changed from the Holtec HI-STORM system that you spent  
4 this presentation talking about to a new manufacturer of  
5 multipurpose canisters with the big difference that the  
6 orientation of the canisters is now horizontal instead  
7 of vertical, and I'm wondering if you could say a few  
8 words about how that affects the long-term storage that  
9 you've talked about.

10 MR. BATES: Right, good. So high burn-up fuel  
11 is fuel that's been through the reactor quite a few  
12 times, and there's actually a number of -- it's -- a  
13 reactor engineer understands it, but for the sake of  
14 expediency, it basically means that the fuel has been in  
15 the reactor a long time, and when fuel is in the reactor  
16 a long time, there's effects to metal and other things,  
17 and so the high burn-up fuel was a concern or a  
18 consideration within the industry, a lot of testing has  
19 been done, and the concern is that the fuel would not  
20 stay integral either in the transportation process or  
21 when it got to its final destination. So the industry  
22 has spent a great deal of time on it, lots of research  
23 has been done on it, and this actually the final step in  
24 that very deliberative process to show that high burn-up  
25 fuel can indeed be safely transported from one location

1 to another. This transportation package which the DOE  
2 has designed has all kinds of instrumentation on it.  
3 It'll measure how many G forces it's received, and it  
4 will also indicate the integrity of the fuel inside, and  
5 the fuel will actually be taken out at some point and  
6 validated that it remained integral. It's a key step,  
7 because there are some high burn-up fuel assemblies at  
8 almost every site around the country, and this will just  
9 ensure that all of our theoretical calculations are  
10 actually manifested in reality.

11 And then high level waste is more attune to if  
12 you did reprocessing and you separated out the material  
13 from all of the rest of the isotopes, high level waste  
14 is really that subset of things and it doesn't --  
15 typically wouldn't have the same form as our used fuel  
16 has, which is a very solid -- you know, a structure 10  
17 inches by 10 inches by 12 feet. High level waste could  
18 take many forms, it could be vitrified glass, hopefully  
19 not a liquid, but it could be other things. We don't  
20 deal with high level waste at Diablo Canyon and we don't  
21 generate high level waste. Do you want to --

22 MR. ANDERS: We need to move on.

23 MR. LUCAS: One thing I wanted to say that you  
24 didn't mention is those casks are periodically inspected  
25 to look at the corrosion and the bolts and things like

1 that, and so far they've been successful, I saw one of  
2 those myself.

3 MR. BATES: We can literally spend an evening  
4 just talking about aging management.

5 MR. LUCAS: But looking at your scenario C, I  
6 mean, obviously the people in the room, and this is my  
7 biggest concern, is scenario C-5, or whatever it would  
8 be, assuming you go on the 20-year license that's been  
9 applied for, although the state hasn't endorsed it, you  
10 would need more ISFSI if there is no temporary storage,  
11 correct?

12 MR. BATES: At some point, in the process of  
13 decommissioning, which again is, you know, it's five  
14 years, normally five years from now, if the license gets  
15 approved, we would have to evaluate that, and there are  
16 technologies that could be applied. I think last  
17 December I talked a little bit about this. We can  
18 actually increase the density and getting back to the  
19 Aronno question. We could actually increase the density  
20 of our storage and just go with, you know, what we have.  
21 So it will be dry storage, I can ensure you that,  
22 because eventually, we will want to take all the fuel  
23 out of wet storage and put it into dry storage before we  
24 could complete decommissioning.

25 MR. LUCAS: But you don't have any studies

1 that we've seen, but you have done enough work to know  
2 that the area that PG&E will control when  
3 decommissioning begins is satisfactory to store the  
4 other fuel that might be there in dry casks?

5 MR. BATES: So the amazing thing is thinking  
6 back to that first picture, that's the -- that area of  
7 the ISFSI can contain 40 years worth of nuclear fuel  
8 from two very large generating units generating clean  
9 power, so it's a small footprint. You know, it  
10 basically comes down to the fact that it's a small  
11 footprint to store the spent nuclear fuel, and there's  
12 many technologies we can employ.

13 MR. LUCAS: Thanks.

14 MS. SEELEY: Thank you, Al. When was the last  
15 time you moved spent fuel into dry storage before this?

16 MR. BATES: It was about I think five years,  
17 about five years ago. So we were a little -- we didn't  
18 do it in the normal kind of three-year cadence, and  
19 really, that was because we were heading to  
20 decommissioning.

21 MS. SEELEY: Right. And another thing is that  
22 you said that -- in the slide, it said that if you go  
23 into 20 years extra operation beyond the license that it  
24 will be the same scenario as if -- as like if you were  
25 going to close down now, I don't quite understand what

1 that means.

2 MR. BATES: So if we went 20 years beyond,  
3 remember we have 60 years total worth of storage, so for  
4 example, I don't have to go and find more space for my  
5 fuel for an extra 20 years. We already have 60 years  
6 worth of storage on site. Eventually, we'll want to get  
7 it all into dry storage, and at that time, we can  
8 address that issue, and certainly, the dry storage  
9 systems that we're using now would be capable of doing  
10 that.

11 MS. SEELEY: So you're saying that you have 40  
12 years storage on the pad, 20 years storage in the pools?

13 MR. BATES: That's correct.

14 MS. SEELEY: Right. And your plan would be if  
15 you get the extension of the license to put the fuel  
16 into the pools and then hope to be able to get a permit  
17 to build another ISFSI maybe?

18 MR. BATES: I mean, that's far in the future  
19 after we would, you know, be in decommissioning if that  
20 was the 20-year period. In the interim, we can easily  
21 store all the fuel we have in the pools, we've got ample  
22 room, right, so we don't have to move it to dry storage  
23 immediately. 40 years plus another 20 years, 60 years  
24 total.

25 MR. JONES: I'll just take on the regulatory

1 part of that, Linda. The 20 years is quite hypothetical  
2 at this point. We don't know what X is yet, right, we  
3 have a volumetric storage problem that depending on how  
4 long we run will determine how we modify the dry cask  
5 storage pad. That location, we would use the existing  
6 licenses and permits and amend them. So remember, from  
7 decommissioning, the only component of storage that's  
8 part of the EIR or the decommissioning plan is the  
9 greater than class C waste. What we've always looked at  
10 is that we handle the dry cask storage facilities both  
11 at Humboldt and at Diablo Canyon as separate licensed  
12 and permitted facilities, because obviously we see their  
13 lifetime is much longer, right, so we look at them on a  
14 longer term, but again, we don't know what the volume is  
15 yet.

16 So that will drive that ultimate decision.  
17 Look for it to be in that upper plateau, that 310-foot  
18 area, and as Michael had asked, how does that work with  
19 the future? We have plans to isolate that area for both  
20 maintaining transmission and dry cask storage and water  
21 storage in the future separate from what happens down  
22 below where the power block and the marina is today.

23 MR. SEVERANCE: Can I ask a corollary question  
24 about this just like five seconds? Yeah, yeah. I mean,  
25 isn't it conceivable that, you know, we could have CIS

1 established somewhere in 15 or 20 years and you wouldn't  
2 need to build an ISFSI even if you ran for 20 years  
3 more?

4 MR. BATES: Correct. Just to give you an  
5 idea, and Manuel and others will talk about this later,  
6 but if CIS is available to us, we will certainly take  
7 advantage of it.

8 MR. SEVERANCE: Okay.

9 MR. HOUGHTON: I had a short terminology  
10 question. When you were talking about high-burn fuel,  
11 you mentioned the fuel must remain integral, and I was  
12 just hoping you might translate that for the rest of us.  
13 What does that mean?

14 MR. BATES: So there were fears, and this goes  
15 back 20 years, that the fuel would become more brittle,  
16 the rods themselves would become brittle, it's a  
17 metallurgy issue, it has to do with the neutron flux  
18 hitting into steel, or in this case it's inconel, so  
19 that's been proven to be hypothetical in nature by  
20 laboratory tests and the demonstration test that's going  
21 to be shown because of our confidence in the research  
22 that's been done. This will just be the final stroke to  
23 show that high burn-up fuel can be safely moved around  
24 the country.

25 MR. HOUGHTON: And just keeping it all



1 together so it doesn't fall apart?

2 MR. BATES: Yeah, so you want your package to  
3 remain integral, you want all the fuel to -- that nice  
4 10 inch by 10 inch by 12-foot structure, you want that  
5 to look exactly like that when you take it to its final  
6 destination.

7 MR. HOUGHTON: You've answered it, thanks.

8 MR. BATES: Sorry about the interval.

9 THE COURT REPORTER: Sir, can I get your name,  
10 the gentleman with the yellow shirt?

11 MR. ANDERS: I'm sorry, we'll have some  
12 questions after, but we need to move on to this next  
13 agenda item.

14 THE COURT REPORTER: This is the court  
15 reporter. I just need his name real quick.

16 MR. ANDERS: That was Dave Houghton that just  
17 asked the last question.

18 THE COURT REPORTER: Thank you, sir. How  
19 about the gentleman on the podium, what was his name?

20 MR. ANDERS: I will work with you after this  
21 meeting to identify the people if there's a problem.  
22 So...

23 THE COURT REPORTER: Okay.

24 MR. ANDERS: Thank you for your help, though.  
25 Appreciate it.

1 All right, Linda, you want to bring us into  
2 the next topic?

3 MS. SEELEY: We're moving now into the  
4 national spent fuel storage efforts to create a  
5 repository for national -- for our whole nation, and  
6 Paul Murray is going to be speaking to us about this.  
7 He is the deputy assistant secretary of the Office of  
8 Spent Fuel and High Level Waste Disposition at the US  
9 Department of Energy.

10 Paul, are you here?

11 MR. MURRAY: I am.

12 MS. SEELEY: Okay, thank you.

13 MR. MURRAY: All right. First of all, thank  
14 you for inviting me to talk this evening. I'm actually  
15 sorry I'm not there in person. I'm actually in Idaho,  
16 I've been watching a Navy transportation demonstration  
17 today. I'm originally from the United Kingdom, I have  
18 44 years in the commercial nuclear industry, and in  
19 1986, I was working on the UK commercial reprocessing  
20 plants and also supporting overseas commercial  
21 reprocessing plants. In 1996, I moved to the US with my  
22 family. In 2007, I joined Areva, which is a French  
23 reprocessing company as part of the Global Nuclear  
24 Energy Partnership, looking at reprocessing of  
25 commercial spent nuclear fuel in the US.

1           In late 2023, I joined DOE, so just over 10  
2 months ago, I joined the Department of Energy. I'd like  
3 to start my talk by saying as we sit here today,  
4 talking, there are no technical issues stopping me from  
5 executing my program, it's just building public and  
6 political trust to actually go out and basically do my  
7 job. So next slide, please.

8           So in the US, there can be 94 operating  
9 reactors at 28 different states. We also have 20  
10 reactors that are completely shut down, and in some  
11 cases, those reactors are being decommissioned, and all  
12 that remains at the sites now is spent nuclear fuel. So  
13 today, as we sit here, I'm responsible for 95,000 tons  
14 of spent nuclear fuel that has been discharged from  
15 reactors. At the end of the current operating life of  
16 the reactors that we have today, not new reactors, not  
17 advanced reactors, but the current reactor fleet, there  
18 will be 140,000 tons of spent nuclear fuel. Next slide,  
19 please.

20           I'm also responsible for the DOE high level  
21 vitrified waste, so this is liquid waste from  
22 reprocessing that has been turned into glass. Each  
23 glass canister is approximately 2 feet in diameter and  
24 about 14 and a half feet tall. They are being made at  
25 Hanford in Washington state, potentially at Idaho, at

1 West Valley and upstate New York, at Savannah River in  
2 South Carolina, and in total, we are planning on moving  
3 21,000 canisters of vitrified high level waste at some  
4 point in the future. Okay, next slide, please.

5 So this is the history, and we've heard a lot  
6 about the history tonight from several of the speakers,  
7 I'd just like to call out a few things. The Nuclear  
8 Waste Policy Act that congress put into place in 1982  
9 made DOE enter into a contract with the utilities to  
10 manage to spent nuclear fuel, so it's a binding  
11 contract, and the utilities actually paid us to manage  
12 their spent nuclear fuel, and the money went into what  
13 was called the Nuclear Waste Fund. Today, the Nuclear  
14 Waste Fund stands at about \$47 billion, and each year,  
15 due to interest, we accrue about another billion dollars  
16 into that nuclear waste fund.

17 In 1998, into the contract, we were supposed  
18 to start picking up the spent nuclear fuel from the US  
19 utilities, that didn't happen. In 2010, congress  
20 defunded the Yucca Mountain project, and then at that  
21 time, there was over 200 federal employees working on  
22 the Yucca Mountain project. Congress defunded it, a  
23 small number of those people moved into the Office of  
24 Nuclear Energy. DOE Nuclear Energy is primarily a  
25 research organization. So for the last 14 years, we

1 have been doing -- conducting generic R&D.

2 In 2014, the utilities basically stopped  
3 paying into the Nuclear Waste Funds and then started to  
4 sue DOE for partial breach of contract for not picking  
5 up the spent nuclear fuel. So every single year the  
6 federal government is sued by the utilities for not  
7 picking up the spent nuclear fuel. Next slide, please.

8 So here here's the liability table. The  
9 liability table is published every year. The liability  
10 only deals with the cost of not picking up the  
11 commercial spent nuclear fuel. It does not take any  
12 account of the liability for the DOE fuel or us not  
13 picking up the high level waste canisters or us managing  
14 the Navy spent nuclear fuel. So the first column, so in  
15 September of 2023, the estimated total liability was  
16 \$44.7 billion of which the federal government had paid  
17 \$10.6 billion. Last year we paid \$500 million, and our  
18 estimate of our liability, outstanding liability moving  
19 forward, is \$34.1 billion. So every year DOE does not  
20 take title and ownership of the fuel, we can be sued.  
21 Okay, next slide, please.

22 So what are we actually responsible for? So  
23 DOE is responsible for transporting the commercial spent  
24 nuclear fuel to an interim storage facility, and then if  
25 the country then decides we need a repository, we will

1 be responsible for moving it to a repository. We are  
2 also responsible for picking up the DOE high level  
3 waste, the DOE spent nuclear fuel and moving it to a  
4 future repository. The Navy will move their own spent  
5 nuclear fuel to a future geological repository. To give  
6 you some idea of the time frame, we're hoping that an  
7 interim storage facility will open in 2038. 140,000  
8 tons of spent nuclear fuel, even if I can move it at  
9 3,000 tons a year, it will take me 50 years to move all  
10 the spent nuclear fuel in the US to a consolidated  
11 interim storage facility. Once I have the repository  
12 open, it will take me another 50 years to move the fuel  
13 to a repository, then I have to move the DOE high level  
14 waste, the Navy fuel, and the DOE fuel, and then I have  
15 to leave the repository open for 100 years. So this is  
16 probably a 200 to 250-year program, once we seriously  
17 get going on the program. 250 years ago, George  
18 Washington was still alive. Next slide, please.

19 So what are we doing? This is actually a good  
20 news story. So we are funding 13 consortia to go out  
21 and start raising public awareness of what spent nuclear  
22 fuel and high level waste is. So there's been several  
23 meetings around Diablo Canyon, as you can see, consortia  
24 are trying to reach out across the country. The problem  
25 is there's 370 million people in the US, and we have 12

1 consortia starting to reach out and talk to people.

2 Next slide, please.

3           This is published on our website each year --  
4 each month. So people want to know what we're up to,  
5 what we're spending the money on in consent-based  
6 siting. So we have 13 consortia, I have 5 federal  
7 members of staff working on consent-based siting. The  
8 two takeaways that we need to take from this particular  
9 slide is two schedules, the two time lines on the  
10 bottom. The bottom right shows you where the consortia  
11 currently are in their contracts, they're over halfway  
12 through their contracts. On the left-hand side is the  
13 schedule for DOE. We are currently preparing the sites  
14 and criteria for future facility. Next year, we will go  
15 out with an RFI, looking through it, for those  
16 communities to come forward. Next slide, please.

17           This summarizes what we're doing. Between  
18 April and June, we'll prepare all the documents we need,  
19 cites screening criteria, starts really through the  
20 average, July through September, the expression of  
21 interest will be released. We recognize that some  
22 communities and some stakeholders are not prepared to  
23 respond against a formal DOE discussion of interest, so  
24 we will do a second call to make sure we have equity and  
25 people are interested in coming forward. Then DOE will

1 start to review it and then start to move forward. Next  
2 slide, please.

3 Federal consolidated interim storage facility.  
4 In May of this year, we passed -- we became a DOE  
5 capital acquisition project, so we are now a formal  
6 project within DOE, the design is proceeding on  
7 schedule, the liability estimates I showed you assume  
8 the facility opens in 2038. It's initially sized to  
9 take 20,000 tons of spent nuclear fuel, and it's  
10 scalable. We are currently authorized to look at one or  
11 more consolidated interim storage facilities.

12 Looking at the US, I estimate we need about  
13 five interim storage facilities. It will be in Nuclear  
14 Regulatory Commission license sights, so we're designed  
15 to obey requirements so the facility and design will be  
16 safe, but DOE will become an NRC licensee and we have to  
17 have the organizational culture to allow us to design  
18 and operate this facility. Next slide, please.

19 How are we going to move the fuel? Great  
20 question. One of the things -- there's several things  
21 we found from consent-based siting, some initial  
22 findings are that one, people believe that consolidated  
23 interim storage without a geological repository won't  
24 happen, people are worried that then the sites then  
25 become the de facto repository sites, people are worried



1 about moving spent nuclear fuel, okay, how are we going  
2 to transport it safely? And the third thing that we  
3 found out is some of the communities that currently have  
4 spent nuclear fuel aren't so interested in that spent  
5 nuclear fuel going away. So DOE in collaboration with  
6 the Navy developed what we call the Atlas Railcar, it is  
7 the safest railcar in the US for transporting spent  
8 nuclear fuel. It's fully instrumented, we can tell if  
9 anything's going wrong with the railcar, and in summer  
10 of 2024, this Atlas Railcar was certified by the  
11 Association of American Railroads to transport weights  
12 up to 480,000 pounds, so each railcar can transport one  
13 spent nuclear fuel cask. In a consist, we will  
14 transport between five and seven casks at a time, okay.  
15 Next slide, please.

16 The high burn-up demonstration project, we  
17 heard about this earlier. It is currently supporting  
18 the long-term storage of high burn-up fuel, so that's  
19 fuel that's been in the reactor a long time, and a lot  
20 of the energy's been extracted from it. Most fuel  
21 that's discharged from reactors now is high burn-up.  
22 This one demonstration cask is currently supporting over  
23 60 of the current commercial fleet. To say that nothing  
24 is happening to the spent nuclear fuel is tremendously  
25 boring, literally nothing's happening in the cask.

1           In 2027, so just over two years time, we are  
2 looking at moving this cask, which contains 15 tons of  
3 fuel, from North Vanner in Virginia to a new home. So  
4 we're currently evaluating potential DOE sites where we  
5 can take this cask. We are going to open the cask, we  
6 will take the fuel out, we will examine the fuel to show  
7 that everything's good, nothing's happening, we'll put  
8 all the fuel back in the cask and then have someone else  
9 put that cask to be used on to help me with the disposal  
10 problem. Next slide, please.

11           So as I've said, people are worried about  
12 transporting spent nuclear fuel. I just saw the Navy  
13 demonstration today. The Navy has done over 900  
14 shipments of spent nuclear fuel from the west coast to  
15 the east coast to Idaho. Their package is actually  
16 bigger than any of the commercial packages that are on  
17 the rails. Well, we recognize that the general public  
18 is worried about this, so we put together the idea of  
19 doing a package performance demonstration. We will take  
20 a spent fuel package, and we will drop it, crash it, set  
21 it on fire, drop it in a lake, push it out, put it on  
22 the back of a railcart, drive it off into the sunset.  
23 There's currently an expression of interest on the  
24 street, there's webinars from my group asking for public  
25 feedback on this demonstration. What are people most

1 worried about in the transportation of spent nuclear  
2 fuel? If we can get a consensus on what people are  
3 worried about, then this demonstration, which is going  
4 to take place over a period of five to seven years, we  
5 will try and address those fears and concerns. Okay,  
6 next slide, please.

7 Geological repositories. The US has not  
8 decided that we need a geological repository. As Steve  
9 said, every other country has a nuclear program, with  
10 the exception of Spain and the Ukraine, they do not have  
11 a repository program, everybody else does. So at the  
12 moment, I am conducting, looking at all options in line  
13 with the Nuclear Waste Policy Act. I will continue to  
14 support international R&D where people are building real  
15 repositories, if I can do stuff which I can learn from,  
16 I am supporting. I am going to try and send my DOE  
17 engineers and managers to work on international  
18 projects.

19 I'll also try and work with US industry to  
20 build capacity so that when we do decide we need a  
21 geological repository, we can move forward quickly, all  
22 right. Next slide, please.

23 So in conclusion, what are my risks?  
24 Communication and controlling the message. This is a  
25 very sensitive subject, very politically sensitive, very

1 sensitive to members of the general public. Schedule  
2 slip will be effective to the US taxpayer. In the last  
3 ten years since the Office of Civilian Waste Management  
4 was shut and we moved to DOE NE, the schedule has  
5 slipped 17 years, and we are at risk, we don't get  
6 funding, we don't get people, that schedule's slipping  
7 significantly again, adding billions of dollars to the  
8 liability. I'd like to point out when Yucca Mountain  
9 was going, there was hundreds of federal employees. My  
10 total federal team trying to do all these different  
11 projects is 24 people.

12 We've got to educate stakeholders and their  
13 business of long term projects. This is an over  
14 200-year project from when we start to when we put the  
15 final fuel into the hole in the ground. When to amend  
16 the Nuclear Waste Policy Act? The Nuclear Waste Policy  
17 Act as written does not allow me to build a consolidated  
18 interim storage facility. I can license it, I can't  
19 build it. I also cannot look for a second repository,  
20 all right. I also cannot look for a second repository.  
21 What we're trying to do is we're trying to build trust  
22 with members of the general public and on Capitol Hill  
23 to show that we are making slow but steady progress to  
24 deliver on our requirements, and then hopefully next  
25 year, we can start to address about changing the Nuclear

1 Waste Policy.

2 Okay. That is a very quick summary of my  
3 program and where we're going. In the last ten months,  
4 we've really turned the program around, primarily from  
5 being an R&D program into a focused program which is all  
6 interlinked and then we'll drive towards what's a common  
7 mission. We are making progress, we have the railcar,  
8 the personal design, we're releasing expressions of  
9 interest for engineering support, also from the feedback  
10 on the package, and we're planning to do the  
11 demonstration cask in 2027. With that, I'll stop and  
12 take any questions.

13 MR. ANDERS: Thank you very much. We've got  
14 about five minutes for the panel if they have any  
15 questions of Mr. Murray. Michael and then Patrick.

16 MR. LUCAS: Thank you, Mr. Murray. That was a  
17 lot of really big numbers there. Could you just clarify  
18 for my own benefit, you said the Navy's doing about 900  
19 shipments. Are those the five to seven casks at a time,  
20 or what does that mean?

21 MR. MURRAY: So the Navy in total, the nuclear  
22 Navy, after the submarines or aircraft carriers have  
23 decommissions, they remove the spent nuclear fuel from  
24 the reactor put it into a package, and then transport it  
25 to Idaho where they basically repackage it and store it,

1 waiting for a geological repository to open. So in the  
2 history of the nuclear Navy, over 900 shipments have  
3 safely been made from the west coast and the east coast  
4 to Idaho.

5 MR. LUCAS: Thanks, okay.

6 MR. ANDERS: Patrick.

7 MR. LEMIEUX: Thank you for the presentation,  
8 Paul. I also want to add that, you know, your talk at  
9 the Nuclear Energy Institute Conference back in the  
10 spring along with Steve Nesbit has impressed us enough  
11 that that's why we want to invite you guys here, so  
12 thank you for coming. And you've talked about the  
13 impressive steps you've made to make the transport of  
14 these wastes as safe as possible and the process for  
15 doing this, but I can't help to wonder where are they  
16 going? What are the potential CIS sites that you now  
17 have in mind as well as the potential national  
18 repository site that you have in mind, given that  
19 Yucca Mountain is not happening? Arguably, I would  
20 think those are the questions that concern our  
21 constituency the most at this point, what possibilities  
22 are there on the horizon for those?

23 MR. MURRAY: So for the consolidated interim  
24 storage facility, we will go out for an expression of  
25 interest for interested communities to come forward.

1 Not to make a commitment to take the fuel, we are not  
2 committing to send the fuel there, but we are going to  
3 follow the consent-based siting process for host  
4 communities to come forward. At this moment in time,  
5 the US does not have the commitment to build a future  
6 geological repository. That's a decision that has not  
7 been made.

8 MR. LEMIEUX: But are there any potential  
9 sites that are being considered, are there some that  
10 you're able to share that are in the process of being  
11 considered?

12 MR. MURRAY: So based on the work that's been  
13 done since the late 1950's, the only two states in the  
14 continental US that are not suitable for future  
15 geological repository are West Virginia and Idaho.  
16 Every other state has suitable geological media.

17 MR. ANDERS: Linda.

18 MS. SEELEY: Thank you, Paul. One quick  
19 question. You talked about shipping it by rail, but you  
20 didn't mention anything about how, say, at  
21 Diablo Canyon, how we would get it to the rail. And  
22 about the -- I think about -- according to the  
23 Department of Transportation, I think over 50 percent of  
24 our bridges right now are getting a D in their  
25 scorecards for being strong enough. So you're talking

1 about a quarter of a million pounds. How do you get  
2 that from Diablo Canyon to a railroad?

3 MR. MURRAY: So what we do -- that's a very  
4 good question by the way. So what we've been doing is  
5 we've been doing what's called the inventory study, so  
6 we can actually get them going to the shutdown reactor  
7 sites, and we're looking at the infrastructure that  
8 exists to look at actually being able to move the fuel  
9 off that site by -- by rail, by road, by barge, you  
10 know, to actually get it off the site, and then we've  
11 been doing hypothetical studies to show that we can  
12 actually move it by rail to a fictitious location in the  
13 center of the US, just to make sure that there's no show  
14 stoppers, and so that's what we've been doing. So when  
15 Diablo Canyon's turn happens, we will do the inventory  
16 study, make sure the infrastructure of the site was  
17 suitable, that the transportation routes were suitable,  
18 and then that would be how it went. The 12-axle railcar  
19 has been designed with 12 axles to distribute the load  
20 so it's not the heaviest weight on the rails at this  
21 moment in time.

22 MS. SEELEY: Thank you.

23 MR. ANDERS: We have two people that would  
24 like to ask questions. If we could make it quick, Dave,  
25 and then Bruce, and then we'll move onto the next



1 agenda.

2 MR. HOUGHTON: Yeah, I'll continue to be the  
3 terminology police here. You brought up the term  
4 consent-based siting, and that may be the first time  
5 that some of the audience has heard that term, and can  
6 you briefly describe what that is and how it differs  
7 from what was done in the past.

8 MR. MURRAY: So in the past, so Yucca Mountain  
9 congress was the final congress chosen for the  
10 Yucca Mountain site, as for final repository. We were  
11 then selecting sites, there's three sites, and then  
12 congress amended the Nuclear Waste Policy Act and just  
13 said "it's got to be Yucca Mountain," okay. And then --  
14 so we've got to have -- you know, Steve talked about  
15 some of the other private initiatives to try and store  
16 spent nuclear fuel, right, to favor them by commercial  
17 companies who've picked a site and off they went. What  
18 we're trying to do is we're trying to build consent with  
19 the public to actually want to host one of these  
20 facilities. So we're going out, we're educating people,  
21 we're going to do outreach to the states, to  
22 communities, to regions to basically explain to them  
23 what we're trying to do, no commitments on either side,  
24 but then build consent for people that want it and don't  
25 feel forced, that this has been forced down their

1 throats, basically.

2 MR. HOUGHTON: Okay, thank you.

3 MR. ANDERS: Bruce, one last question.

4 MR. SEVERANCE: Bruce Severance. Thank you  
5 very much for your presentation and for making time for  
6 us. There's been some discussion about the high burn-up  
7 fuel and the fast neutron radiation that might cause  
8 embrittlement of some of the structures. Does that  
9 apply to the canister itself, how robust is the  
10 canister?

11 MR. MURRAY: The canisters are very robust,  
12 and the fuel itself is very robust. If there was some  
13 fear that some -- you know, spent nuclear fuel is a  
14 very, very solid mechanical structure. It's designed to  
15 withstand forces inside a nuclear reactor, if it  
16 overflows, the temperatures, the pressures, and then we  
17 take it out, we stick it in the pool, then we stick it  
18 in a dry storage canister, and it's not subject to  
19 anything, but people can then postulate things that  
20 would happen. In fact, very recently, we just conducted  
21 a series of simulated earthquakes on a vertical system  
22 and a horizontal system at the University of San Diego,  
23 the outside shaker table test. We built a full-sized  
24 mock-up of the storage system and shook it with this  
25 instrument out the yin-yang, and basically, the

1 conclusion of those results, the worst case earthquake  
2 scenario was equivalent to a rain drop hitting this fuel  
3 assembly, or in the extreme case, an angry wasp flying  
4 into the fuel assembly. It was underwhelming, to be  
5 honest. When you watch the video, it was underwhelming  
6 what happened to that canister and the fuel.

7 MR. SEVERANCE: What is the projected life of  
8 one of these canisters? I've heard they're expected to  
9 last at least 100 years, and what is that life  
10 expectancy relative to how long the radiation continues  
11 to be a danger within the canister?

12 MR. MURRAY: So the fuel remains radioactive.  
13 So the projected life of the canisters, it's going to  
14 be -- it's regulated by the Nuclear Regulatory  
15 Commission, and it depends on if it's a low-burning fuel  
16 or a high-burning fuel in the canister. And my office  
17 recognizes there's public concern about the canisters,  
18 so we have a large R&D program going to develop a way to  
19 monitor the structural integrity of the canisters in  
20 realtime, 365 days a year, right, and we hope to deploy  
21 the first of those systems in late 2026, is what we're  
22 aiming for. So we will come up with a way to monitor  
23 the canister to show people absolutely nothing is  
24 happening to that canister.

25 MR. SEVERANCE: If they last 100 years, do you

1 have the ability to remove the contents and put it in a  
2 new canister, transfer the contents?

3 MR. MURRAY: We would have to build what's  
4 called a mobile repackaging facility; one of those  
5 currently doesn't exist in the US. My old firm that I  
6 worked for, the French company, Areva, currently has  
7 three mobile repackaging facilities operational in  
8 France, repackaging high level waste. So there's an  
9 engineering problem if we have to repackage.

10 MR. ANDERS: Thank you. We need to move on to  
11 the next agenda item. So Linda, would you introduce the  
12 next topic, please.

13 MS. SEELEY: Yes, we're moving on now, thank  
14 you very much, Paul. We're moving on to international  
15 examples of spent nuclear fuel storage. Dave Houghton  
16 is going to introduce our next speaker.

17 MR. HOUGHTON: Thanks, Linda. So so far,  
18 we've been looking at the United States, its situation  
19 and what we have done, and some of the other countries  
20 around the world are some distance ahead of us in  
21 dealing with this issue. So we have three presentations  
22 in this next section. We're going to have two on  
23 Canada, the first one is from Jason Donev who's a  
24 professor of physics at the University of Calgary, he  
25 has a PhD in physics from the University of Washington.

1 He is a dual citizen of both Canada and the  
2 United States, and to prove that, he lives in Calgary  
3 and he went to high school in Bakersfield.

4 So that will be the first, and then we have a  
5 second presentation that Linda will introduce, and  
6 finally, we have a presentation from Finland that it was  
7 pre-recorded, we recorded the interview with  
8 Pasi Tuohimaa nine days ago. He's in Austria right now,  
9 and it's 4:00 a.m. there, so we took the liberty of  
10 doing that, and so that's our program that we'll be  
11 looking at. And so with that, I'm going to introduce  
12 Jason Donev who is speaking to us from Calgary.

13 And Jason, are you there with us?

14 MR. DONEV: I am here, I'm ready to talk.

15 MR. HOUGHTON: Okay, great, it's all yours.

16 MR. DONEV: All right, thank you for inviting  
17 me. I run Energy Education dot CA, which is the largest  
18 repository, if you'll excuse the term, of energy  
19 information for adults, everybody else was doing it on  
20 kids. So Energy Education dot CA, check it out, we have  
21 over 1,100 pages of information on anything you could  
22 ever want to know about energy. Because as it says on  
23 the slide, I believe solving the world's biggest  
24 problems require understanding energy. Next slide,  
25 please.

1           So been enjoying the talks, it's interesting  
2 hearing the US perspective for a change, I'm very used  
3 to the Canadian perspective on nuclear waste. We have  
4 some different terminology. We have low level waste,  
5 intermediate level waste, and what we call high level  
6 waste is spent fuel. So when we refer to high level  
7 waste in Canada, we are actually just referring to the  
8 spent fuel, and it looks an awful lot like this. This  
9 is empty, this has never been in a reactor, this is what  
10 a CANDU fuel bundle looks like. Ours are a whole lot  
11 shorter than the US fuel bundles, which we'll talk about  
12 in a little bit. So what we have is some waste that has  
13 been produced, it needs to be handled, it needs to be  
14 gotten rid of, so in 2002, parliament, which is sort of  
15 like congress and the president wrapped up together,  
16 passed the Nuclear Fuel Waste Act, that's 2002, to form  
17 something that you don't really have in the US, which is  
18 a crown corporation. This is a company that is owned  
19 entirely by the government and then reports to  
20 parliament, sort of like reporting to congress, but it  
21 is actually a company that is arm's length from the  
22 people who are producing the nuclear waste, it is arm's  
23 length from the regulator, the Canadian Nuclear Safety  
24 Commission, which is sort of like your Nuclear  
25 Regulatory Commission, that's the police officers that

1 tell people what to do.

2 So this Nuclear Fuel Waste Act in 2002 formed  
3 an organization called the nuclear waste management  
4 organization. So the NWMO formed in 2002 and started  
5 having a whole lot of conversations with Canadians.  
6 Because what they wanted to do is they wanted to find a  
7 way to move forward on nuclear waste. Next slide,  
8 please. Oh, that didn't work correctly. Interesting.

9 MR. HOUGHTON: That's your next slide, isn't  
10 it?

11 MR. DONEV: No, the next slide, the graphs  
12 aren't supposed to be up yet.

13 MR. HOUGHTON: They're all there, sorry.

14 MR. DONEV: Okay. Okay.

15 MR. HOUGHTON: PowerPoint to PDF translation  
16 perhaps.

17 MR. DONEV: I didn't realize there was going  
18 to be a PDF translation of my PowerPoint.

19 MR. HOUGHTON: We'll see if we can fix that,  
20 but do the best you can.

21 MR. ANDERS: I think we did a PDF of your  
22 presentation, so we'll see if we can fix that, but right  
23 now, please go ahead with what you've got.

24 MR. DONEV: We can just talk over the slide,  
25 it's fine.

1           So the NWMO went from sea to shining sea to  
2 shining sea, because we've got -- you know, we're a  
3 triangle with an ocean on the top as well, and they  
4 talked to Canadians, they talked to indigenous people,  
5 they talked to small municipalities, they talked to  
6 large municipalities, they talked to old people, they  
7 talked to young people, they talked to lots and lots of  
8 different people, and they noticed a lot of emerging  
9 themes when the NWMO went out to talk to Canada -- to  
10 talk to Canadians. And among the things they said was  
11 the Canadians wanted a consent-based siting process.  
12 They want -- we, as Canadians, wanted a community to say  
13 yes, I want to be there, I want to have nuclear waste in  
14 my community buried permanently. So the NWMO took the  
15 very, very daring act of saying we are looking for  
16 communities, much like the previous speaker mentioned,  
17 are looking for communities that are interested in  
18 learning more.

19           So this was not, in fact, a commitment to  
20 having spent nuclear fuel buried there but a commitment  
21 to being part of the discussion process. 22 communities  
22 came forward, of those 22 communities, a number of the  
23 communities said no, we don't want this, a number of  
24 communities were excluded for geologic reasons or there  
25 wasn't enough interest, just, it didn't work for a bunch



1 of different reasons. So when we look at these 22  
2 different communities, of the 22 that are left, so if  
3 you can -- it's probably on a timer. So the -- one of  
4 the things that the commission said was we want the  
5 provinces that have benefited from nuclear power to host  
6 the repository. So that meant Saskatchewan, which has  
7 the highest uranium mine, highest grade uranium mine in  
8 the world, Ontario which gets 60 percent of its  
9 electricity from nuclear, Quebec or New Brunswick to  
10 host the repository. So they focused on communities  
11 within that. Three communities from Saskatchewan came  
12 forward. The remaining 19 came forward from Ontario.  
13 Two of those now remain. So the 19 and 21 that's  
14 Huron-Kinloss, that's on the shore of Lake Huron, so it  
15 should give you some idea of where that is in the US.  
16 And then number five is Ignace, and with Ignace, that's  
17 north of Minnesota.

18 Ignace has now voted within the past few  
19 months on whether or not they're -- they're willing to  
20 do this. The south Bruce Huron-Kinloss combined site is  
21 holding their vote sometime in the next couple months to  
22 say whether or not the municipality is ready to go. So  
23 next slide, please.

24 So the -- the response was that the vast  
25 majority of people of the 660 that voted, 590 said yes,

1 we're ready to vote, and the remainder were like not  
2 sure yet, not sure yet. But out of the actual vote,  
3 more than three quarters of the people who voted said  
4 yes. This was an overwhelming display within the  
5 municipality of an enthusiastic informed post community.

6 MR. HOUGHTON: Time check here, we're about  
7 halfway through our time, and we're on slide two or  
8 three, so let's -- just a heads up.

9 MR. DONEV: Okay. So that's what worked. The  
10 indigenous communities have not yet come forward, and if  
11 the indigenous communities say no, that completely halts  
12 this. Next slide, please.

13 So the options for waste, you can recycle or  
14 you can take what you've got and put it underground,  
15 that's already been discussed, so I won't really talk  
16 about it. Even if you recycle, you still have nuclear  
17 waste that you still have to deal with. Next slide,  
18 please. So much like what has already been discussed,  
19 in the short term for us, it's about ten years, you have  
20 spent nuclear fuel sitting in large pools of water, that  
21 water completely shields all the ionizing radiation, so  
22 it's the same method because the various experts for  
23 nuclear waste in Canada and US, Switzerland, et cetera,  
24 all talk to each other and come up with best practices,  
25 so we're doing very similar things. Next slide, please.

1           The time makes the fuel bundles less  
2 dangerous, so they want to hold off for decades, so  
3 that's why we're getting around to it now. Next slide,  
4 please.

5           So after 300 years, it's no more radioactive  
6 than getting a CT scan. Next slide, please.

7           So the interim storage, the medium term  
8 storage that is sitting on those pads that you have, for  
9 us, at most of our sites, this is Bruce Power, right  
10 next to one of the sites that's about to vote, this is  
11 the equivalent of that with a physicist for scale. We  
12 have those fuel bundles that are sitting inside of that  
13 dry storage container, those are also rated for 100 to  
14 150 years, they'd probably last a lot longer than that,  
15 but that's what they're rated for. The radiation makes  
16 them slightly warm to the touch. So we're doing  
17 something very similar there. Next slide, please.  
18 We'll just skip this slide.

19           So we have five barriers to manage our risk.  
20 So this is very, very similar to what I believe the  
21 first speaker talked about, we want a deep geologic  
22 repository, and we want to keep water from it, because  
23 international experts all agree that that's what's going  
24 to move the radioactive material around, so this -- this  
25 has largely been designed for either of the two

1 remaining sites. Next slide, please.

2 The first barrier is the fuel pellet itself,  
3 it's a ceramic which doesn't dissolve in water, and our  
4 fuel pellets look an awful lot like your fuel pellets,  
5 they are different but they are very similar. Next  
6 slide, please.

7 The next thing is that it's kept inside of the  
8 fuel bundles, so it's a solid. It's the size of a  
9 fireplace log or a rolled up yoga mat. This is a  
10 "zurcoy" and this will keep water out. It also keeps  
11 radon gas in. Next slide, please.

12 This sits inside of a used nuclear fuel  
13 container. This is two and a half meters long, which is  
14 about nine feet long, which is much, much shorter than  
15 the containers that would go for the Diablo Canyon. So  
16 that's copper coated and the copper-coated containers  
17 will hold the nuclear fuel indefinitely in perpetuity.  
18 And they hold 48 of these fuel bundles, and that's what  
19 we've been working on here in Canada. Next slide,  
20 please.

21 These are then packed in bentonite clay, and  
22 that stops the water flowing. This is to keep from  
23 corroding the copper, which is holding everything  
24 inside. So it's lots of redundancy of what we're doing.  
25 Next slide, please.

1           So we only need one hole for decades of spent  
2 nuclear fuel. Can I get a time check?

3           MR. HOUGHTON: Yeah, we just caught up pretty  
4 well, we've got about two or three minutes left.

5           MR. DONEV: Okay, good.

6           So the one hole for decades of spent nuclear  
7 fuel to me is a success story. We've done consent-based  
8 siting, and municipalities are in favor of it. The  
9 indigenous communities may or may not be in favor of it,  
10 and you can make a strong case that the indigenous  
11 communities were not initially part of the consent-based  
12 siting, and as a result, it's far, far less clear  
13 whether or not they're going to want to do this. The  
14 south Bruce site was also a potential host for a low and  
15 intermediate level waste, so this is your mop heads,  
16 this is your gloves, this is your resins, your filters  
17 and so forth, and that did not get approval. The  
18 indigenous community, the Saugeen Ojibway Nation, voted  
19 resoundingly no, we will not take the low level waste.

20           So we are a whole lot closer to having a  
21 solution for our high level waste, which isn't  
22 necessarily going forward, the vote could still be no,  
23 in which case, Canada, with the NWMO, will go back to  
24 the drawing board and do this again. And that's what  
25 we've had to do with our low and intermediate level

1 waste, so a separate DGR plan is now starting based on  
2 consent-based siting, because we made the same mistake,  
3 if you'll excuse the accusation, that was made in the US  
4 where it was command and convince. We are now really  
5 recognizing that we have to be engaged with the  
6 community from the get go. When we do that, we get  
7 resounding support. When we don't do that, we get  
8 resounding no's. Thank you for your time and thank you  
9 for the invitation, I hope that was close to the time.

10 MR. HOUGHTON: Yeah, that was great, Jason,  
11 thank you very much. And so stick around, please. The  
12 format we're going to have, we have one more  
13 presentation on Canada from Gordon Edwards. Linda will  
14 introduce him just in a moment, and then we have the  
15 pre-recorded story from Finland where they actually do  
16 have a repository build now. So we'll do Q&A after  
17 those two with our panel. And so Linda, I'll hand it  
18 back to you to introduce Gordon.

19 MS. SEELEY: Okay, thank you very much, Jason.  
20 That was very interesting. Gordon Edwards is our next  
21 speaker from Canada, he's the president and co-founder  
22 of the Canadian Coalition for Nuclear Responsibility,  
23 which is a non-profit corporation established in 1975,  
24 he's a retired professor of mathematics and science at  
25 Vanier College in Montreal.

1                   Gordon, are you there?

2                   MR. EDWARDS: Yes, I just unmuted my  
3 microphone, I'm here.

4                   MS. SEELEY: Okay. Welcome.

5                   MR. EDWARDS: Thank you. And I'm going to  
6 share my slides if I can. And I just wanted to make a  
7 correction. It's not true that the Nuclear Waste  
8 Management Organization is a crown corporation. It is  
9 owned by the nuclear producers, it's owned by the  
10 utilities that produce nuclear waste. There was a  
11 ten-year environmental assessment of the concept of  
12 geological disposal in Canada, and during that  
13 assessment, they unanimously recommended that there  
14 should be an independent agency to look after nuclear  
15 waste, but the government of Canada decided not to do  
16 that and to put it right into the hands of the nuclear  
17 waste producers, which is one of the problems that many  
18 people are having with the process.

19                   Another point I'd like to make is that the  
20 consent-based process that has been talked about only  
21 dealt with the one option, which is a geological  
22 disposal of radioactive waste, and did not consider the  
23 possibility of phasing out of nuclear power as an  
24 alternative option to proceeding with the industry, that  
25 was a source of contention as well. So my talk is

1 really about the basics of nuclear power, and I hope it  
2 is of some value to people. If I can just get it  
3 started.

4           Okay. If nuclear power were just generating  
5 electricity and nothing else, it would be safe, but it's  
6 also mass producing deadly radioactive poisons that were  
7 never found in nature before the nuclear age began just  
8 85 years ago. For example, nuclear fuel can be safely  
9 handled before it goes into the reactor, but after it  
10 comes out, it is millions of times more radioactive and  
11 it will kill any nearby human being in a matter of  
12 seconds by an enormous blast of gamma radiation. What  
13 makes the used fuel suddenly so dangerous? Well, inside  
14 the fuel, there are literally hundreds of brand new  
15 varieties of radioactive elements that are created by  
16 the splitting of uranium atoms. These are smaller atoms  
17 which are the broken pieces, they're called fission  
18 products. For example, iodine 131, cesium 137,  
19 strontium 90, and hundreds more. These are radioactive  
20 varieties of nonradioactive elements that exist in  
21 nature all around us. They are human-made radioactive  
22 poisons, they're sort of like evil twins of what exists  
23 around us, and this is a list of about 211 of them,  
24 which is not a complete list, from Atomic Energy of  
25 Canada, Limited.



1           Just to give you an example, ordinary table  
2 salt has a little bit of iodine added to it, it's called  
3 iodized table salt. This is not radioactive. It goes  
4 to the thyroid gland, and it helps to prevent a terrible  
5 disfiguring disease called goiter. Well, nuclear plants  
6 produce radioactive iodine. It also goes to the thyroid  
7 gland, it also counteracts goiter, but it causes cancer.  
8 6,000 children in Belarus had to have their thyroid  
9 glands surgically removed because of radioactive iodine  
10 given off from the Chernobyl accident in 1986. In  
11 northern England and Wales, for 30 years after  
12 Chernobyl, sheep farmers could not sell their meat for  
13 human consumption in cases where it was contaminated  
14 with radioactive cesium. Now, cesium again is not  
15 radioactive in nature, but nuclear power makes  
16 radioactive cesium. To this day, hunters in Germany and  
17 Austria who kill a wild boar cannot eat the meat because  
18 of radioactive cesium contamination from Chernobyl  
19 almost 40 years ago. I'm having a little difficulty  
20 with -- you know, everything is made up of atoms. The  
21 only difference is that a radioactive atom will suddenly  
22 explode, it's called an atomic disintegration.

23           Radioactive atoms are like little time bombs.  
24 If they explode inside you, they can damage living  
25 cells, especially DNA molecules. When DNA is damaged,

1 it may make things grow in an unnatural way. Some of  
2 the radiation damaged cells can and do develop into  
3 cancers of a great many kinds. What's even worse is  
4 that if the reproductive cells are damaged, the eggs or  
5 the sperm, genetic illnesses can be passed on to  
6 children and grandchildren, and this danger remains as  
7 long as the radioactive wastes remain, which is  
8 essentially forever.

9           Every radioactive material has a half-life,  
10 that's how long it takes for half of the atoms to  
11 disintegrate. Some have very long half-lives.  
12 Plutonium 239, for example, has a half-life of 24,000  
13 years, that's five times longer than the Egyptian  
14 pyramids have existed. And when a plutonium atom  
15 disintegrates, it doesn't disappear, it turns into  
16 another radioactive material that has a half-life of  
17 600 million years. So radioactive wastes remain  
18 dangerous for millions of years.

19           This is a chart covering ten million years of  
20 projection after coming out of the reactor. They are  
21 the most toxic wastes ever produced by any industry  
22 ever. They are essentially indestructible. Countless  
23 billions of dollars are planned to be spent to keep  
24 these materials out of the food we eat, the water we  
25 drink, and the air we breathe. In fact, the real

1 products of a nuclear reactor, you could say, are  
2 radioactive waste and plutonium which remain dangerous  
3 for millions of years.

4           The electricity is just a little blip, a  
5 little short term benefit for a few decades. The  
6 radioactive legacy lasts forever. The very first  
7 reactors did not produce electricity. They were built  
8 for the express purpose of creating plutonium for atomic  
9 bombs. Plutonium is a uranium derivative, and it is  
10 created inside all uranium-fueled reactors. It's one of  
11 the hundreds of radioactive byproducts created by  
12 fission. Plutonium is the stuff from which nuclear  
13 weapons are made. Every large nuclear war had in the  
14 world's arsenals uses plutonium as a trigger. In fact,  
15 when they dismantle these weapons, they simply remove  
16 the plutonium and it's no longer a nuclear weapon.

17           But plutonium can also be used as a nuclear  
18 fuel. The first electricity-producing power reactor  
19 started up in 1951 in Idaho. It was called the EBR1  
20 reactor, it suffered a partial meltdown. EBR stands for  
21 Experimental Breeder Reactor, and it was cooled not with  
22 water but with hot liquid sodium metal. Another sodium  
23 cooled electricity producing reactor was built right  
24 here in California, and it also had a partial meltdown,  
25 the Santa Susana reactor. The same thing happened to

1 the Fermi 1 reactor outside of Detroit, another sodium  
2 cooled reactor, another partial meltdown.

3 The dream of many nuclear proponents was and  
4 still is to use plutonium as the fuel of the future,  
5 replacing uranium. A breeder reactor is one that uses  
6 plutonium for fission and simultaneously produces even  
7 more plutonium than it uses. Breeder reactors are  
8 usually sodium cooled. But sodium cooled reactors have  
9 failed commercially all over the world, in the US,  
10 France, Britain, Germany, and Japan. Nevertheless, it  
11 is still the holy grail of the nuclear industry, the  
12 breeder reactor, so watch out.

13 This might be next on the agenda. There is in  
14 fact a sodium cooled reactor right now, the Natrium,  
15 that is being proposed in the United States. Also, in  
16 Canada, we have a Moltex reactor. To use plutonium, you  
17 have to extract it from the fiercely radioactive nuclear  
18 fuel. The technology of plutonium extraction is called  
19 reprocessing and must be carried out robotically because  
20 of the deadly penetrating radiation from the used fuel.  
21 In the past --

22 MS. SEELEY: Excuse me, Gordon, can you move  
23 on to -- because this is about our -- can you move on to  
24 the rolling stewardship idea.

25 MR. EDWARDS: Yes. Okay, fine.

1 MS. SEELEY: Thank you.

2 MR. EDWARDS: For the first 30 years of the  
3 nuclear age until the mid-1970's, no one knew about  
4 radioactive waste, and the nuclear industry did not tell  
5 anyone about it. People were told that nuclear power's  
6 clean and they believed it, but it was not true. In the  
7 mid-70's, radioactive waste suddenly became public  
8 knowledge, major reports in several countries called for  
9 a halt to nuclear power unless that problem is solved.  
10 The industry in self-defense claimed without real  
11 evidence that they had a solution to bury the waste in  
12 an undisturbed geological formation. But of course, the  
13 moment you dig, it is no longer undisturbed, and we  
14 don't have any scientific method for proving that if you  
15 put something underground that it will stay there  
16 forever, because the containers are going to  
17 disintegrate and they are the containers of the waste.

18 The fuel bundles themselves, the fuel  
19 assemblies are not the waste but the containers of the  
20 waste. All those hundreds of radioactive materials are  
21 inside. Any damage to the containers, even scratches or  
22 pinholes, will allow some of those wastes to escape.  
23 And they're not all contained in the fuel; some of them  
24 are in the gap between the fuel and the cladding. So  
25 rolling stewardship is a concept put forward by the

1 National Academy of Sciences in connection with other  
2 long-lived toxic wastes like heavy metals and asbestos.

3           When we do not have a solution to a waste  
4 problem, we must not simply abandon the waste. We must  
5 continue to look after it on an intergenerational basis,  
6 passing the responsibility on to the next generation  
7 along with the knowledge and the resources with the  
8 object of continually improving the safe storage from  
9 one generation to the next.

10           Now, rolling stewardship is not a solution to  
11 the waste problem but rather an acknowledgment that we  
12 do not yet have an actual solution. So instead of  
13 deserting the waste as the industry wants to do, we  
14 should monitor it and make sure it is retrievable.  
15 Instead of waiting for the containers to fall apart  
16 underground, we should repair and repackage and improve  
17 the packaging and other safety measures from one  
18 generation to the next. Instead of abandoning the  
19 waste, we should look after it. Instead of walking away  
20 from the waste, we should monitor it and keep it  
21 retrievable.

22           Geologic disposal assumes that you will  
23 abandon it. Leakage in a burial chamber will not be  
24 detected until it is too late. Rolling stewardship will  
25 allow us to take timely action to stop the leak and to

1 prevent recurrence. Instead of closing the door on  
2 research to find a genuinely permanent solution to the  
3 waste problem, rolling stewardship will keep that quest  
4 at the forefront of human consciousness. This sounds,  
5 to some, idealistic, but in fact, it is quite realistic.  
6 The worst thing about self-deception, thinking that you  
7 have a solution when you don't, is that you end up with  
8 a mess, a vastly inferior and dangerous form of rolling  
9 stewardship, because it was not planned for at the  
10 outset.

11 We know how to package these wastes well  
12 enough to keep the radioactive contents out of the  
13 environment. The containers should be thick-walled,  
14 very robust, built to last, but they should not be right  
15 beside major bodies of water. They should be subject to  
16 hardened on-site storage, away from the shores and  
17 protected against external forces. The main reason that  
18 nuclear waste storage is currently so unsatisfactory is  
19 that the industry has told us it is only temporary. We  
20 have to stop thinking that way. Because we do not have  
21 a solution, rolling stewardship is what we do in the  
22 meantime to keep ourselves and our environment safe from  
23 the radioactive legacy of the nuclear age.

24 One of the worst things about abandoning  
25 radioactive waste is that over the very long term,

1 amnesia sets in, and amnesia means that nobody anymore  
2 knows where it is or what it is, and consequently, there  
3 isn't the knowledge and the technology available to deal  
4 with it. Rolling stewardship on the other hand is  
5 predicated on the persistence of memory. The knowledge  
6 of these highly toxic wastes and how to deal with them  
7 must be kept alive from generation to generation because  
8 it remains an ongoing risk.

9           In 2019, I attended a three-day conference in  
10 Stockholm, Sweden, about how to warn future generations  
11 about the legacy of radioactive waste that we are  
12 leaving behind. We do not know even what languages  
13 people will be speaking in 2,000 years or 10,000 years,  
14 so how do we warn them? Do we put up a sign saying "do  
15 not dig here"? Will they understand the sign? And if  
16 they do understand it, will they obey it? If I were a  
17 future archaeologist who came across such a sign, I  
18 would say to my team "let's dig here."

19           The Stockholm conference was an interesting  
20 affair. One third of the participants were nuclear  
21 scientists from several countries, one third were  
22 independent commentators and critics like myself, and  
23 one third were librarians and archivists and museum  
24 curators. When you know little about radioactive waste  
25 but lots about preserving records, knowledge, and



1 memory, we were all aware that the problem we were  
2 addressing was similar to the problem of communicating  
3 with extraterrestrial intelligence.

4           How do we communicate with no assurance that  
5 they understand any of the human languages that we use  
6 today? One of the advantages of rolling stewardship is  
7 that one can more easily pass on the knowledge,  
8 information, and technology from one generation to the  
9 next rather than trying to communicate with a completely  
10 unknown society of the future. We can still leave  
11 records for future societies, but each generation can  
12 review the adequacy of those records and try to improve  
13 them.

14           The age of nuclear energy will come to an end,  
15 but the age of nuclear waste will continue forever  
16 unless we learn how to eliminate that radioactive waste  
17 permanently. As long as we continue to build and  
18 operate nuclear reactors, we are simply compounding an  
19 already intractable problem. Because no matter how fast  
20 we bury the old waste, the surface of Europe will always  
21 be prone to catastrophic releases from the freshly  
22 produced nuclear waste of new reactors which will  
23 accumulate every day in the core of operating reactors  
24 and in the immediate vicinity of those plants.

25           Burial is no solution as long as the industry

1 is growing or even maintaining the status quo. There  
2 will be at least 30 years of unburied waste at the  
3 surface at all times. California was wise to pass a law  
4 since 1976 that phases out the production of new nuclear  
5 waste by banning the building of new nuclear plants.  
6 It's time for other states and other nations to follow  
7 suit. Thank you.

8 MS. SEELEY: Thank you very much.

9 Okay, now, Dave.

10 MR. HOUGHTON: Okay, two rather different  
11 perspectives from our neighbors to the north. And to  
12 conclude this section, we are now going to hear from  
13 Pasi Tuohimaa, who has background in journalism and  
14 communications. Pasi works with Posiva Oy which is the  
15 company that designed and built the world's only, to  
16 date, geologic repository. And this is a pre-recorded  
17 interview that we did just over a week ago, and I  
18 mentioned the time difference, and that's why we did it  
19 that way.

20 So the interview was conducted by myself and  
21 Kara of this panel, and so we have 15 minutes of that,  
22 and after that, we'll have some Q&A. Thank you.

23 MR. SEVERANCE: Can you clarify that that  
24 Q&A's going to include Jason and Gordon?

25 MR. HOUGHTON: Yes.

1 MR. SEVERANCE: Okay. Thank you.

2 MR. HOUGHTON: We have Pasi Tuohimaa from  
3 Finland and he's going to be talking with us about the  
4 Olkiluoto spent nuclear fuel repository in Finland, and  
5 they're really the only one who has successfully pursued  
6 this so far. So I'm going to turn it over to Pasi now,  
7 he's going to tell us his story.

8 MR. TUOHIMAA: Hello, everybody, and greetings  
9 from Finland. My name is Pasi Tuohimaa, I'm a  
10 communications manager for Posiva, which is the company  
11 that is taking care of the final disposal of the Finnish  
12 spent nuclear fuel. We're just about ready to start the  
13 real operation, so we're quite far.

14 MR. HOUGHTON: So Olkiluoto is pretty much  
15 built at this point, and how long has it taken you to  
16 construct this and do the design work and everything?

17 MR. TUOHIMAA: Well, the whole process has  
18 been quite long, but I actually looked that in October,  
19 it's exactly 20 years since we started excavating the  
20 underground facilities, so it's been a long way.

21 MR. HOUGHTON: Was there a long process in  
22 site selection or was that fairly straightforward in  
23 your case?

24 MR. TUOHIMAA: The site selection was -- of  
25 course, the whole world was very different at that time,

1 there was no social media, there was no quick medias.  
2 We started it in the end of 70's, and in the beginning,  
3 we had more than a hundred sites all over Finland, but  
4 then we found out that the bedrock in Finland, it's  
5 quite suitable almost everywhere. So then we decided  
6 that the best places would be close to the power plants  
7 where there's also suitable bedrock. And because people  
8 were used to nuclear power, we had a really good track  
9 record, so did the other place, "Loby Saiid" from  
10 Helsinki. And actually, in the end, there was just  
11 five, and then two of the nuclear sites, they were  
12 really on the municipalities around them, they were  
13 really competing, which one of them would get the site.  
14 So it's been quite interesting, and that has been our  
15 message, that the more people know about nuclear, the  
16 less they fear about it.

17 MR. HOUGHTON: And then how big is the nuclear  
18 sector in Finland, how many plants do you have and what  
19 percentage approximately of the Finnish electricity is  
20 provided through nuclear?

21 MR. TUOHIMAA: Finland now has five  
22 functioning reactors, two east from Helsinki and then  
23 three at our site here in the west coast of Finland.  
24 The annual amount of nuclear energy or electricity in  
25 Finland is something like 45, 46 percent. Now we have

1 the first five final disposal tunnels ready to take the  
2 oldest cooled spent fuel, and then it goes in terms that  
3 then we continue excavating later on. And if everything  
4 goes as planned, we will continue for the next hundred  
5 years. This is short lived, Finland's approach to final  
6 disposal of spent nuclear fuel, and I put the Diablo  
7 Canyon Decommissioning Engagement Panel there as well,  
8 for the headlines.

9 MR. HOUGHTON: Thank you.

10 MR. TUOHIMAA: First of all, there's a picture  
11 of Olkiluoto Island, there you can see up there our  
12 three reactors, Olkiluoto the one in the middle,  
13 Olkiluoto the two on the right, and then Olkiluoto the  
14 three which is the newest one in Europe which at the  
15 moment is a 1,600-megawatt power plant, so it came to  
16 commercial production last year, so it will continue at  
17 least 60 next year, and then you need to cool down 40  
18 years the spent fuel, so that's where the hundred years  
19 comes.

20 We have all the waste management in one  
21 island. We have the decommissioning waste repository at  
22 the end of the island, we have operating waste  
23 repository which is low and medium level waste,  
24 contaminated things from the power plant. Low level is  
25 tools, overall, things like that. And the medium level

1 is the kind of waste that we get in filters from the  
2 steam -- particles from the steam and then we put it in  
3 plutonium and then pack it.

4 MR. HOUGHTON: So everything except for spent  
5 fuel, pretty much.

6 MR. TUOHIMAA: There we have the interim  
7 storage for spent fuel, there's three pools, and we  
8 built three more pools, so all the waste that has been  
9 produced in this island during the last 45 years, it's  
10 there. And then here in the front we are building the  
11 encapsulation plan and disposal facility for spent fuel.  
12 It's always better to put it underground to a half  
13 kilometer or more than keep it on temporary storages.  
14 And people here, so do we feel, that our generation that  
15 has decided to make nuclear energy, it's our  
16 generation's responsibility to also take care of the  
17 waste and not leave it to the solar diary of the future  
18 generations or future taxpayers.

19 MR. HOUGHTON: So why don't you take us into  
20 the guts of this thing and show us the tunnels and  
21 everything that you have there.

22 MR. TUOHIMAA: Well, here you can see also in  
23 this picture, here in the left-upper corner, there's a  
24 long tunnel. This tunnel, which you can go down via  
25 cars and vehicles, it's a five-kilometer long tunnel,

1 and it goes -- there's like a small village, the  
2 technical area down there, and then the five first  
3 tunnels are there, but let's move on.

4 MS. WOODRUFF: How long do you have to store  
5 this material for it to be non-dangerous to people? I  
6 think in a documentary, I saw the expectation is a  
7 hundred thousand years. Do you agree with that?

8 MR. TUOHIMAA: That's a requirement, that's  
9 from the regulator. They decided that if you do this  
10 final disposal of spent fuel, you have to guarantee it's  
11 safe for at least a hundred thousand years. And we have  
12 the saying that we have taken the uranium from the rock  
13 and we put it back to the rock. Well, this sorts the  
14 time scale, that's how we started, and it's in the end  
15 of 70's, there were site investigations. Then the  
16 detail design, which we did together with the Swedes,  
17 which is this multi-barrier system. Then we started to  
18 excavate it in actually 2004, but first it was a  
19 research facility, and then we got the construction  
20 license in 2016, and now we are just about to start the  
21 operation and we'll end somewhere there, 2120.

22 Like I said, only safe final disposal is  
23 possible. This is the multi-barrier principle in short.  
24 You have the pellets, then fuel rod, fuel assembly,  
25 inner canister, which is cast iron, outer canister,

1 which is copper, then we have buffer bentonite clay  
2 around it, which is very -- it swells when it gets a  
3 little bit humidity, but then it's flexible, also, if  
4 there will be any rock movements. And then in the end,  
5 there's this almost half a kilometer of bedrock. But  
6 the capacity of the whole repository is 6,500 tons,  
7 uranium tons, and that means something like 3,250  
8 canisters which are like 6 meters long, they are quite  
9 big ones.

10           Footprint, it's about two square kilometers.  
11 It's -- in this island, we are not under the power  
12 plants and we are not under the sea, so we're here. And  
13 our excavating volume will be, in the end of the  
14 project, about two million cubic meters. And we now  
15 have like ten kilometers of tunnels, and in the end,  
16 there will be like 50 kilometers of tunnels.

17           MR. HOUGHTON: Good.

18           MR. TUOHIMAA: There's some pictures where we  
19 are, that you can also see the structure here in the  
20 middle. We have already underground canister receiving  
21 station, we have canister storage rooms, we have a lot  
22 of air-conditioning, they're all completed now. There's  
23 a personal shaft which is 300 -- 450 meters, it's a  
24 really really fast elevator. That helped a lot, because  
25 it used to take like 25 minutes to go down. Now it



1 takes one minute, six seconds for the people. There are  
2 pictures of the first real final disposal tunnel, it's  
3 350 meters long, it holds every six meters, and that's  
4 deep underground. There's a drilling machine, another  
5 one, that's also you can see a hole drilled underneath.  
6 Encapsulation plant, it's really a 500-million Euros  
7 complex, which everything is done remotely. You can see  
8 here the room number two, which is the encapsulation  
9 chamber where all the magic happens, there are docking  
10 stations for the canister and the fuel transport cask,  
11 the drying station for the spent fuel, and also the fuel  
12 handling itself, it's quite special.

13 MR. HOUGHTON: It's all robotic and done by  
14 machines, right?

15 MR. TUOHIMAA: Yeah, it's all robotic. No  
16 human beings can be there when you have highly  
17 radioactive stuff being encapsuled. There's a newer  
18 picture, what it looks like now. These were a bit older  
19 ones, but there's a fuel transfer machine in there, and  
20 everything is done automatically, and we are exactly  
21 testing it just right now.

22 MR. HOUGHTON: Okay.

23 MR. TUOHIMAA: We have a canister building, a  
24 machinery station, that's on the line as well. So the  
25 capsules are upwards, and just at the end of it, it's

1 the encapsulation chamber, then it goes down. It moves  
2 in the line, in the corridor, and then it pops up in the  
3 welding station, it's welded. It's actually a US-made  
4 welding machine, DuPont Industries, then it comes down,  
5 and the machining is done, and then it moves onto the  
6 storage on the ground level. And this is the canister  
7 transfer trolley in the canister transfer corridor where  
8 the huge six-meter capsule is upwards.

9 MR. HOUGHTON: And what was the total cost of  
10 this -- the entire site including the design and  
11 construction?

12 MR. TUOHIMAA: Well, we've said that so far,  
13 that when we'll start the operation, we have spent like  
14 1 billion Euros, and then when we move on, we have  
15 calculated that that will be like 40 million Euros every  
16 year as keeping the process going.

17 MR. HOUGHTON: The 1 billion Euros, does that  
18 include the encapsulation plant which you said was 500  
19 million?

20 MR. TUOHIMAA: Yeah, because excavating is not  
21 that expensive. It's -- the technology is in the  
22 encapsulation plant and the elevators, they are the  
23 costly things.

24 MR. HOUGHTON: Okay, interesting.

25 MR. TUOHIMAA: Although I know many waste

1 organizations in the world, they have spent much more  
2 money and they still haven't got anything, but it's  
3 just, you know.

4 MR. HOUGHTON: Right.

5 MR. TUOHIMAA: But that's our expenses. In  
6 the end, you can say that it's like 5 billion Euros, but  
7 that's hypothetical, because it's so much in the future.

8 MR. HOUGHTON: Was there opposition to this or  
9 was pretty much the citizenry of Finland on board with  
10 this, was that a difficulty for you?

11 MR. TUOHIMAA: In the beginning, when the site  
12 selection was in a different place and people didn't  
13 know, if you go north and eastern Finland, they didn't  
14 know about anything, they didn't have any experience,  
15 they didn't know about the safety culture in the power  
16 plants, they were very skeptical. And our message is  
17 that it's really difficult to go somewhere where people  
18 do not have industrial identity or nuclear identity, and  
19 this has been the message to all of our customers  
20 worldwide, that it's better to start looking the place  
21 where you already have trust, where you have been open  
22 and transparent and people know your safety culture,  
23 they have family members, they have friends who work in  
24 the power plant, they're not scared, they know it's  
25 like, you know, in Diablo Canyon for sure.

1 MR. HOUGHTON: Yeah.

2 MS. WOODRUFF: So I just wanted to confirm the  
3 total cost, because I think I read it was about  
4 3.9 billion US dollars total cost. Do you think that's  
5 a reasonable figure?

6 MR. TUOHIMAA: What is the total cost? Is it  
7 now or is it after a hundred years? So it's really  
8 difficult to -- I would say it's 5 billion Euros in the  
9 total cost in the end. But right now, it's 1 billion.

10 MS. WOODRUFF: And then secondly, when you  
11 think about a hundred thousand years, I think if you  
12 call a generation 25 years, that's about 4,000  
13 generations where this will be stored, and I guess the  
14 question that comes to mind is for future generations,  
15 are you going to try to warn them to not go down there  
16 and discover this toxic material, or conversely, are you  
17 going to try to hide it so people don't think about  
18 considering what's down there, or is there some other  
19 approach that you're considering?

20 MR. TUOHIMAA: This is the question I've asked  
21 quite often, but the concept is we had really, really  
22 philosophical discussions a long time ago, and we  
23 decided that there's no need to mark it at all. The  
24 thing is that as long as we are here, as long as future  
25 generations, as the societies are like they are now, of

1 course, the information is there, but then if you think  
2 next ice age, for example, after 10,000 years or  
3 something when there's two kilometers of ice on top of  
4 Europe, there's no Paris left, there's no London left,  
5 there's no industries left, no Helsinki, no Stockholm,  
6 everything is demolished, or if there would be a -- a  
7 huge explosion in the world that everything is to  
8 disappear, and then some humankind of people, they  
9 start, you know, living again, how do we know what kind  
10 of language, what kind of signals do they understand?  
11 And then if you would mark the site, it would all be  
12 demolished anyway by the ice, so there would be nothing  
13 left. So it's better to put it down, fill up the  
14 tunnels, put back the granite and the rocks, and just  
15 close it, and then it's there.

16 MR. HOUGHTON: That's the word from Finland.  
17 So we have a little time, I'll let Chuck monitor some  
18 Q&A here, and you can be the master of that, Chuck.

19 MR. ANDERS: We have a few minutes, as Dave  
20 said, for some questions of our speakers that are  
21 online, or Dave who participated in the interview.

22 Bruce.

23 MR. SEVERANCE: Yeah, I'm always interested in  
24 life cycle cost, and if we have a responsibility to  
25 isolate and show good stewardship for the waste, what is

1 the plan like, at least a thousand years or you kind of  
2 give up after 500? Do -- do federal agencies have a  
3 sense for how long they're going to watch the nuclear  
4 waste? And I had one other question, just because the  
5 dynamics of how things get done in Finland and Canada,  
6 and I realize the Finnish presenter isn't here, but one  
7 of the issues in the United States that's created a lot  
8 of barriers are the, you know, relationship between  
9 state and federal agencies and the dynamics of that, you  
10 know, tending to cause, you know, a stick in the mud,  
11 you know, that would interfere with eventual solutions  
12 at least in the United States. So what is Canada doing  
13 differently in order to kind of overcome those  
14 differences between local and federal interests?

15 MR. HOUGHTON: Bruce, I can tackle the first  
16 part of your question about how long do you do this, and  
17 on behalf of Finland and what Pasi has described, the  
18 plan is to construct and place the waste for the next  
19 hundred years, and then to back fill, and then to walk  
20 away, so that's their plan.

21 MR. ANDERS: And I'm wondering if either  
22 Gordon or Jason has a comment on how Canada might be  
23 doing it differently than the US.

24 MR. DONEV: Absolutely. Dr. Edwards, would  
25 you like to go first or second?

1 MR. ANDERS: Let's go with Jason and then  
2 Gordon.

3 MR. DONEV: Okay. So if you divide it out,  
4 we've got a \$24 billion project, and if you look at the  
5 amount of electricity that goes towards, that's \$36 to  
6 store a Canadian's nuclear waste for a year for the  
7 hundred-thousand-year life cycle, because that hundred  
8 thousand years to a million years, the engineering is  
9 there one way or the other. As to how Canada is making  
10 sure that federal and provincial and municipal  
11 governments all cooperate, we also have problems with  
12 that, that is very much a difficulty. One thing that  
13 Canada did do differently in setting up our government  
14 from how the US has set up our government, because I am  
15 both, is that the delineation of responsibilities is  
16 actually laid out more clearly. So I do think that  
17 there will be provincial and federal conflict on  
18 whatever the final repository is. But we have very  
19 clearly laid out that the impact assessment agency and  
20 the Canadian Nuclear Safety Commission are the governing  
21 bodies that actually have to sign off on this, but they  
22 will have to work with certain provincial authorities.  
23 I don't want to get too lost in the weeds here, but  
24 that's actually what's next.

25 If one of these two sites gets picked, that

1 does not necessarily mean that there will be a site  
2 there, it does not necessarily mean that it's a go.  
3 What happens after that point is a long assessment  
4 process where there's a lot of opportunities for  
5 intervenors to come in and say this is why this is a  
6 problem. So there will be collaboration between the  
7 federal, provincial, and municipal governments, there  
8 will also be conflict. As a physicist, I think I'm sort  
9 of tapping out my limit on that, but I'll turn it over  
10 to Dr. Edwards.

11 MR. ANDERS: Gordon, go ahead. Thank you.

12 MR. EDWARDS: Yes, it's true, there are kind  
13 of differences for sure. Manitoba is the only province  
14 that actually excavating an underground research  
15 laboratory and they passed a law making it -- forbidding  
16 the burial of radioactive waste in the province of  
17 Manitoba, so they were not even included in the NWMO  
18 search process. Saskatchewan, they did have a  
19 consultation with their population, and the population  
20 rejected the idea of accepting high level radioactive  
21 waste in that province. In New Brunswick, they didn't  
22 even try to find a site in New Brunswick, but in Quebec,  
23 there was a unanimous resolution, and there's very few  
24 unanimous resolutions coming out of the National  
25 Assembly of Quebec because of internal divisions, but



1 there was a unanimous resolution against the idea of  
2 importing radioactive waste from any other jurisdiction  
3 for permanent disposal in Quebec.

4 So there was also an incident, by the way, in  
5 the United States when they were originally looking at  
6 two possible sites, one in the southwest and one in the  
7 north east, where the Canadian government sent a note to  
8 the US government through their ambassador saying that  
9 Canada would not look favorably on a high level  
10 radioactive waste site on the border with Canada where  
11 the water flows into Canada, and that's one of the  
12 reasons why the north east site was dropped from the  
13 law. The law was amended, as was mentioned by earlier  
14 presenters, where originally they were looking for two  
15 sites and then they narrowed it down to only the one,  
16 Yucca Mountain.

17 So there's many a slip between the cup and the  
18 lip as they say, and it's quite possible that they could  
19 come up empty handed as they did previously. They were  
20 trying to find -- back in the 1980's, they were trying  
21 to find a home for voluminous radioactive waste hailings  
22 from uranium mining and processing. These are not high  
23 level radioactive wastes but very voluminous and toxic  
24 wastes that are very long-lived, and they spent eight  
25 years trying to find a consent-based community in

1 Ontario, and they ended up coming up empty handed, so  
2 that could also happen again.

3 It is quite clear, one thing that's quite  
4 clear is that the assurances that governments are given  
5 by the industry that this would be a relatively simple  
6 thing, to bury the waste in an undisturbed geological  
7 formation, has turned out to be abysmally wrong, and  
8 it's -- it's led us to wonder whether the whole idea of  
9 abandoning it in an underground repository when we have  
10 no scientific way of knowing that it will in fact stay  
11 there for these periods of time, whether this is really  
12 a wise decision and whether the law should be changed in  
13 both Canada and in the United States to reflect a more  
14 realistic appreciation of the situation.

15 MR. ANDERS: Thank you both, Jason and Gordon.  
16 Panel, any other comments, questions, or  
17 discussion? Linda.

18 MS. SEELEY: Just a quick comment. Sitting  
19 here, listening to these presentations and about how --  
20 we have these ideas and hopes that we will have a  
21 permanent repository, if that's even a good idea,  
22 because we don't know what's going to happen in the next  
23 hundred thousand to a million years, this idea of  
24 rolling stewardship seems much more sensible to me to  
25 keep it in sight, to keep looking at it and changing it

1 and making sure that it doesn't escape into the  
2 biosphere. We've got it, and it seems to me that the  
3 responsible thing to do is to take care of it, it's like  
4 having a bad kid that you know doesn't mean to be bad,  
5 but you have to take care of them and watch them and  
6 make sure they don't do something to harm the rest of  
7 the world.

8 MR. EDWARDS: To add one little point, in  
9 Germany, they had a geological disposal for much less  
10 radioactive waste, low and intermediate level waste,  
11 called the asitu salt mine, and they put those wastes  
12 down there for many decades, and now the German  
13 government has discovered that that's been a complete  
14 fiasco and they're removing the waste from the  
15 underground repository back to the surface again at a  
16 cost of more than \$5 billion, and it'll take 30 years,  
17 and it's not an easy job to get the waste out of there  
18 again. So this is a kind of a nightmare scenario. We  
19 all know that you can put the waste underground. The  
20 question is is it going to be safe there? And what  
21 happens if it turns out that it was a bad choice and  
22 you've got to take it out again? We've already seen  
23 that happen with one repository and possibly two in  
24 Germany, thank you.

25 MR. ANDERS: We have Paul Murray has his and

1 up for a comment. Paul.

2 MR. MURRAY: So several things. The National  
3 Academy of Sciences in the US first recommended that the  
4 US should have a geological depository in 1957. Ever  
5 since then, our best scientists, our best engineers have  
6 continuously recommended that in the US that we have a  
7 geological repository. All other countries with nuclear  
8 programs, with the exception of Spain and the Ukraine,  
9 have moved forward with geological repository programs.  
10 In the US, we've had to have the geological repository  
11 operating in Carlsbad, New Mexico, for 25 years to  
12 dispose of transuranic waste from a weapons production  
13 program. The facility just received a 15-year extension  
14 to its operation. So I'm going to say that the best  
15 scientists in the world and the best scientists in the  
16 US recommend that we have a deep geological repository  
17 for the disposal of our spent nuclear fuel and high  
18 level waste.

19 Remember, we have 140,000 tons of spent  
20 nuclear fuel, we have 21,000 high level waste canisters,  
21 we have the spent nuclear fuel from the naval reactors,  
22 and we have the DOE spent nuclear fuel.

23 MR. ANDERS: Thank you. One last comment from  
24 Jason, and then we'll move on.

25 MR. DONEV: Thank you. As a scientist, I do

1 agree with those brightest best scientists. I would not  
2 put myself in that category, but I do agree. And one of  
3 the reasons I agree is working with the indigenous  
4 communities, they talk a lot about learning from the  
5 rock, and there's some rock that we've learned from in  
6 Canada where we see that uranium has stayed in place  
7 half a kilometer under the surface for millions of years  
8 with no engineering to keep it in place. So we are  
9 looking at that. We are also looking at the Aclocabal  
10 mine in Africa where there was a natural nuclear  
11 reactor, and the geology just kept the fission products  
12 in place for billions of years, a thousand times longer  
13 than what we need. So scientists are actually  
14 looking -- and engineers are looking at what nature can  
15 tell us about what happens with these radionuclides  
16 under the rocks. And it's very impressive that without  
17 engineering, it stays put, and with engineering, I'm  
18 confident it would be even more stable. Yes, this is a  
19 difficult problem, this is not something that's easy to  
20 do, and that's why smart people have been working for a  
21 long time to do their absolute best to solve this as  
22 best they can. That's what I wanted to add. Thank you.

23 MR. SEVERANCE: Can I ask one really short  
24 thing? I promise it's five seconds.

25 Gordon, could you just elaborate on what the

1 fiasco was? Was there ground water intrusion or what  
2 was the issue in Germany that you said required them to  
3 pull all the waste back to the surface?

4 MR. ANDERS: Gordon, I think you're muted.

5 MR. EDWARDS: Yes, the problem of seepage, the  
6 waste had been seeping into the ground water for about  
7 ten years, and because of the bad public relations that  
8 would accrue to revealing that this leakage was  
9 occurring, it was kind of hidden for about ten years  
10 until finally, the people in charge of the repository  
11 fessed up and said yeah, it's really happening, and  
12 that's when the German government was quite scandalized  
13 and said this has got to be corrected, and the only way  
14 to correct it now is to just simply get all that waste  
15 out of there and try and do the best recovery we can.  
16 So I might also mention that the whip project, where --  
17 that was mentioned in Carlsbad, New Mexico, they had a  
18 situation where one of the underground drums exploded  
19 and turned into a flame thrower and sent radioactive  
20 dust 750 meters vertically upwards to the surface as a  
21 result of chemical reactions taking place in the drum.  
22 So we don't always know what's going to happen  
23 underground. We have to remember that this waste is not  
24 inert, it's active. It's radioactive, it's chemically  
25 active, it's biologically active, and so -- and there's

1 even the possibility, very remote, but a real  
2 possibility of spontaneous criticality occurring over a  
3 very long period of time.

4 But these containers that are being talked  
5 about are temporary, they're not going to be lasting  
6 forever by any means. In a relatively short period of  
7 time, there will be no containers.

8 MR. ANDERS: Thank you. We need to move on.  
9 We want to make sure that we have time for public  
10 comment. And so I want to remind everyone, if anyone  
11 does want to make public comment, there are some blue  
12 cards right over here, and please fill those out and  
13 give them to me, and you'll have the opportunity to make  
14 public comment.

15 For those of you online, if you would like to  
16 make a public comment, please raise your hand. We have  
17 one more speaker before the public comment period  
18 begins, so I'll turn it back to Linda for either  
19 thanking our guests in this wonderful conversation and  
20 to move forward.

21 MS. SEELEY: Yeah, thank you so much,  
22 Canadians and Pasi, yeah, so much.

23 Bruce.

24 MR. SEVERANCE: Yeah, thank you. It's my  
25 pleasure to introduce Manuel Camargo. He is a principal

1 manager for strategic planning at San Onofre Nuclear  
2 Generating Station, which is often referred to as SONGS  
3 and he's -- he works with Southern California Edison and  
4 has the responsibility that includes spent fuel  
5 management and disposition. He has also headed up an  
6 effort along with David Victors who lives down in that  
7 same area to create a national spent fuel policy  
8 committee. I had the pleasure of serving on that  
9 committee for a short time. What that did was develop a  
10 seven-page concise policy statement that became the  
11 basis for advocating and meetings with people in  
12 congress to support a national repository as well as  
13 consolidated interim storage. Manuel, thank you very  
14 much for making the trip up here today from San Diego,  
15 it's really greatly appreciated.

16 MR. CAMARGO: Absolutely, I appreciate it. So  
17 Manuel Camargo, Southern California Edison, that has  
18 been covered. I have four content slides that I'll walk  
19 through briefly, and actually, for your convenience, I'm  
20 starting with sort of the summary, starting with my key  
21 point. So we've talked a lot tonight about some of the  
22 challenges, and to a degree, part of what this group  
23 that David Victor helped convene and that Bruce and  
24 others supported is to look at what we do going forward.

25 So first, I would say that the spent nuclear



1 fuel is going to remain at reactor sites like  
2 Diablo Canyon and like SONGS unless there is advocacy,  
3 coordinated advocacy, in order to make something happen  
4 at the federal level. Paul and Mr. Nesbit talked about  
5 issues related to the Nuclear Waste Policy Act, and so  
6 there is action that's required in order to kind of  
7 break loose this kind of stalemate that we're in at  
8 present, with the exception of some key issues, progress  
9 as it relates to consolidated interim storage. So I  
10 would say that on-site storage is very robust in  
11 independent spent fuel storage installations, the dry  
12 storage facilities that have been discussed, but it's  
13 very expensive.

14           So \$2 million per day, and more than  
15 \$10 billion to date has been spent for paying for that  
16 on-site storage that really never should have had to  
17 happen should the federal government had obeyed its --  
18 followed its own law in the Nuclear Waste Policy Act and  
19 implemented that law. And also the communities around  
20 these reactor sites, including here in the San Luis  
21 Obispo area, did not consent to the long-term storage  
22 of -- the perpetual storage of spent fuel in their  
23 community, same with the 70-plus sites across the  
24 country where you have nuclear plants. And also, I  
25 think very importantly, you know, we should not pass

1 this problem on to the next generation, it's time to  
2 solve this problem, and so that's something that we've  
3 been working on and one of the key issues that the David  
4 and Victor group helped to address.

5           So we do see that a window of opportunity is  
6 opening. You've seen in the last couple of years that  
7 the Department of Energy is working on part of the  
8 solution, Consolidated Interim Storage, so that's good.  
9 We did partner with local governments back in 2022 --  
10 we, Southern California Edison, partnered with local  
11 governments in order to form an advocacy coalition  
12 called Spent Fuel Solutions, and David Victor is an  
13 adviser to the -- to that group, and they're well  
14 positioned to lead the way in terms of an advocacy piece  
15 and working with congressional leaders, so I'll talk to  
16 that briefly. And you know, I would say that with some  
17 help, we can actually make something happen.

18           So here's our current situation. On-site  
19 storage is safe. These canister systems, yes, are --  
20 per the Nuclear Regulatory Commission, they're good for  
21 a hundred years or more with aging management, sort of  
22 the kind of healthcare maintenance to ensure that we  
23 understand what's happening with these canisters over  
24 time, that's done at all the sites including here at  
25 Diablo Canyon. And we also, as an industry, including

1 at SCE and SONGS, have identified a way to mitigate a  
2 potential issue with the canisters if ever there was to  
3 be an issue, meaning a repair.

4 And then I would say that the -- the dual  
5 purpose canisters are good for long term, they're good  
6 for on-site storage and off-site transportation. So at  
7 a high level, I would say that one of the challenges we  
8 have in this base, certainly people here in this room  
9 are aware of the challenge, but at a high level, this  
10 issue does not get enough attention, and so we're  
11 working on that as well, and part of that challenge as  
12 well is that there's very little pressure on congress to  
13 do something and make something happen.

14 So here's what we're doing about that.  
15 There's really three keyword strings, creating  
16 awareness, supporting the US Department of Energy and  
17 what they're doing now in Consolidated Interim Storage,  
18 and then advocating for legislative reform. On the  
19 first one, including legislators in the vicinity of  
20 San Luis Obispo, we just passed a joint assembly  
21 resolution in the state legislature calling on congress  
22 to perform, so we appreciate that, it's part of raising  
23 awareness, opinion editorials, those sorts of things.

24 For the DOE, working on consent-based siting,  
25 we appreciate that work, and also, they're working on

1 some confidence building initiatives, which is helpful.  
2 And then finally, legislative reform, so that's  
3 important. There's basically four key things that we  
4 think you need to get done, more like six, but in terms  
5 of the two most important are our single-purpose entity.  
6 Every other country that has an active spent fuel  
7 program for a repository is as a single-purpose entity.  
8 Ours is being led by the Department of Energy, and we do  
9 appreciate the work at the Department of Energy, but  
10 they have a lot of fish to fry, many priorities. A  
11 single purpose entity is one thing that we'd like to see  
12 changed in the Nuclear Waste Policy Act.

13 Two is reliable funding, right. If you look  
14 back to 2010, one of the ways that the program was  
15 stopped, by turning off the money spigot.

16 And then, you know, authorizing the DOE to  
17 work on consent-based siting for other repositories,  
18 Yucca Mountain is really at a standstill, so to get the  
19 program moving, you really need to give the DOE the --  
20 or the single-purpose entity the authority to work on  
21 other repositories.

22 And then there's this quirky thing about the  
23 linkage between consolidated interim storage and a  
24 permanent disposal facility. Paul Murray talked about  
25 that, that needs to be addressed.

1           So finally, we did form this coalition, it's a  
2 broad-based coalition with, you know, labor, business,  
3 local government, Native American representation, more  
4 than 250 people, and we are current in that we're taking  
5 the learnings from the group that Bruce and others  
6 helped to support and working with congressional leaders  
7 at present to introduce legislation hopefully early next  
8 year. If you'd like to join, Spent Fuel Solutions Now  
9 dot com is the website, you can sign up there, because  
10 we could really use the support. That's what I would  
11 offer.

12           MR. SEVERANCE: Yeah, of course I have a  
13 question. I would like to ask you if you could talk to  
14 us a little bit about the community activism that's gone  
15 on down near SONGS and the -- my understanding is they  
16 have something like our decommissioning panel, and what  
17 kind of outreach are you doing there locally in order to  
18 gain support for letter writing or contacting, you know,  
19 congressional leaders, et cetera. And, you know, since  
20 you've got a coordinated effort to actually lobby and  
21 travel to Washington and things like that, what can  
22 community, you know, leaders and participants do to  
23 perhaps create coalitions at more of a local level in an  
24 area like San Luis Obispo, what would you recommend?

25           MR. CAMARGO: Sure. Yeah, so what I would

1 offer is, you know, going back to let the assembly joint  
2 resolution that we passed just in August of this year,  
3 that's really a message bill to send a message to  
4 congress, and that's being followed up with the two  
5 state legislators who authored that bill, are working on  
6 opinion editorials, I would say that you can look at the  
7 coalition that was formed, the Spent Fuel Solutions, you  
8 can look at replicating that here, or just joining the  
9 coalition. We are looking to expand it. Your former  
10 colleague, Will Almos, here on this panel, we've had  
11 recent conversations with him, he's now -- actually  
12 spends his time half here and half in Wyoming, and we've  
13 had over the past several weeks conversations with him  
14 and a senator in Wyoming, and we're broadening that to  
15 see if they'd be looking to replicate. So I think it's  
16 things like opinion editorials, it's raising awareness  
17 for the issue. You know, again, the problem is really,  
18 to my mind, is that there is no problem, right, nobody's  
19 dying because they're living next to an ISFSI.  
20 Elsewhere in the country, you have communities and an  
21 indigenous community, in one particular area, where that  
22 is 300 yards from an ISFSI. We have a popular surfing  
23 beach, you know, down at San Onofre, and, you know, this  
24 storage is safe, there's really no problem there. You  
25 know, congress really doesn't have much pressure on it.

1 All that -- the \$10.6 billion that I mentioned in  
2 damages, that gets paid through the Department of  
3 Justice in the justice fund, and congress doesn't touch  
4 that, congress doesn't appropriate those funds. So  
5 there's really not enough pressure. So I would say  
6 finding your way to add pressure, things like joining a  
7 coalition or forming a coalition, letters to the editor,  
8 all those things, I think will help, and coordinated  
9 advocacy, I think it would make sense. As we look to  
10 introduce legislation ideally early next year, it's  
11 going to be very tough, it's going to be very  
12 challenging, we will need bipartisan support, and  
13 ideally support from communities across the country. So  
14 to the degree that we can coordinate efforts and timing,  
15 I think we'll have the greatest impact.

16 MR. SEVERANCE: I would appreciate if you  
17 could just add, you know, 30 seconds of commentary on  
18 how the Spent Fuel Solutions coalition really has a  
19 number of people that are environmental activists at the  
20 local level working and collaborating directly with  
21 utilities, because there's very much an overlapping  
22 interest in solving the storage problem, and how broad  
23 was the base of people that participated in that? My  
24 recollection is that there were people from power plants  
25 all over the country that were participating in our

1 meetings. Do you know how many power plants contributed  
2 to that initiative?

3 MR. CAMARGO: Yeah, probably about a half a  
4 dozen or so power plants, and yeah, across the country  
5 from the northeast to here on the west coast, I would  
6 say as well the -- we do have environmental groups on  
7 that coalition, California Environmental Voters, you  
8 know, Coast Keeper is another environmental group, but  
9 we could use more help, and folks who have a common  
10 interest in solving this issue, whether, you know,  
11 you're pronuclear, antinuclear, whatever your position  
12 is, if you want to solve the challenge as it relates to  
13 the offsite storage and disposal of spent nuclear fuel,  
14 I'd say right now is a great time to get engaged. You  
15 know, to my mind, being optimistic, we will see  
16 legislation introduced. Getting that legislation passed  
17 may take multiple congresses and is going to take a lot  
18 of coordinated effort to get it done.

19 MR. SEVERANCE: And that website again was now  
20 dot com?

21 MR. CAMARGO: Spent Fuel Solutions Now dot  
22 com.

23 MR. SEVERANCE: Thank you.

24 MR. CAMARGO: Other questions from the panel  
25 for me?



1 MS. SEELEY: One.

2 MR. LATHROP: Thank you. Not so much a  
3 question, but I just wanted to kind of bring forth the  
4 panel's vision for used fuel at Diablo Canyon for the  
5 benefit of the public. If you read our document, I  
6 believe it says in there that one of the strong visions  
7 or desires is to have the used fuel relocated off site  
8 as soon as possible, I think with a little caveat as far  
9 as an approved location. And so the used fuel, again,  
10 whether you're pro or antinuclear, is there, it's an  
11 issue that needs to be dealt with, and at least in my  
12 experience with going around sharing information from a  
13 tribal perspective, what I have discovered is that  
14 there's just a lack of knowledge as far as what it's all  
15 about, all the way from safety and all these kinds of  
16 things. But I think it's very important that we manage  
17 this in a responsible way. And also in relationship to  
18 the finances, there's a tremendous amount of dollars  
19 being spent, and it really doesn't make a lot of sense,  
20 the way, and so it's a problem, again, whether you're in  
21 favor or against, that needs to be solved, and I would  
22 really strongly suggest that people need to learn a  
23 little bit more about it and also try to come together  
24 with a solution whether it's interim, above grade, below  
25 grade, you know, there's all kinds of opinions about

1 that. If you want a Native's position on it, we have a  
2 strong belief when it comes to the environment that you  
3 take very little from the environment and you put very  
4 small back into it. In other words, you take little  
5 from the earth and you put back little to the earth. So  
6 from the standpoint of having a deep depository for used  
7 fuel, it's not a concern of mine as a Native person,  
8 because I see we're putting a small amount back to  
9 nature, and I think it was also addressed by the  
10 gentleman from Canada that when you take a look at  
11 uranium in the earth, it stays pretty stable, and so  
12 those are just comments that I just wanted to put on the  
13 table.

14 MR. SEVERANCE: Scott, could you just mention  
15 for 30 seconds the initiative that you're involved in  
16 for consent-based --

17 MR. LATHROP: Sure, not a problem. We're part  
18 of a consortium of the 13 that was addressed earlier by  
19 Mr. Murray, and our goal or our charge is essentially go  
20 and do community engagement to try to inform the  
21 community all the way from mining issues, the nuclear  
22 cycle, looking at also used fuel, just to try to educate  
23 people so that they can make an informed decision on  
24 anything going forward in reference to potential  
25 consent-based siting for interim storage.

1 MS. SEELEY: Quick question, Manuel. You said  
2 that you have a method to mitigate any kind of a leak or  
3 crack. What's that method?

4 MR. CAMARGO: It's called cold spray, is the  
5 general term, we call it metallic overlay. So it  
6 takes -- so if you do have an issue, let's say a crack  
7 in a canister, the shell of a canister, it accelerates a  
8 nickel at supersonic speeds, and when that nickel makes  
9 contact with the metal, the shell of the canister, it  
10 creates a molecular bond and seals it. So they call it  
11 cold spray, it does in part a small amount of heat, but  
12 small as it relates to other types of welding  
13 techniques. If you were to use an arc welder or  
14 something like that, you'll create what's called a heat  
15 affected zone, and then you do create a potential future  
16 problem in that heat affected zone by imparting too much  
17 heat into the canister shell. So in contrast, by  
18 accelerating a nickel at supersonic speeds, the level of  
19 heat that's introduced is much lower, and so you  
20 mitigate the risk. You can basically fix the crack and  
21 mitigate the risk of future issues in that affected  
22 zone.

23 MS. SEELEY: And do you pull the canister out?

24 MR. CAMARGO: That's an excellent question.  
25 The answer is no. So this can be done -- so you know

1 from here at Diablo Canyon that the industry uses remote  
2 robotics in order to do NC2 inspections of canisters, so  
3 we use the same basic technology to take a nozzle, a  
4 laval nozzle it's called, that's attached to a remote  
5 robot, and it crawls down inside the canister while the  
6 canister is still in its module and does the work there.  
7 So --

8 MR. SEVERANCE: Can you describe what a module  
9 is and, you know, the concrete sleeve versus the steel  
10 so people can visualize that this is a robotic device  
11 that slips in there? I thought people might be confused  
12 by that.

13 MR. CAMARGO: There are different types of  
14 systems, and we have two different systems employed at  
15 SONGS actually similar to what you'll have here, and so  
16 for instance, with the vertical system, it has magnetic  
17 wheels, the robot crawls down on the wheels to get to  
18 the right spot and then it points the laval nozzle at  
19 that spot. Anyway, and at SONGS, we also have a test  
20 canister in that vertical system and we actually  
21 deployed and tested it in that as well as in a  
22 laboratory, we've done what's called destructive  
23 examination, which is to take a coupon of metal, use  
24 this process on it, and then cut it apart to demonstrate  
25 the sufficiency of the molecular bond.

1 MR. SEVERANCE: Thank you.

2 MR. CAMARGO: Thank you.

3 MR. ANDERS: Thank you, Manuel.

4 Our next agenda item is public comment, and I  
5 have two cards, folks here. If anybody else would like  
6 to speak, please fill out a card. There will be three  
7 minutes for public comment, and it'll be entered into  
8 the record and part of the official transcript of the  
9 meeting.

10 So the first speaker is Francene McClintock.  
11 And I would like you to state your name and spell your  
12 name for our court reporter, please. And then also,  
13 give us your residence and any affiliation you might  
14 have. So Francene.

15 MS. MCCLINTOCK: Hello, so I'm a public  
16 citizen, I live in Ventura right now, and my name is  
17 Francene McClintock, F-R-A-N-C-E-N-E, McClintock,  
18 M-C-C-L-I-N-T-O-C-K. And they mentioned this, I should  
19 have my glasses on, Nuclear Waste Policy Act, I think  
20 you said 1982, I think, I don't know, I thought it was  
21 '85, but I guess it's '82, and I didn't understand the  
22 deference between -- I thought it differentiated between  
23 military and commercial, but it almost sounded like that  
24 gentleman was talking about one dump where military and  
25 commercial nuke waste would go into a repository, so if

1 we really did rolling stewardship and hard and on-site  
2 storage above ground, could that go on a military base?  
3 I guess is my question.

4           And then I also wanted to ask about Curie's,  
5 because Madam Curie, I guess, died of cancer, and that  
6 was the whole idea of radioactivity, is it has Curie's.  
7 So in the low level waste dump phase, they always talked  
8 about square feet or cubic feet that you had to have the  
9 snoop dump that was so big, and it sounds like here  
10 you're talking about tons, and I'm just curious how many  
11 Curies we are actually talking about in the  
12 United States, military, commercial, in Russia, in the  
13 whole world, et cetera. Just I wish they would talk  
14 about the Curies, because that is the reason we have to  
15 isolate it from the biosphere. Thank you, that's all.

16           MR. ANDERS: Thank you. Next speaker is  
17 Dolores Howard and is followed by, this is what the card  
18 says, Nikola Tesla.

19           MS. HOWARD: Hello, my name is Dolores Howard,  
20 I'm a resident of Paso Robles, and you spell my first  
21 name D-O-L-O-R-E-S H-O-W-A-R-D for my last name. The  
22 extended operation of Diablo Canyon means the generation  
23 and on-site storage of even more high level radioactive  
24 waste in an active seismic zone. The extended operation  
25 is unnecessary and dangerous for us and for future

1 generations that will question why we left them this  
2 horrible legacy. Although it is true that the community  
3 of San Luis Obispo never agreed to Diablo Canyon site  
4 turning out to be a long-term storage site, neither did  
5 future generations agree to our planet being a permanent  
6 repository excavated and abandoned with nuclear waste.  
7 At Diablo, the current pads are designed to hold only  
8 the accumulative waste as of the expiration of current  
9 licenses. Storing spent fuel in pools is much more  
10 dangerous than storing it in dry casks. The Union of  
11 Concerned Scientists states that a large radiation  
12 release from a spent fuel pool could release more cesium  
13 137 than the Chernobyl disaster, resulting in thousands  
14 of cancer deaths and hundreds of billions of dollars in  
15 decontamination costs and economic damage. The  
16 continued operation is not necessary. We have the  
17 supplies, the battery storage, one of the largest fleets  
18 in the world, Elliot Manes, our chief executive, the  
19 California Independent System Operator, states that in  
20 the current situation, the state has been in a position  
21 to reliably meet load inside California and export quite  
22 a bit of energy outside of California to other parts of  
23 the west. Recent joint reliability assessments by the  
24 CEC and CPUC highlight the state's ability to meet and  
25 exceed power needs through renewable energy investments

1 and an increase in battery storage.

2 Let's remember the generations upon  
3 generations that will need to steward this dangerous  
4 waste wherever it is, let's begin that process now.  
5 Let's stop Diablo operations at the end of current  
6 licenses. The license for unit one expires  
7 November 2nd, 2024. Let's close unit one immediately.  
8 Thank you.

9 MR. ANDERS: Thank you. Our next speaker is  
10 Peter Allen, I think, or Nikola. State your name and  
11 your city and please spell your name for our court  
12 reporter before you start.

13 MR. ALLEN: Peter Allen, P-E-T-E-R A-L-L-E-N.  
14 I lived in the Five Cities my whole life and I live --  
15 reside in a small corner of San Luis Obispo, and I'm  
16 really happy to be here. I can see that everybody's  
17 looking concerned, and I'm hoping that we can come --  
18 I'd love to be on the panel, you all are very concerned  
19 citizens, I'd love to set precedent that we can conquer  
20 this for the whole world. From what I've seen,  
21 everybody is struggling, trying to do the right thing,  
22 and they're hurting everybody in the planet, which it's  
23 going to be. But people have told me that this is going  
24 to be a meltdown from nuclear wars to nuclear energy  
25 plants, and so it's been a battle. I believe



1 Nikola Tesla's knowledge was mothballed for future --  
2 for people wanting to monopolize off of energy. And so  
3 anyways, I have some hot topics.

4 So being that there's 30 years --

5 MR. SEVERANCE: Can you talk directly into the  
6 microphone?

7 MR. ALLEN: Absolutely.

8 For 500 million years of waste is completely  
9 absurd, and I wish I was smart enough to be a nuclear  
10 engineer, physicist, and -- but I'm not, and -- but I  
11 wish that they were reducing the fuel down to spent fuel  
12 which it would be less of a waste and it'd be hopefully  
13 easier to manage. So I know they're reducing it down,  
14 pulling the water out and processing it, but I think  
15 it's absurd to put it into our drinking water, but it's  
16 going to land there anyways when they put it in the  
17 ocean and it circulates and it's -- it's what you don't  
18 know that you don't know, just like sewer water, nobody  
19 wants to drink it, but it's -- they're living off their  
20 septic. So -- so yeah, the legacy for future  
21 generations and wanting to hide it from them for the  
22 future, because they're wanting to save money, it hurts  
23 my heart, and I know it hurts all of you here also  
24 for -- for these dump zones in your backyard where your  
25 grandchildren and future generations are going to be

1 potentially leaking and they're going to have cancers  
2 and they're going to be on potassium pills. So people  
3 are getting hurt in these plants, working in  
4 containment, where they have to be scrubbed down with a  
5 wire brush, I don't know the correct thing, but  
6 obviously, they get cleaned up and hopefully they can  
7 live their life. And when I was in Russia, I met a girl  
8 who her dad went to Chernobyl for two hours to do  
9 something after the meltdown -- okay, am I cut off?  
10 Okay. I'd love to be on the panel.

11 MR. ANDERS: Thank you. I don't -- I don't  
12 see anyone online with their hands raised. I would like  
13 to remind everyone here and online that you can submit  
14 written comments on the panel's website, that's  
15 Diablo Canyon Panel dot org, and when you submit those  
16 written comments, all the panel members see them right  
17 away. So please feel free, if you want to add something  
18 to what you talked about or you know someone who would  
19 like to make a comment that couldn't be here, please  
20 encourage them to make those comments, because the panel  
21 members do see those.

22 We do have one -- oh, we have two, good.  
23 First is Sheila Baker and followed by Jane Swanson. So  
24 if anyone else online would like to make a comment,  
25 please raise your hand.

1                   Go ahead, Sheila.

2                   MS. BAKER:   Okay, thank you.   Sheila,  
3   S-H-E-I-L-A, Baker, B-A-K-E-R.   I don't agree that it's  
4   a popular idea that holes and big, big places that  
5   should be dug in the earth, and with this substance  
6   placed in the earth.   And I -- I think that it's not a  
7   sustainable way, I mean, we are so used to using this  
8   planet to our -- whatever we want, okay, that we do  
9   things that we don't even stop and think that not  
10  everyone feels that way and that digging holes and  
11  placing radioactive stuff in the earth is not really  
12  very good.   The other comment I want to make is -- or  
13  question, are the two states that have been designated  
14  as interim storage states, that would be Texas and  
15  New Mexico, my part of the objection would be the  
16  transportation on freeways, highways, and freight on the  
17  railways.   So anyways, thank you so much.

18                  MR. ANDERS:   Thank you very much.

19                  Our next speaker is Jane Swanson.   Jane, go  
20  ahead.

21                  MS. SWANSON:   Yes, thank you.   My first  
22  comment is I completely endorse the comments of  
23  Dolores Howard who spoke shortly before me, and sorry, I  
24  didn't identify myself.   Jane Swanson, J-A-N-E  
25  S-W-A-N-S-O-N, spokesperson, San Luis Obispo, Mothers

1 for Peace. So Dolores Howard fully expressed the  
2 opinions and viewpoints of the Mothers for Peace, and I  
3 thank her for doing that. I also want to thank the  
4 panel and PG&E for this opportunity to learn from each  
5 other, to ask questions, and to express opinions. We  
6 are aware that PG&E is not obligated to act upon the  
7 input given at these meetings, but it's still a value to  
8 learn from each other and to share opinions and  
9 resources. The guest speakers that we had from Canada  
10 and elsewhere were excellent, and also the questions  
11 from the members of the board of the panel were very  
12 excellent, so thank you for a very useful meeting and  
13 I'll let it go at that, thank you.

14 MR. ANDERS: Thank you, Jane. I don't have  
15 any other speakers in public or online, so we have a few  
16 minutes for the panel to have discussion. Any thoughts,  
17 observations, any additional questions?

18 MR. SEVERANCE: I just wanted to say I really  
19 appreciated the thoughts that Gordon Edwards had to  
20 contribute, that there should be a culture of ongoing  
21 stewardship and monitoring that, you know, sticking it  
22 in the hole and burying it and forgetting about it after  
23 a hundred years just doesn't seem to me to be a prudent  
24 solution, given the scenario of what happened already in  
25 Germany. I think it's going to require ongoing

1 security, ongoing monitoring of ground water, mitigation  
2 measures, and I -- I would hope that the solutions are  
3 thoughtful with an eye for our impact on future  
4 generations. It just seems that for us to get the  
5 benefit of cheap energy now with long-term impacts for,  
6 you know, the next 4,000 generations seems shortsighted  
7 in my opinion, so we have to take on the full life cycle  
8 costs of monitoring that waste for, what, thousands of  
9 years. I mean really, there should be an ongoing  
10 culture of stewardship.

11 MR. ANDERS: Thank you, Bruce.

12 Any other observations or comments?

13 Patrick and then Michael.

14 MR. LEMIEUX: I'm just echoing what he just  
15 said. It was news to me as well, the rolling  
16 stewardship approach to it, a very interesting one. I'm  
17 not sure I completely agree with Bruce, though, however.  
18 I think it oversimplifies things a little bit when you  
19 try and think of that kind of stewardship for 4,000  
20 generations, and I think that the gentleman, Pasi from  
21 Finland, illustrated that with his example of ice age  
22 every 10,000 years, which is a fraction of the period  
23 for which these wastes have to be monitored, in addition  
24 to things like wars, that happen periodically over such  
25 a period of time. So while, I mean, we have plenty of

1 time to accept rolling stewardship before these things  
2 happen, I think I'm still not convinced that that's the  
3 100,000-year solution. I think given enough evidence of  
4 geological repository that can withstand the -- the  
5 likelihood of -- of failures I think needs to continue  
6 to be investigated, and I hope that we continue to have  
7 this conversation. So I really appreciate the comments  
8 from everyone, I think it's -- we need to -- to continue  
9 this conversation.

10 MR. ANDERS: Thank you, Patrick.

11 Michael and then Dave.

12 MR. LUCAS: I want to thank my colleagues for  
13 putting together a really fantastic evening of  
14 commentary with our guests, and it's been very valuable  
15 for me. The one thing I'm left with is this idea of  
16 life cycle costing and how we take into account the full  
17 life of these processes. The one comment I thought was  
18 very informative was the idea that even at the beginning  
19 of the mining cycle, the uranium tailings, which have  
20 been disastrous for so many indigenous reservations in  
21 the southwest, among other places, that's an ongoing  
22 issue, and with the increase of fuel requirements that  
23 we're seeing across the board with new nuclear plants  
24 and the continuation of this, that becomes an issue as  
25 well as this idea of waste at the end that we don't

1 really have a good solution for. You know, I loved  
2 hearing these ideas, but I'm kind of left with I have no  
3 concept of what's the ethical or moral thing to do with  
4 this kind of generational impact. So this has been very  
5 enlightening, and I just thank everybody for their  
6 comments.

7 MR. ANDERS: Okay, Dave and then final  
8 thoughts by Linda.

9 MR. HOUGHTON: Wow, there's a lot to think  
10 about and to say about this topic. The word that kept  
11 coming up in key points was the word "trust," and that  
12 is a key element of what's happened in Finland, where  
13 they're actually moving forward in doing something.  
14 That word came up again in both the Canadian  
15 presentations, and it's a difficult thing to  
16 reestablish, and this industry has not really built  
17 that. Though we're trying now, I think this panel and  
18 this process is an example of attempting to build that  
19 trust and openness and transparency and having dialogue  
20 about this and the other issues that surround nuclear  
21 power and Diablo Canyon in particular. So it's a  
22 difficult thing, and we can't wish it away, and like it  
23 or not, it's a part of the bigger issues of climate  
24 change, and I don't have my mind made up on whether or  
25 not nuclear is part of the solution to reducing our

1 carbon impact on the atmosphere, but that's an even  
2 bigger tragedy of the comments that affects everybody on  
3 earth. And so we've got -- we've got some real issues  
4 to deal with, and I come away enlightened but also with  
5 lots of new questions, and the discussion will continue  
6 and I'll leave it at that for now.

7 MR. ANDERS: Thank you, Dave.

8 Linda, final thoughts, and adjourn the  
9 meeting.

10 MS. SEELEY: I just have one comment about --  
11 that came to me when you were talking, Patrick, about  
12 rolling stewardship, about keeping it above ground and  
13 monitoring it. Maybe in the future, with scientific  
14 progress, we'll find a way to de -- what do you call it,  
15 detoxify it, I don't know if that's the right word, but  
16 to make it actually safe. And so I think like thinking  
17 about burying it underground, I don't -- I don't know  
18 what's the best solution, I can't say, but I -- but I  
19 keep thinking that maybe there will be some kind of  
20 progress made to be able to detoxify it, but I want to  
21 thank everybody for coming here tonight and our panel,  
22 our speakers who you -- you brought things to our minds  
23 that we don't ordinarily think about, and we very much  
24 appreciate it, and we are the -- like it or not, we've  
25 got this problem. We didn't ask for it and -- but we've



1 got it, and so I feel like our panel can maybe do  
2 something to help pave the way to fixing it. So it's --  
3 I feel very grateful to you, Chuck, for helping us  
4 figure this out, and to the planning committee for  
5 hanging in there and doing a great job, and to PG&E for  
6 facilitating this whole thing. Thank you.

7 MR. SEVERANCE: I just want to thank Manuel  
8 Camargo one more time for driving all the way up here to  
9 talk about the spent fuel initiative, and I'm deeply  
10 grateful, really, to all the speakers, I thought it was  
11 just a tremendous well-rounded presentation from  
12 everybody, thank you.

13 MR. ANDERS: Thank you all, and the meeting's  
14 adjourned, and everybody travel safely.

15 (Adjourned at 9:00 p.m.)  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

1 STATE OF CALIFORNIA )  
 ) SS.  
 2 COUNTY OF SAN LUIS OBISPO )

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

I, JAHMY ALVAREZ, Official Certified Shorthand Reporter of the State of California, County of San Luis Obispo, do hereby certify that the foregoing pages numbered 1 to 121, inclusive, contain a full, true and correct transcript of my shorthand notes, and a full, true and correct statement of the proceedings had and testimony given as reflected herein.

Dated this 15th day of October, 2024.




---

JAHMY ALVAREZ, CSR  
 Certificate No. 14094

<hr/>	<b>17</b> 43:5	<b>2006</b> 12:5	<b>3,250</b> 79:7	<b>6,000</b> 64:8
<b>\$</b>	<b>19</b> 56:12,13	<b>2007</b> 33:22	<b>3.9</b> 83:4	<b>6,500</b> 79:6
<b>\$10</b> 96:15	<b>1950's</b> 7:23 46:13	<b>2008</b> 10:16	<b>30</b> 64:11 68:2 73:2 90:16 102:17 105:15 112:4	<b>60</b> 21:19 29:3,5,23 40:23 56:8 76:17
<b>\$10.6</b> 36:17 102:1	<b>1951</b> 66:19	<b>2010</b> 10:18,25 12:19 35:19 99:14	<b>300</b> 58:5 79:23 101:22	<b>600</b> 65:17
<b>\$2</b> 96:14	<b>1954</b> 3:19	<b>2014</b> 36:2	<b>31</b> 19:4 20:6	<b>65</b> 17:6
<b>\$24</b> 86:4	<b>1957</b> 8:1,5 91:4	<b>2016</b> 78:20	<b>310-foot</b> 30:17	<b>660</b> 56:25
<b>\$34.1</b> 36:19	<b>1960's</b> 8:12	<b>2018</b> 11:5	<b>350</b> 80:3	<hr/> <b>7</b> <hr/>
<b>\$36</b> 86:5	<b>1970</b> 8:17	<b>2019</b> 71:9	<b>365</b> 50:20	<b>70</b> 17:17,19
<b>\$44.7</b> 36:16	<b>1970's</b> 8:10,17	<b>2021</b> 12:5	<b>370</b> 37:25	<b>70's</b> 9:1 75:2 78:15
<b>\$47</b> 35:14	<b>1972</b> 9:1	<b>2022</b> 97:9	<b>384</b> 17:14	<b>70-plus</b> 96:23
<b>\$5</b> 90:16	<b>1975</b> 61:23	<b>2023</b> 12:6 34:1 36:15	<hr/> <b>4</b> <hr/>	<b>750</b> 93:20
<b>\$500</b> 36:17	<b>1976</b> 73:4	<b>2024</b> 40:10 111:7	<b>4,000</b> 83:12	<hr/> <b>8</b> <hr/>
<hr/> <b>1</b> <hr/>	<b>1980's</b> 88:20	<b>2026</b> 50:21	<b>40</b> 17:2 21:21 22:8 28:7 29:11,23 64:19 76:17 81:15	<b>8</b> 22:6
<b>1</b> 67:1 81:14,17 83:9	<b>1982</b> 9:8 35:8 108:20	<b>2027</b> 23:8 41:1 44:11	<b>44</b> 33:18	<b>82</b> 108:21
<b>1,100</b> 52:21	<b>1986</b> 33:19 64:10	<b>2030</b> 23:25 24:13	<b>45</b> 75:25 77:9	<b>85</b> 63:8 108:21
<b>1,600-megawatt</b> 76:15	<b>1987</b> 9:20 11:23	<b>2038</b> 37:7 39:8	<b>450</b> 79:23	<hr/> <b>9</b> <hr/>
<b>10</b> 15:7 26:16,17 32:4 34:1	<b>1990's</b> 12:1	<b>21</b> 56:13	<b>46</b> 75:25	<b>90</b> 10:9 63:19
<b>10,000</b> 71:13 84:2	<b>1996</b> 33:21	<b>21,000</b> 35:3 91:20	<b>48</b> 59:18	<b>900</b> 10:11 41:13 44:18 45:2
<b>100</b> 37:15 50:9,25 58:13	<b>1998</b> 35:17	<b>211</b> 63:23	<b>480,000</b> 40:12	<b>94</b> 34:8
<b>12</b> 15:6 17:12 22:6 26:17 37:25 47:19	<hr/> <b>2</b> <hr/>	<b>2120</b> 78:21	<b>4:00</b> 52:9	<b>95,000</b> 34:13
<b>12-axle</b> 47:18	<b>2</b> 34:23	<b>22</b> 55:21,22 56:1,2	<hr/> <b>5</b> <hr/>	<hr/> <b>A</b> <hr/>
<b>12-foot</b> 32:4	<b>2,000</b> 17:9 71:13	<b>239</b> 65:12	<b>5</b> 38:6 82:6 83:8	<b>A-L-L-E-N</b> 111:13
<b>13</b> 37:20 38:6 105:18	<b>2,240</b> 17:18	<b>24</b> 43:11	<b>50</b> 37:9,12 46:23 79:16	<b>a.m.</b> 52:9
<b>131</b> 63:18	<b>20</b> 14:19 15:9,13, 14 18:11 21:20,22 22:4 28:23 29:2,5, 12,23 30:1 31:1,2, 15 34:9 74:19	<b>24,000</b> 65:12	<b>500</b> 81:18 85:2 112:8	<b>abandon</b> 69:4,23
<b>137</b> 63:18 110:13	<b>20,000</b> 39:9	<b>25</b> 79:25 83:12 91:11	<b>500-million</b> 80:6	<b>abandoned</b> 110:6
<b>14</b> 34:24 35:25	<b>20-year</b> 27:8 29:20	<b>250</b> 37:17 100:4	<b>590</b> 56:25	<b>abandoning</b> 69:18 70:24 89:9
<b>140,000</b> 34:18 37:7 91:19	<b>200</b> 35:21 37:16	<b>250-year</b> 37:16	<hr/> <b>6</b> <hr/>	<b>ability</b> 51:1 110:24
<b>15</b> 31:1 41:2 73:21	<b>200-year</b> 43:14	<b>28</b> 34:9	<b>6</b> 79:8	
<b>15-year</b> 91:13	<b>2002</b> 10:1 53:14, 16 54:2,4	<b>2nd</b> 111:7		
<b>150</b> 58:14	<b>2004</b> 78:18	<hr/> <b>3</b> <hr/>		
		<b>3</b> 22:5,6		
		<b>3,000</b> 37:9		

<b>absolute</b> 92:21	<b>add</b> 16:12 45:8 90:8 92:22 102:6, 17 113:17	<b>agencies</b> 8:14 85:2,9	106:11	<b>area</b> 4:10 5:21 8:16 19:8 28:2,6 30:18,19 78:2 95:7 96:21 100:24 101:21
<b>absolutely</b> 50:23 85:24 95:16 112:7	<b>added</b> 64:2	<b>agency</b> 62:14 86:19	<b>ample</b> 29:21	<b>Areva</b> 33:22 51:6
<b>absurd</b> 112:9,15	<b>adding</b> 43:7	<b>agenda</b> 3:2,3 32:13 48:1 51:11 67:13 108:4	<b>anchored</b> 19:10	<b>Arguably</b> 45:19
<b>abysmally</b> 89:7	<b>additional</b> 15:21	<b>aging</b> 27:4 97:21	<b>ANDERS</b> 24:17 26:22 32:11,16, 20,24 44:13 45:6 46:17 47:23 49:3 51:10 54:21 84:19 85:21 86:1 87:11 89:15 90:25 91:23 93:4 94:8 108:3 109:16 111:9 113:11 114:18	<b>arm's</b> 53:21,22
<b>Academy</b> 8:2 69:1 91:3	<b>address</b> 13:7 29:8 42:5 43:25 97:4	<b>agree</b> 58:23 78:7 92:1,2,3 110:5 114:3	<b>angry</b> 50:3	<b>Aronno</b> 27:19
<b>accelerates</b> 106:7	<b>addressed</b> 99:25 105:9,18	<b>agreed</b> 110:3	<b>annual</b> 75:24	<b>array</b> 20:19
<b>accelerating</b> 106:18	<b>addressing</b> 72:2	<b>ahead</b> 51:20 54:23 87:11 114:1,20	<b>antinuclear</b> 103:11 104:10	<b>arrow</b> 14:5
<b>accepting</b> 87:20	<b>adequacy</b> 72:12	<b>aiming</b> 50:22	<b>anymore</b> 71:1	<b>arsenals</b> 66:14
<b>accident</b> 64:10	<b>adjacent</b> 10:10	<b>air</b> 65:25	<b>anything's</b> 40:9	<b>asbestos</b> 69:2
<b>account</b> 36:12	<b>administration</b> 11:4	<b>air-conditioning</b> 79:22	<b>application</b> 10:15	<b>asitu</b> 90:11
<b>accrue</b> 35:15 93:8	<b>ado</b> 4:17	<b>aircraft</b> 44:22	<b>applied</b> 27:9,16	<b>assemblies</b> 5:9, 10,18 6:15 7:3 17:9,14,18 18:4 19:5 20:6 23:19 26:7 68:19
<b>accumulate</b> 8:11 72:23	<b>adults</b> 52:19	<b>alive</b> 37:18 71:7	<b>apply</b> 49:9	<b>assembly</b> 15:6 23:24 50:3,4 78:24 87:25 98:20 101:1
<b>accumulative</b> 110:8	<b>advanced</b> 34:17	<b>Allen</b> 111:10,13 112:7	<b>appreciated</b> 95:15	<b>assess</b> 24:3
<b>accusation</b> 61:3	<b>advantage</b> 31:7	<b>allocate</b> 11:4	<b>appreciation</b> 89:14	<b>assessment</b> 62:11,13 86:19 87:3
<b>acknowledgment</b> 69:11	<b>advantageous</b> 2:14	<b>Almos</b> 101:10	<b>approach</b> 7:8 76:5 83:19	<b>assessments</b> 24:9 110:23
<b>Aclocabal</b> 92:9	<b>advantages</b> 72:6	<b>Alsaed</b> 2:17	<b>appropriated</b> 10:24	<b>assigned</b> 9:13
<b>acquisition</b> 39:5	<b>adviser</b> 97:13	<b>alternative</b> 62:24	<b>approval</b> 12:12 60:17	<b>assistant</b> 33:7
<b>acronym</b> 4:2 14:9 16:23	<b>advocacy</b> 96:2,3 97:11,14 102:9	<b>amazing</b> 28:5	<b>approved</b> 27:15 104:9	<b>Association</b> 40:11
<b>acronyms</b> 3:21 16:1	<b>advocating</b> 95:11 98:18	<b>ambassador</b> 88:8	<b>approximately</b> 14:19 22:2 34:23 75:19	<b>assume</b> 39:7
<b>act</b> 3:19 9:9,19 11:1,22 35:8 42:13 43:16,17 48:12 53:16 54:2 55:15 96:5,18 99:12 108:19	<b>AEC</b> 8:18,25	<b>amend</b> 30:6 43:15	<b>April</b> 38:18	<b>assumes</b> 69:22
<b>action</b> 12:9 24:5 69:25 96:6	<b>AED</b> 2:21	<b>amended</b> 9:9 10:25 48:12 88:13	<b>arc</b> 106:13	<b>assuming</b> 27:8
<b>active</b> 93:24,25 99:6 109:24	<b>affair</b> 71:20	<b>amendments</b> 9:19 11:22	<b>archaeologist</b> 71:17	<b>assurance</b> 72:4
<b>activism</b> 100:14	<b>affected</b> 106:15, 16,21	<b>American</b> 13:10 40:11 100:3	<b>archivists</b> 71:23	<b>assurances</b> 89:4
<b>activists</b> 102:19	<b>affects</b> 25:8	<b>amnesia</b> 71:1		<b>Atlas</b> 40:6,10
<b>actual</b> 2:3 24:5 57:2 69:12	<b>affiliation</b> 108:13	<b>amount</b> 75:24 86:5 104:18 105:8		<b>atom</b> 64:21 65:14
	<b>afforded</b> 24:8			<b>atomic</b> 3:18 8:7, 17 63:24 64:22
	<b>Africa</b> 92:10			
	<b>age</b> 63:7 68:3 70:23 72:14,15 84:2			

66:8	<b>backyard</b> 112:24	<b>beings</b> 80:16	<b>board</b> 60:24 82:9	<b>Bruce</b> 47:25 49:3, 4 56:20 58:9 60:14 84:22 85:15 94:23 95:23 100:5
<b>atoms</b> 63:16 64:20,23 65:10	<b>bad</b> 10:12 90:4,21 93:7	<b>Belarus</b> 64:8	<b>bodies</b> 70:15 86:21	<b>Brunswick</b> 56:9 87:21,22
<b>attached</b> 18:8 19:14 107:4	<b>Baker</b> 113:23 114:2,3	<b>belief</b> 105:2	<b>bolt</b> 21:2	<b>brush</b> 113:5
<b>attended</b> 71:9	<b>Bakersfield</b> 52:3	<b>believed</b> 68:6	<b>bolted</b> 21:3,4,10	<b>buffer</b> 79:1
<b>attention</b> 98:10	<b>band</b> 19:9	<b>benefit</b> 44:18 66:5 104:5	<b>bolts</b> 21:1 26:25	<b>build</b> 29:17 31:2 42:20 43:17,19,21 46:5 48:18,24 51:3 61:16 72:17
<b>attune</b> 26:11	<b>banning</b> 73:5	<b>benefited</b> 56:5	<b>bombs</b> 64:23 66:9	<b>building</b> 8:1 14:5 34:5 42:14 73:5 77:10 80:23 99:1
<b>audience</b> 48:5	<b>barge</b> 47:9	<b>bentonite</b> 59:21 79:1	<b>bond</b> 106:10 107:25	<b>buildings</b> 14:7
<b>August</b> 101:2	<b>barrier</b> 59:2	<b>big</b> 2:9 7:2 9:16 11:18 14:24 16:5, 24 19:9 20:25 25:5 44:17 75:17 79:9 109:9 114:4	<b>border</b> 88:10	<b>built</b> 49:23 66:7, 23 70:14 73:15 74:15 77:8
<b>Austria</b> 52:8 64:17	<b>barriers</b> 58:19 85:8	<b>bigger</b> 41:16	<b>borehole</b> 7:2,3	<b>bunch</b> 16:18,19 55:25
<b>authored</b> 101:5	<b>base</b> 98:8 102:23 109:2	<b>biggest</b> 27:7 52:23	<b>boreholes</b> 7:9	<b>bundle</b> 53:10
<b>authorities</b> 86:22	<b>based</b> 46:12 61:1	<b>bill</b> 101:3,5	<b>boring</b> 40:25	<b>bundles</b> 53:11 58:1,12 59:8,18 68:18
<b>authority</b> 99:20	<b>basic</b> 107:3	<b>billion</b> 35:14,15 36:16,17,19 81:14,17 82:6 83:4,8,9 86:4 90:16 96:15 102:1	<b>bottom</b> 14:23 20:23 38:10	<b>burial</b> 69:23 72:25 87:16
<b>authorized</b> 39:10	<b>basically</b> 4:3 6:24 11:9 25:14 28:10 34:6 36:2 44:25 48:22 49:1, 25 99:3 106:20	<b>billions</b> 43:7 65:23 92:12 110:14	<b>box</b> 6:7	<b>buried</b> 55:14,20
<b>authorizing</b> 99:16	<b>basics</b> 63:1	<b>binding</b> 35:10	<b>boxes</b> 5:8,25	<b>burn-up</b> 23:10,11 24:22,24 25:10, 17,24 26:7 31:23 40:16,18,21 49:6
<b>automatically</b> 80:20	<b>basis</b> 69:5 95:11	<b>biologically</b> 93:25	<b>brand</b> 63:14	<b>briefly</b> 3:15 48:6 95:19 97:16
<b>avail</b> 2:24	<b>Bates</b> 13:21,23 16:15 25:10 27:3, 12 28:5,16 29:2, 13,18 31:4,14 32:2,8	<b>biosphere</b> 90:2 109:15	<b>breach</b> 36:4	<b>brightest</b> 92:1
<b>average</b> 38:20	<b>battery</b> 110:17 111:1	<b>bipartisan</b> 22:25 102:12	<b>break</b> 96:7	<b>bring</b> 19:1 33:1 104:3
<b>aware</b> 72:1 98:9	<b>battle</b> 111:25	<b>bit</b> 6:14 17:8 21:11,13,15 27:17 53:12 64:2 79:3 80:18 100:14 104:23 110:22	<b>breathe</b> 65:25	<b>Britain</b> 67:10
<b>awareness</b> 37:21 98:16,23 101:16	<b>beach</b> 2:10,17 101:23	<b>blast</b> 63:12	<b>breeder</b> 66:21 67:5,7,12	<b>brittle</b> 31:15,16
<b>awful</b> 53:8 59:4	<b>bedrock</b> 75:4,7 79:5	<b>blip</b> 66:4	<b>bridges</b> 46:24	<b>broad</b> 102:22
<b>axles</b> 47:19	<b>began</b> 10:17 63:7	<b>block</b> 30:22	<b>break</b> 96:7	<b>broad-based</b> 100:2
<hr/> <b>B</b> <hr/>	<b>begin</b> 111:4	<b>blue</b> 16:5 94:11	<b>breath</b> 65:25	<b>broadening</b> 101:14
<b>B-A-K-E-R</b> 114:3	<b>beginning</b> 75:2 82:11	<b>boar</b> 64:17	<b>breed</b> 66:21 67:5,7,12	<b>broken</b> 63:17
<b>back</b> 5:19 7:21 10:20 13:13 14:12 27:18 28:6 31:15 41:8,22 45:9 60:23 61:18 78:13 84:14 85:19 88:20 90:15 93:3 94:18 97:9 99:14 101:1 105:4,5,8	<b>begins</b> 28:3 94:18		<b>bring</b> 19:1 33:1 104:3	<b>brought</b> 19:7 48:3
<b>background</b> 73:13	<b>behalf</b> 85:17		<b>bridges</b> 46:24	
			<b>briefly</b> 3:15 48:6 95:19 97:16	<hr/> <b>C</b> <hr/>
			<b>brightest</b> 92:1	<b>C-5</b> 27:7
			<b>bring</b> 19:1 33:1 104:3	<b>CA</b> 52:17,20
			<b>Britain</b> 67:10	<b>cadence</b> 28:18
			<b>brittle</b> 31:15,16	
			<b>broad</b> 102:22	
			<b>broad-based</b> 100:2	
			<b>broadening</b> 101:14	
			<b>broken</b> 63:17	
			<b>brought</b> 19:7 48:3	

<b>calculated</b> 81:15	109:5 110:14	<b>caring</b> 2:4	<b>challenging</b> 102:12	<b>citizenry</b> 82:9
<b>calculations</b> 26:9	<b>cancers</b> 65:3 113:1	<b>Carlsbad</b> 91:11 93:17	<b>chamber</b> 69:23 80:9 81:1	<b>citizens</b> 111:19
<b>Calgary</b> 51:24 52:2,12	<b>CANDU</b> 53:10	<b>Carolina</b> 35:2	<b>chance</b> 21:10	<b>city</b> 2:9 111:11
<b>California</b> 66:24 73:3 95:3,17 97:10 103:7 110:19,21,22	<b>canister</b> 5:19 15:1,2 16:21 17:25 18:2,6,9,17, 25 19:2,3,5,6,14, 15,19,22 20:1,2,5, 14 22:15 34:23 49:9,10,18 50:6, 11,16,23,24 51:2 78:25 79:20,21 80:10,23 81:6,7 97:19 106:7,9,17, 23 107:5,6,20	<b>carried</b> 8:9 67:19	<b>change</b> 53:2	<b>Civilian</b> 43:3
<b>call</b> 7:20 14:8 19:7,24 22:9 35:7 38:24 40:6 53:5 83:12 106:5,10	<b>canisters</b> 17:4 19:24 22:7,10,11 25:5,6 35:3 36:13 49:11 50:8,13,17, 19 79:8 91:20 97:23 98:2,5 107:2	<b>carriers</b> 44:22	<b>changed</b> 9:6 25:3 89:12 99:12	<b>cladding</b> 68:24
<b>called</b> 4:1,2,11 15:18 16:2,22 19:12 20:18 35:13 47:5 51:4 54:3 63:17 64:2,5,22 66:19 67:18 68:8 90:11 97:12 106:4,14 107:4,22	<b>Canyon</b> 3:7,25 14:17 21:7 26:20 30:11 37:23 46:21 47:2 59:15 76:7 82:25 96:2 97:25 104:4 107:1 109:22 110:3 113:15	<b>carry</b> 11:4	<b>changing</b> 43:25 89:25	<b>claimed</b> 68:10
<b>calling</b> 98:21	<b>Canyon's</b> 47:15	<b>cars</b> 77:25	<b>charge</b> 93:10 105:19	<b>clarify</b> 44:17 73:23
<b>Camargo</b> 94:25 95:16,17 100:25 103:3,21,24 106:4,24 107:13 108:2	<b>capable</b> 23:19 29:9	<b>case</b> 21:9 31:18 50:1,3 60:10,23 74:23	<b>chart</b> 65:19	<b>class</b> 30:9
<b>campaign</b> 17:5, 7,11,16	<b>capacity</b> 42:20 79:6	<b>cases</b> 34:11 64:13	<b>check</b> 52:20 57:6 60:2	<b>clay</b> 59:21 79:1
<b>campaigns</b> 17:4	<b>capital</b> 39:5	<b>case</b> 5:19 19:8 30:4,10,20 40:13, 22,25 41:2,5,8,9 44:11 80:10	<b>chemical</b> 93:21	<b>clean</b> 5:9 28:8 68:6
<b>Canada</b> 51:23 52:1 53:7 55:9 57:23 59:19 60:23 61:13,21 62:12,15 63:25 67:16 85:5, 12,22 86:9,13 88:9,10,11 89:13 92:6 105:10	<b>Capitol</b> 43:22	<b>asks</b> 17:6,7,12, 15,17 26:24 28:4 40:14 44:19 110:10	<b>chemically</b> 93:24	<b>cleaned</b> 113:6
<b>Canadian</b> 53:3, 23 61:22 86:20 88:7	<b>capsule</b> 81:8	<b>cast</b> 78:25	<b>Chernobyl</b> 64:10,12,18 110:13 113:8	<b>clear</b> 60:12 89:3,4
<b>Canadian's</b> 86:6	<b>capsules</b> 80:25	<b>catastrophic</b> 72:21	<b>chief</b> 110:18	<b>close</b> 28:25 61:9 75:6 84:15 111:7
<b>Canadians</b> 54:5 55:4,10,11,12 94:22	<b>card</b> 108:6 109:17	<b>category</b> 92:2	<b>children</b> 64:8 65:6	<b>closely</b> 20:23
<b>canceled</b> 12:19	<b>cards</b> 94:12 108:5	<b>caught</b> 60:3	<b>chimney</b> 16:11	<b>closer</b> 24:7 60:20
<b>cancer</b> 64:7	<b>care</b> 74:11 77:16 90:3,5	<b>caveat</b> 104:8	<b>choice</b> 90:21	<b>closing</b> 70:1
	<b>career</b> 23:1	<b>CEC</b> 110:24	<b>chooses</b> 22:17	<b>co-founder</b> 61:21
		<b>cells</b> 64:25 65:2,4	<b>chosen</b> 48:9	<b>coalition</b> 61:22 97:11 100:1,2 101:7,9 102:7,18 103:7
		<b>center</b> 14:23 47:13	<b>Chuck</b> 3:13 84:17,18	<b>coalitions</b> 100:23
		<b>ceramic</b> 59:3	<b>circle</b> 18:7,15	<b>coast</b> 13:6 41:14, 15 45:3 75:23 103:5,8
		<b>certified</b> 2:21 40:10	<b>circles</b> 20:25	<b>coated</b> 59:16
		<b>cesium</b> 63:18 64:14,16,18 110:12	<b>circulates</b> 112:17	<b>cold</b> 7:25 10:11 106:4,11
		<b>cetera</b> 57:23 100:19 109:13	<b>CIS</b> 4:12 24:15 30:25 31:6 45:16	<b>collaborating</b> 102:20
		<b>challenge</b> 98:9, 11 103:12	<b>CIS's</b> 6:5	<b>collaboration</b> 40:5 87:6
		<b>challenges</b> 95:22 98:7	<b>cites</b> 38:19	<b>colleague</b> 101:10
			<b>Cities</b> 2:19 111:14	<b>collected</b> 6:4
			<b>citizen</b> 52:1 108:16	<b>collecting</b> 9:15
				<b>College</b> 61:25

<b>column</b> 36:14	38:16,22 40:3	<b>concerns</b> 42:5	<b>consent-based</b> 38:5,7 39:21 46:3 48:4 55:11 60:7, 11 61:2 62:20 88:25 98:24 99:17 105:16,25	7
<b>combined</b> 56:20	45:25 46:4 48:22 55:16,17,21,22, 23,24 56:2,10,11 57:10,11 60:9,11 92:4 96:19 101:20 102:13	<b>concise</b> 95:10	<b>consideration</b> 25:18	<b>containment</b> 14:7 113:4
<b>command</b> 61:4	<b>community</b> 12:10 55:12,14 57:5 60:18 61:6 88:25 96:23 100:14,22 101:21 105:20,21 110:2	<b>conclude</b> 73:12	<b>considered</b> 46:9, 11	<b>contaminated</b> 64:13 76:24
<b>comment</b> 85:22 89:18 91:1,23 94:10,11,14,16,17 108:4,7 113:19,24 114:12,22	<b>companies</b> 48:17	<b>conclusion</b> 8:5 42:23 50:1	<b>consist</b> 40:13	<b>contamination</b> 18:24 64:18
<b>commentary</b> 102:17	<b>company</b> 33:23 51:6 53:18,21 73:15 74:10	<b>concrete</b> 21:1 107:9	<b>consolidated</b> 4:11,12 6:5 7:17 11:15,20,23 12:4, 11 22:25 37:10 39:3,11,22 43:17 45:23 95:13 96:9 97:8 98:17 99:23	<b>content</b> 95:18
<b>commentators</b> 71:22	<b>compares</b> 24:25	<b>condition</b> 16:10	<b>consortia</b> 37:20, 23 38:1,6,10	<b>contention</b> 62:25
<b>comments</b> 89:16 105:12 113:14,16, 20 114:22	<b>competing</b> 75:13	<b>conducted</b> 49:20 73:20	<b>consortium</b> 105:18	<b>contents</b> 51:1,2 70:12
<b>commercial</b> 6:11 8:12 9:3 23:5 33:18,19,20,25 36:11,23 40:23 41:16 48:16 76:16 108:23,25 109:12	<b>complete</b> 27:24 63:24 90:13	<b>conducting</b> 36:1 42:12	<b>constituency</b> 45:21	<b>context</b> 6:9
<b>commercially</b> 67:9	<b>completed</b> 79:22	<b>conference</b> 45:9 71:9,19	<b>construct</b> 74:16 85:18	<b>continental</b> 46:14
<b>commission</b> 8:7, 18 39:14 50:15 53:24,25 56:4 86:20 97:20	<b>completely</b> 19:21 20:2 21:4 34:10 57:11,21 72:9 112:8 114:22	<b>confidence</b> 31:21 99:1	<b>constructing</b> 11:8	<b>continually</b> 69:8
<b>commitment</b> 46:1,5 55:19,20	<b>complex</b> 17:24 80:7	<b>confident</b> 92:18	<b>construction</b> 12:6 78:19 81:11	<b>continue</b> 24:1,2 42:13 48:2 69:5 72:15,17 76:3,4, 16
<b>commitments</b> 48:23	<b>component</b> 30:7	<b>confirm</b> 83:2	<b>consultation</b> 87:19	<b>continued</b> 12:21 110:16
<b>committee</b> 95:8, 9	<b>compounding</b> 72:18	<b>conflict</b> 86:17 87:8	<b>contact</b> 106:9	<b>continues</b> 50:10
<b>committing</b> 46:2	<b>consumption</b> 64:13	<b>confuse</b> 16:13	<b>contacting</b> 100:18	<b>continuously</b> 91:6
<b>common</b> 44:6 103:9	<b>conceivable</b> 30:25	<b>confused</b> 107:11	<b>contained</b> 68:23	<b>contract</b> 35:9,11, 17 36:4
<b>communicate</b> 72:4,9	<b>concept</b> 6:23 7:1, 2 62:11 68:25 83:21	<b>confusing</b> 3:22	<b>construction</b> 12:6 78:19 81:11	<b>contracts</b> 38:11, 12
<b>communicating</b> 5:5 72:2	<b>concepts</b> 11:19	<b>congress</b> 9:8,21 10:6,24 11:3 35:8, 19,22 48:9,12 53:15,20 95:12 98:12,21 101:4,25 102:3,4	<b>consultation</b> 87:19	<b>contrast</b> 24:24 106:17
<b>Communication</b> 42:24	<b>concern</b> 8:14 25:17,19 27:7 45:20 50:17 105:7	<b>congresses</b> 103:17	<b>contact</b> 106:9	<b>contributed</b> 103:1
<b>communication</b> s 73:14 74:10	<b>concerned</b> 110:11 111:17,18	<b>congressional</b> 97:15 100:6,19	<b>contacting</b> 100:18	<b>control</b> 28:2
<b>communities</b>		<b>connected</b> 20:3	<b>containing</b> 68:23	<b>controlling</b> 42:24
		<b>connection</b> 69:1	<b>containers</b> 11:21 21:10 59:15,16 68:16,17,19,21 69:15 70:13 94:4,	<b>convection</b> 16:11
		<b>conquer</b> 111:19		<b>convene</b> 95:23
		<b>consciousness</b> 70:4		<b>convenience</b> 95:19
		<b>consensus</b> 7:7 42:2		<b>conversation</b> 94:19
		<b>consent</b> 48:18,24 96:21		

<b>conversations</b> 54:5 101:11,13	<b>counteracts</b> 64:7	<b>cubic</b> 79:14 109:8	<b>day</b> 64:16 72:23 96:14	<b>defense</b> 23:5
<b>conversely</b> 83:16	<b>Countless</b> 65:22	<b>culture</b> 39:17 82:15,22	<b>days</b> 17:24 19:3 23:23 50:20 52:8	<b>defer</b> 3:2
<b>convince</b> 61:4	<b>countries</b> 11:7 51:19 68:8 71:21 91:7	<b>cup</b> 88:17	<b>de</b> 39:25	<b>deference</b> 108:22
<b>cool</b> 5:14 23:17 76:17	<b>country</b> 5:7,16, 24 8:8 9:10 23:4,6 26:8 31:24 36:25 37:24 42:9 96:24 99:6 101:20 102:13,25 103:4	<b>curators</b> 71:24	<b>deadly</b> 63:6 67:20	<b>defined</b> 24:23
<b>cooled</b> 66:21,23 67:2,8,14 76:2	<b>couple</b> 16:3 24:20 56:21 97:6	<b>Curie</b> 109:5	<b>deal</b> 25:22 26:20 57:17 71:3,6	<b>defunded</b> 35:20, 22
<b>cooling</b> 4:4	<b>coupon</b> 107:23	<b>Curie's</b> 109:4,6	<b>dealing</b> 51:21	<b>degree</b> 95:22 102:14
<b>cooling-off</b> 22:1	<b>court</b> 10:21 32:9, 14,18,23 108:12 111:11	<b>Curies</b> 109:11,14	<b>deals</b> 36:10	<b>dehydrated</b> 19:19
<b>cooperate</b> 86:11	<b>covered</b> 95:18	<b>curious</b> 11:1 109:10	<b>dealt</b> 62:21 104:11	<b>deliberative</b> 25:24
<b>coordinate</b> 102:14	<b>covering</b> 65:19	<b>current</b> 34:15,17 40:23 97:18 100:4 110:7,8,20 111:5	<b>deaths</b> 110:14	<b>delineation</b> 86:15
<b>coordinated</b> 96:3 100:20 102:8 103:18	<b>CPR</b> 2:21	<b>customers</b> 82:19	<b>decades</b> 22:11 58:2 60:1,6 66:5 90:12	<b>deliver</b> 43:24
<b>copper</b> 59:16,23 79:1	<b>CPUC</b> 110:24	<b>cut</b> 107:24 113:9	<b>December</b> 27:17	<b>demolished</b> 84:6,12
<b>copper-coated</b> 59:16	<b>crack</b> 106:3,6,20	<b>cycle</b> 7:21 84:24 86:7 105:22	<b>decent</b> 9:25	<b>demonstrate</b> 23:9 107:24
<b>core</b> 15:18,20 72:23	<b>crane</b> 15:5 18:8, 13	<b>cylindrical</b> 19:12	<b>decide</b> 42:20	<b>demonstration</b> 23:8 31:20 33:16 40:16,22 41:13, 19,25 42:3 44:11
<b>corner</b> 16:19 77:23 111:15	<b>crash</b> 41:20	<b>D</b>	<b>decided</b> 42:8 62:15 75:5 77:15 78:9 83:23	<b>density</b> 27:18,19
<b>corollary</b> 30:23	<b>crate</b> 18:15	<b>D-O-L-O-R-E-S</b> 109:21	<b>decides</b> 36:25	<b>Department</b> 2:17,20 9:14 10:15 33:9 34:2 46:23 97:7 98:16 99:8,9 102:2
<b>corporation</b> 53:18 61:23 62:8	<b>crates</b> 14:20	<b>dad</b> 113:8	<b>decision</b> 30:16 46:6 89:12 105:23	<b>depending</b> 30:3
<b>correct</b> 27:11 29:13 31:4 93:14 113:5	<b>cravls</b> 107:5,17	<b>damage</b> 64:24 68:21 110:15	<b>decisions</b> 24:6	<b>depends</b> 50:15
<b>corrected</b> 93:13	<b>create</b> 33:4 95:7 100:23 106:14,15	<b>damaged</b> 64:25 65:2,4	<b>decommission</b> 23:15	<b>deploy</b> 50:20
<b>correction</b> 62:7	<b>created</b> 63:15 66:10,11 85:7	<b>damages</b> 102:2	<b>decommission</b> <b>d</b> 34:11	<b>deployed</b> 107:21
<b>correctly</b> 54:8	<b>creates</b> 106:10	<b>danger</b> 50:11 65:6	<b>decommissionin</b> <b>g</b> 11:14 22:3 23:25 24:7 27:13,24 28:3,20 29:19 30:7,8 76:7,21 100:16	<b>depository</b> 91:4 105:6
<b>corridor</b> 81:2,7	<b>creating</b> 66:8 98:15	<b>daring</b> 55:15	<b>decommissions</b> 44:23	<b>deputy</b> 33:7
<b>corroding</b> 59:23	<b>criteria</b> 38:14,19	<b>date</b> 6:13 24:8 73:16 96:15	<b>decontaminatio</b> <b>n</b> 110:15	<b>derivative</b> 66:9
<b>corrosion</b> 26:25	<b>criticality</b> 94:2	<b>Dave</b> 32:16 47:24 51:15 73:9 84:19, 21	<b>deep</b> 2:2 6:17,25 7:2 58:21 80:4 91:16 105:6	<b>describe</b> 48:6 107:8
<b>cost</b> 36:10 81:9 83:3,4,6,9 84:24 90:16	<b>critics</b> 71:22	<b>David</b> 95:6,23 97:3,12		<b>Desert</b> 10:9
<b>costly</b> 81:23	<b>crown</b> 53:18 62:8			<b>deserting</b> 69:13
<b>costs</b> 110:15	<b>CT</b> 58:6			



<b>design</b> 39:6,15, 17 44:8 74:16 78:16 81:10	<b>differentiated</b> 108:22	<b>dismantle</b> 66:15	<b>Dolores</b> 109:17, 19 114:23	<b>drying</b> 80:11
<b>designated</b> 114:13	<b>differently</b> 85:13, 23 86:13	<b>display</b> 57:4	<b>domes</b> 14:6	<b>dual</b> 52:1 98:4
<b>designation</b> 8:18	<b>differs</b> 48:6	<b>disposal</b> 6:3,4,14 7:6,16,20 8:9,19 9:11 11:6,9 41:9 62:12,22 69:22 74:11 76:1,6 77:11 78:10,22 80:2 88:3 90:9 91:17 99:24 103:13	<b>Donev</b> 51:23 52:12,14,16 54:11,14,17,24 57:9 60:5 85:24 86:3 91:25	<b>due</b> 10:19 35:15
<b>designed</b> 26:2 39:14 47:19 49:14 58:25 73:15 110:7	<b>difficult</b> 12:12 82:17 83:8 92:19	<b>dispose</b> 9:6 91:12	<b>door</b> 2:12,13,22, 23 70:1	<b>dug</b> 114:5
<b>desires</b> 104:7	<b>difficulty</b> 64:19 82:10 86:12	<b>disposed</b> 8:3	<b>doors</b> 2:20	<b>dump</b> 108:24 109:7,9 112:24
<b>destination</b> 25:21 32:6	<b>dig</b> 2:2 68:13 71:15,18	<b>disposing</b> 7:11 8:10 9:5 12:18	<b>dot</b> 3:7 52:17,20 100:9 103:20,21 113:15	<b>Dupont</b> 81:4
<b>destructive</b> 107:22	<b>digging</b> 114:10	<b>disposition</b> 33:8 95:5	<b>dots</b> 16:20 17:20 20:20	<b>dust</b> 93:20
<b>detail</b> 78:16	<b>Dillon</b> 3:1	<b>dissolve</b> 59:3	<b>dozen</b> 103:4	<b>dying</b> 101:19
<b>detected</b> 69:24	<b>directly</b> 9:7 102:20 112:5	<b>distance</b> 51:20	<b>drawing</b> 60:24	<b>Dylan</b> 2:5
<b>determine</b> 30:4	<b>disappear</b> 65:15 84:8	<b>distribute</b> 47:19	<b>dream</b> 67:3	<b>dynamics</b> 85:5,9
<b>Detroit</b> 67:1	<b>disaster</b> 110:13	<b>disturbances</b> 21:6	<b>dried</b> 19:20	<hr/> <b>E</b> <hr/>
<b>develop</b> 50:18 65:2 95:9	<b>discharged</b> 5:12 34:14 40:21	<b>divide</b> 86:3	<b>drill</b> 6:24 7:2	<b>earlier</b> 14:14 16:3 17:18 18:1 20:20 21:15,22 22:4 24:13 40:17 88:13 105:18
<b>developed</b> 40:6	<b>discontinued</b> 10:17 11:25	<b>divisions</b> 87:25	<b>drilled</b> 80:5	<b>early</b> 11:25 100:7 102:10
<b>developing</b> 7:15	<b>discover</b> 83:16	<b>DNA</b> 64:25	<b>drilling</b> 80:4	<b>earth</b> 105:5,11 114:5,6,11
<b>development</b> 10:5	<b>discovered</b> 90:13 104:13	<b>docking</b> 80:9	<b>drink</b> 65:25 112:19	<b>earthquake</b> 50:1
<b>device</b> 107:10	<b>discussed</b> 21:15 24:13 57:15,18 96:12	<b>document</b> 104:5	<b>drinking</b> 112:15	<b>earthquakes</b> 21:6 49:21
<b>DGR</b> 61:1	<b>discussion</b> 4:16 38:23 49:6 55:21 89:17	<b>documentary</b> 78:6	<b>drive</b> 30:16 41:22 44:6	<b>easier</b> 112:13
<b>Diablo</b> 3:7,25 14:17 21:7 26:20 30:11 37:23 46:21 47:2,15 59:15 76:6 82:25 96:2 97:25 104:4 107:1 109:22 110:3,7 111:5 113:15	<b>discussions</b> 83:22	<b>documents</b> 38:18	<b>drop</b> 41:20,21 50:2	<b>easily</b> 29:20 72:7
<b>diameter</b> 34:23	<b>disease</b> 64:5	<b>DOE</b> 10:17 21:16 22:15,17 24:15 26:1 34:1,20 35:9, 24 36:4,12,19,23 37:2,3,13,14 38:13,23,25 39:4, 6,16 40:5 41:4 42:16 43:4 91:22 98:24 99:16,19	<b>dropped</b> 88:12	<b>east</b> 13:6 14:6,10 41:15 45:3 75:22 88:7,12
<b>diary</b> 77:17	<b>disfiguring</b> 64:5	<b>dollars</b> 35:15 43:7 65:23 83:4 104:18 110:14	<b>drum</b> 93:21	<b>eastern</b> 82:13
<b>died</b> 10:23 109:5	<b>disintegrate</b> 65:11 68:17		<b>drums</b> 93:18	<b>easy</b> 90:17 92:19
<b>Diego</b> 49:22 95:14	<b>disintegrates</b> 65:15		<b>dry</b> 5:17,19 11:18, 19,21 12:22,23 14:16 15:1,2,16 16:3,7,9,21 17:3, 23 19:22 21:14 22:5,7 27:21,23 28:4,15 29:7,8,22 30:4,10,20 49:18 58:13 96:11 110:10	<b>eat</b> 64:17 65:24
<b>difference</b> 25:5 64:21 73:18	<b>disintegration</b> 64:22			<b>EBR</b> 66:20
<b>differences</b> 85:14 87:13	<b>disk</b> 18:13			<b>EBR1</b> 66:19
				<b>economic</b> 110:15
				<b>Edison</b> 95:3,17 97:10
				<b>editor</b> 102:7

<b>editorials</b> 98:23 101:6,16	<b>employed</b> 107:14	<b>enjoying</b> 53:1	<b>evening</b> 2:3,8 3:12,21 27:3 33:14	<b>expected</b> 50:8
<b>educate</b> 43:12 105:22	<b>employees</b> 35:21 43:9	<b>enormous</b> 63:12	<b>event</b> 2:19	<b>expediency</b> 25:14
<b>educating</b> 48:20	<b>empty</b> 53:9 88:19 89:1	<b>ensure</b> 18:24 19:20 26:9 27:21 97:22	<b>eventual</b> 85:11	<b>expenses</b> 82:5
<b>Education</b> 52:17, 20	<b>encapsulation</b> 77:11 80:6,8 81:1, 18,22	<b>enter</b> 22:3 23:15 35:9	<b>eventually</b> 27:22 29:6	<b>expensive</b> 81:21 96:13
<b>Edwards</b> 61:13, 20 62:2,5 67:25 68:2 85:24 87:10, 12 90:8 93:5	<b>encapsuled</b> 80:17	<b>entered</b> 23:25 108:7	<b>everybody's</b> 111:16	<b>experience</b> 82:14 104:12
<b>effective</b> 43:2	<b>encourage</b> 113:20	<b>entire</b> 81:10	<b>everything's</b> 41:7	<b>Experimental</b> 66:21
<b>effects</b> 25:16	<b>end</b> 4:14 7:11 13:5 17:16 34:15 70:7 72:14 75:2, 10 76:22 78:14,21 79:4,13,15 80:25 82:6 83:9 111:5	<b>entity</b> 99:5,7,11, 20	<b>evidence</b> 68:11	<b>expert</b> 13:11
<b>effort</b> 22:11 95:6 100:20 103:18	<b>ended</b> 9:25 89:1	<b>enveloped</b> 22:20	<b>evil</b> 63:22	<b>experts</b> 57:22 58:23
<b>efforts</b> 33:4 102:14	<b>endorse</b> 114:22	<b>environment</b> 6:20 7:13 20:7 21:9 70:13,22 105:2,3	<b>examination</b> 107:23	<b>expiration</b> 110:8
<b>egg</b> 14:20 18:15	<b>endorsed</b> 27:9	<b>environmental</b> 62:11 102:19 103:6,7,8	<b>examine</b> 41:6	<b>expires</b> 111:6
<b>egg-crate</b> 14:25	<b>energy</b> 3:19 5:10 8:7,17 9:14 10:2, 15 33:9,24 34:2 35:24 45:9 52:17, 18,20,22,24 63:24 72:14 75:24 77:15 97:7 98:16 99:8,9 110:22,25 111:24 112:2	<b>equity</b> 38:24	<b>examples</b> 51:15	<b>explode</b> 64:22,24
<b>eggs</b> 65:4	<b>energy's</b> 40:20	<b>equivalent</b> 50:2 58:11	<b>excavate</b> 78:18	<b>exploded</b> 10:11 93:18
<b>Egyptian</b> 65:13	<b>engaged</b> 61:5 103:14	<b>escape</b> 68:22 90:1	<b>excavated</b> 110:6	<b>explosion</b> 84:7
<b>eighth</b> 17:5	<b>engagement</b> 11:14 76:7 105:20	<b>essentially</b> 23:15 65:8,22 105:19	<b>excavating</b> 74:19 76:3 79:13 81:20 87:14	<b>export</b> 110:21
<b>EIR</b> 30:8	<b>engineer</b> 25:13 112:10	<b>established</b> 9:11 31:1 61:23	<b>exceed</b> 110:25	<b>express</b> 66:8
<b>elaborate</b> 92:25	<b>engineering</b> 44:9 51:9 86:8 92:8,17	<b>estimate</b> 36:18 39:12	<b>excellent</b> 106:24	<b>expression</b> 38:20 41:23 45:24
<b>electricity</b> 5:9 56:9 63:5 66:4,7, 23 75:19,24 86:5	<b>engineers</b> 42:17 91:5 92:14	<b>estimated</b> 36:15	<b>exception</b> 42:10 91:8 96:8	<b>expressions</b> 44:8
<b>electricity- producing</b> 66:18	<b>England</b> 64:11	<b>estimates</b> 39:7	<b>excluded</b> 55:24	<b>extended</b> 109:22,24
<b>elements</b> 63:15, 20	<b>enjoy</b> 4:21	<b>Europe</b> 72:20 76:14 84:4	<b>excuse</b> 52:18 61:3 67:22	<b>extension</b> 24:1, 12 29:15 91:13
<b>elevator</b> 79:24		<b>Euros</b> 80:6 81:14, 15,17 82:6 83:8	<b>executing</b> 34:5	<b>external</b> 70:17
<b>elevators</b> 81:22		<b>evaluate</b> 27:15	<b>executive</b> 110:18	<b>extra</b> 28:23 29:5
<b>eliminate</b> 72:16		<b>evaluating</b> 41:4	<b>exist</b> 51:5 63:20	<b>extract</b> 67:17
<b>Elliot</b> 110:18		<b>evaluation</b> 10:22	<b>existed</b> 65:14	<b>extracted</b> 40:20
<b>embrittlement</b> 49:8			<b>existing</b> 30:5	<b>extraction</b> 67:18
<b>emergency</b> 2:19			<b>exists</b> 47:8 63:22	<b>extraterrestrial</b> 72:3
<b>emerging</b> 55:8			<b>exits</b> 2:11,12,13	<b>extreme</b> 50:3
<b>emphasize</b> 13:9			<b>expand</b> 101:9	
<b>employ</b> 28:12			<b>expectancy</b> 50:10	
			<b>expectation</b> 78:6	

<b>F</b>	96:4,17	<b>Finland's</b> 76:5	<b>formally</b> 10:2	19:5 20:6,15,16
<b>F-R-A-N-C-E-N-E</b>	<b>feedback</b> 41:25 44:9	<b>Finnish</b> 74:11 75:19 85:6	<b>format</b> 61:12	21:3,13,17,19,23, 25 22:2,8,14,18
108:17	<b>feel</b> 48:25 77:14 113:17	<b>fire</b> 2:19 41:21	<b>formation</b> 6:17 68:12 89:7	23:4,5,10,11,16, 17,18,19,21,23 24:10,14,23,24
<b>facilities</b> 6:5	<b>feels</b> 114:10	<b>fireplace</b> 59:9	<b>formations</b> 8:19	25:10,11,14,15, 17,19,25 26:4,5,7, 15 27:22 28:4,7, 11,15 29:5,15,21
11:17 12:3 14:3	<b>feet</b> 14:19 15:6,9 18:11 26:17	<b>firm</b> 51:5	<b>formed</b> 54:2,4 101:7	31:10,11,15,23 32:3 33:4,8,25
24:15 30:10,12	34:23,24 59:14 109:8	<b>fish</b> 99:10	<b>forming</b> 102:7	34:12,14,18
39:11,13 48:20	<b>Fermi</b> 67:1	<b>fission</b> 63:17 66:12 67:6 92:11	<b>forms</b> 26:18	35:10,12,18 36:5, 7,11,12,14,20,24
51:7 74:20 96:12	<b>fessed</b> 93:11	<b>five-kilometer</b> 77:25	<b>forward</b> 4:25 17:21 22:25 36:19	37:3,5,8,10,12,14, 22 39:9,19 40:1,4, 5,8,13,18,19,20, 24 41:3,6,8,12,14, 20 42:2 43:15
<b>facility</b> 11:24	<b>fiasco</b> 90:14 93:1	<b>fix</b> 54:19,22 106:20	38:16,25 39:1	44:23 46:1,2 47:8
12:7,11 20:14	<b>fictitious</b> 47:12	<b>flame</b> 93:19	42:21 45:25 46:4	48:16 49:7,12,13
22:15,17 36:24	<b>fiercely</b> 67:17	<b>fleet</b> 34:17 40:23	54:7 55:22 56:12	50:2,4,6,12,15,16
37:7,11 38:14	<b>figure</b> 9:22 22:12 83:5	<b>fleets</b> 110:17	57:10 60:22 68:25	51:15 53:6,8,10, 11,16 54:2 55:20
39:3,8,15,18	<b>fill</b> 5:19 84:13 85:19 94:12 108:6	<b>flowing</b> 59:22	91:9 94:20 95:24 105:24	57:20 58:1,12
43:18 45:24 51:4	<b>filled</b> 4:8	<b>flows</b> 88:11	99:9 94:20 95:24 105:24	59:2,4,8,12,17,18
77:11 78:19 91:13 99:24	<b>filters</b> 60:16 77:1	<b>flux</b> 31:17	<b>found</b> 8:3 39:21 40:3 63:7 75:4	60:2,7 63:8,13,14
<b>fact</b> 8:15 28:10	<b>final</b> 20:11,22 25:21,23 31:22	<b>flying</b> 15:24 50:3	<b>frame</b> 6:22 37:6	66:18 67:4,18,20
49:20 55:19 65:25	32:5 43:15 48:9, 10 74:11 76:1,5	<b>flexible</b> 79:3	<b>France</b> 7:14 51:8 67:10	68:18,23,24 74:4, 12 76:2,6,18 77:5, 7,11 78:10,24
66:14 67:14 70:5 89:10	78:10,22 80:2 86:18	<b>flowing</b> 59:22	<b>Francene</b> 108:10,14,17	7,11 78:10,24
<b>facto</b> 39:25	<b>finally</b> 52:6 93:10 99:2 100:1	<b>flux</b> 31:17	<b>free</b> 15:17 113:17	80:10,11,19
<b>failed</b> 67:9	<b>finances</b> 104:18	<b>flows</b> 88:11	<b>freeways</b> 114:16	91:17,20,21,22
<b>fairly</b> 16:22 17:23 21:7 23:22 74:22	<b>find</b> 3:8 12:10 29:4 54:6 70:2	<b>flux</b> 31:17	<b>freight</b> 114:16	95:4,7 96:1,11,22
<b>fall</b> 19:10 32:1 69:15	87:22 88:20,21,25	<b>flying</b> 15:24 50:3	<b>French</b> 33:22 51:6	97:12 99:6 100:8
<b>fall</b> 19:10 32:1 69:15	<b>finding</b> 10:18 11:24 12:1 102:6	<b>focus</b> 8:10 9:6	<b>freshly</b> 72:21	101:7 102:18
<b>familiar</b> 3:23	<b>findings</b> 39:22	<b>focused</b> 44:5 56:10	<b>friends</b> 82:23	103:13,21 104:4, 7,9 105:7,22
<b>family</b> 33:22 82:23	<b>fine</b> 54:25 67:25	<b>folks</b> 16:1 103:9 108:5	<b>front</b> 77:10	110:9,12 112:11
<b>farmers</b> 64:12	<b>finish</b> 19:4	<b>follow</b> 46:3 73:6	<b>fry</b> 99:10	<b>fuel's</b> 11:20
<b>fascinating</b> 20:10	<b>Finland</b> 11:7 52:6 61:15 74:3,4,9	<b>food</b> 65:24	<b>fuel</b> 2:4 3:18,24 4:1,3,6,9,13,15,25	<b>fuels</b> 6:12
<b>fast</b> 9:20 49:7 72:19 79:24	75:3,4,18,21,23, 25 82:9,13 84:16 85:5,17	<b>footprint</b> 28:9,11 79:10	5:8,10,11,13,15, 18 6:2,4,9,10,15	<b>full</b> 5:15 15:18 17:3,19
<b>favor</b> 48:16 60:8, 9 104:21	<b>findings</b> 39:22	<b>forbidding</b> 87:15	7:3,15,19,21 8:12	<b>full-sized</b> 49:23
<b>favorable</b> 10:21	<b>finding</b> 10:18 11:24 12:1 102:6	<b>forced</b> 48:25	9:3,7 10:13 11:16	<b>fully</b> 19:6 40:8
<b>favorably</b> 88:9	<b>findings</b> 39:22	<b>forces</b> 26:3 49:15 70:17	12:16,17,21,22	<b>functioning</b> 75:22
<b>fear</b> 49:13 75:16	<b>fine</b> 54:25 67:25	<b>forefront</b> 70:4	14:4,5,14,15,21	<b>fund</b> 9:16 35:13, 14,16 102:3
<b>fears</b> 31:14 42:5	<b>finish</b> 19:4	<b>forever</b> 65:8 66:6 68:16 72:15 94:6	15:1,5,11,14,15, 19,20,21 16:2,9, 10,13,16 17:9,13, 14,18,22,25 18:4	<b>funding</b> 11:5
<b>federal</b> 9:1 35:21 36:6,16 38:6 39:3 43:9,10 85:2,9,14 86:10,17 87:7		<b>form</b> 26:15 53:16 70:8 97:11 100:1		
		<b>formal</b> 38:23 39:5		

37:20 43:6 99:13	<b>genuinely</b> 70:2	<b>Gordon</b> 61:13,18, 20 62:1 67:22 73:24 85:22 86:2 87:11 89:15 92:25 93:4	<b>grow</b> 65:1	98:13
<b>funds</b> 10:24 36:3 102:4	<b>geologic</b> 6:2,14, 17 7:6,10,16,20 8:21 9:11 11:6,9 55:24 58:21 69:22 73:16	<b>Goshute</b> 12:7	<b>growing</b> 8:14 73:1	<b>happened</b> 6:1,7 8:6 9:18 50:6 66:25
<b>future</b> 21:15 22:22 24:6 29:18 30:19,21 35:4 37:4,5 38:14 46:5, 14 67:4 71:10,17 72:10,11 77:17,18 82:7 83:14,24 106:15,21 109:25 110:5 112:1,20, 22,25	<b>geological</b> 37:5 39:23 42:7,8,21 45:1 46:6,15,16 62:12,21 68:12 89:6 90:9 91:4,7, 9,10,16	<b>governing</b> 9:10 86:20	<b>guarantee</b> 78:10	<b>happening</b> 8:15 40:24,25 41:7 45:19 50:24 93:11 97:23
<hr/> <b>G</b> <hr/>	<b>geology</b> 10:4 92:11	<b>government</b> 9:2 11:23 12:15,18 36:6,16 53:19 62:15 86:13,14 88:7,8 90:13 93:12 96:17 100:3	<b>guess</b> 83:13 108:21 109:3,5	<b>happy</b> 10:5 111:16
<b>gain</b> 100:18	<b>George</b> 2:5,7 37:17	<b>governmental</b> 8:24	<b>guests</b> 94:19	<b>hard</b> 109:1
<b>gamma</b> 63:12	<b>German</b> 90:12 93:12	<b>governments</b> 86:11 87:7 89:4 97:9,11	<b>guts</b> 77:20	<b>hardened</b> 70:16
<b>gap</b> 68:24	<b>Germany</b> 64:16 67:10 90:9,24 93:2	<b>grade</b> 56:7 104:24,25	<b>guys</b> 45:11	<hr/> <b>H</b> <hr/>
<b>gas</b> 5:20 19:16 59:11	<b>get all</b> 93:14	<b>grail</b> 67:11	<b>H-O-W-A-R-D</b> 109:21	<b>harm</b> 90:6
<b>gears</b> 11:11	<b>girl</b> 113:7	<b>grandchildren</b> 65:6 112:25	<b>hailings</b> 88:21	<b>hazard</b> 6:19
<b>general</b> 41:17 43:1,22 106:5	<b>give</b> 13:21 31:4 37:5 56:15 64:1 85:2 94:13 99:19 108:13	<b>granite</b> 84:14	<b>half</b> 17:3,19 22:3 23:20 34:24 59:13 65:10 77:12 79:5 92:7 101:12 103:3	<b>head</b> 19:24
<b>generate</b> 5:9 26:21	<b>giving</b> 4:24	<b>graphs</b> 54:11	<b>half-life</b> 65:9,12, 16	<b>headed</b> 95:5
<b>generated</b> 6:12	<b>gland</b> 64:4,7	<b>gray</b> 20:19	<b>half-lives</b> 65:11	<b>heading</b> 28:19
<b>generating</b> 7:24 28:8 63:4 95:2	<b>glands</b> 64:9	<b>great</b> 3:9 11:7 14:1 19:1 25:22 39:19 52:15 61:10 65:3 103:14	<b>halfway</b> 38:11 57:7	<b>headlines</b> 76:8
<b>generation</b> 69:6, 9,18 71:7 72:8,11 77:14 83:12 97:1 109:22	<b>glass</b> 26:18 34:22,23	<b>greater</b> 30:9	<b>hall</b> 2:23	<b>heads</b> 57:8 60:15
<b>generation's</b> 77:16	<b>glasses</b> 108:19	<b>greatest</b> 102:15	<b>halt</b> 68:9	<b>healthcare</b> 97:22
<b>generations</b> 71:10 77:18 83:13,14,25 110:1,5 111:2,3 112:21,25	<b>Global</b> 33:23	<b>greatly</b> 95:15	<b>halts</b> 57:11	<b>hear</b> 4:2 11:13 13:24 22:24 73:12
<b>generic</b> 36:1	<b>gloves</b> 60:16	<b>green</b> 5:8,25	<b>hand</b> 3:3 61:17 71:4 94:16 113:25	<b>heard</b> 35:5 40:17 48:5 50:8
<b>genetic</b> 65:5	<b>goal</b> 6:2 105:19	<b>grid</b> 18:6	<b>handed</b> 88:19 89:1	<b>hearing</b> 53:2
<b>gentleman</b> 32:10,19 105:10 108:24	<b>goiter</b> 64:5,7	<b>ground</b> 43:15 81:6 93:1,6 109:2	<b>handle</b> 30:10	<b>heart</b> 112:23
	<b>good</b> 2:8 3:12 7:17 8:23 13:24 14:13 15:24 16:15 25:10 37:19 41:7 47:4 60:5 75:8 79:17 84:25 89:21 97:8,20 98:5 113:22 114:12	<b>group</b> 41:24 95:22 97:4,13 100:5 103:8	<b>handled</b> 8:24 53:13 63:9	<b>heat</b> 16:10 106:11,14,16,17, 19
		<b>groups</b> 103:6	<b>handling</b> 14:5 15:10 80:12	<b>heats</b> 19:18
		<b>Grover</b> 2:10,17	<b>hands</b> 62:16 113:12	<b>heaviest</b> 47:20
			<b>Hanford</b> 34:25	<b>heavy</b> 69:2
			<b>happen</b> 35:19 39:24 49:20 89:2, 22 90:23 93:22 96:3,17 97:17	<b>helium</b> 5:20 19:16
				<b>helped</b> 79:24 95:23 97:4 100:6
				<b>helpful</b> 99:1
				<b>helps</b> 64:4
				<b>Helsinki</b> 75:10,22 84:5
				<b>HI-STORM</b> 16:23

20:18 21:2 25:3	61:9 63:1	83:7,11 85:19 86:7 89:23 97:21	<b>imparting</b> 106:16	<b>indigenous</b> 55:4 57:10,11 60:9,10, 18 92:3 101:21
<b>HI-STORMS</b> 20:19	<b>hopes</b> 89:20	<b>hundred-</b> <b>thousand-year</b> 86:7	<b>impervious</b> 21:5	<b>industrial</b> 82:18
<b>hidden</b> 93:9	<b>hoping</b> 31:12 37:6 111:17	<b>hundreds</b> 43:9 63:14,19 66:11 68:20 110:14	<b>implemented</b> 96:19	<b>industries</b> 81:4 84:5
<b>hide</b> 83:17 112:21	<b>horizon</b> 45:22	<b>hunters</b> 64:16	<b>implication</b> 9:4	<b>industry</b> 22:11, 12 23:12 25:18,21 33:18 42:19 62:24 65:21 67:11 68:4, 10 69:13 70:19 72:25 89:5 97:25 107:1
<b>high</b> 8:10,20 9:5 19:12 23:9,11 24:22 25:1,10,17, 24 26:7,11,13,17, 20,21 31:23 33:8 34:20 35:3 36:13 37:2,13,22 40:16, 18,21 49:6 51:8 52:3 53:5,6 60:21 87:20 88:9,22 91:17,20 98:7,9 109:23	<b>horizontal</b> 25:6 49:22	<b>Huron</b> 56:14	<b>important</b> 16:24 99:3,5 104:16	
<b>high-burn</b> 31:10	<b>horrible</b> 110:2	<b>Huron-kinloss</b> 56:14,20	<b>importantly</b> 14:3 96:25	
<b>high-burning</b> 50:16	<b>hoses</b> 19:15,16 20:3	<b>hurt</b> 113:3	<b>importing</b> 88:2	
<b>highest</b> 56:7	<b>hosing</b> 18:23	<b>hurting</b> 111:22	<b>impressed</b> 45:10	
<b>highlight</b> 3:20 110:24	<b>host</b> 12:11 46:3 48:19 56:5,10 60:14	<b>hurts</b> 112:22,23	<b>impressive</b> 45:13 92:16	<b>inert</b> 5:20 93:24
<b>highly</b> 71:6 80:16	<b>hosting</b> 2:10	<b>hypothetical</b> 24:12 30:1 31:19 47:11 82:7	<b>improve</b> 69:16 72:12	<b>inferior</b> 70:8
<b>highways</b> 114:16	<b>hot</b> 66:22 112:3	<b>ice</b> 84:2,3,12	<b>improving</b> 69:8	<b>inform</b> 105:20
<b>hill</b> 14:10 43:22	<b>Houghton</b> 31:9, 25 32:7,16 48:2 49:2 51:15,17 52:15 54:9,13,15, 19 57:6 60:3 61:10 73:10,25 74:2,14,21 75:17 76:9 77:4,19 79:17 80:13,22 81:9,17,24 82:4,8 83:1 84:16 85:15	<b>Idaho</b> 33:15 34:25 41:15 44:25 45:4 46:15 66:19	<b>inch</b> 32:4	<b>information</b> 4:20 5:1,6 52:19,21 72:8 84:1 104:12
<b>history</b> 4:19 7:23 12:7 35:5,6 45:2	<b>hours</b> 113:8	<b>idea</b> 6:15 15:8 31:5 37:6 41:18 56:15 67:24 87:20 88:1 89:8,21,23 109:6 114:4	<b>inches</b> 15:7 26:17	<b>informed</b> 57:5 105:23
<b>hitting</b> 31:18 50:2	<b>houses</b> 10:6	<b>idealistic</b> 70:5	<b>incident</b> 88:4	<b>infrastructure</b> 47:7,16
<b>hold</b> 58:2 59:17, 18 110:7	<b>hovering</b> 15:4 18:8	<b>ideally</b> 102:10,13	<b>incidentally</b> 22:9	<b>initial</b> 39:21
<b>holding</b> 56:21 59:23	<b>Howard</b> 109:17, 19 114:23	<b>ideas</b> 89:20	<b>include</b> 73:24 81:18	<b>initially</b> 39:8 60:11
<b>holds</b> 22:4,8 80:3	<b>huge</b> 81:8 84:7	<b>identified</b> 98:1	<b>included</b> 87:17	<b>initiative</b> 103:2 105:15
<b>hole</b> 21:2 43:15 60:1,6 80:5	<b>human</b> 63:11 64:13 70:4 72:5 80:16	<b>identify</b> 32:21 114:24	<b>includes</b> 12:16 17:7 95:4	<b>initiatives</b> 48:15 99:1
<b>holes</b> 18:7 114:4, 10	<b>human-made</b> 63:21	<b>identity</b> 82:18	<b>including</b> 81:10 96:20 97:24,25 98:19	<b>injected</b> 19:17
<b>Holtec</b> 25:3	<b>humankind</b> 84:8	<b>Ignace</b> 56:16,18	<b>inconel</b> 31:18	<b>input</b> 19:15
<b>holy</b> 67:11	<b>Humboldt</b> 30:11	<b>illnesses</b> 65:5	<b>increase</b> 27:18, 19 111:1	<b>inside</b> 5:21 16:22 19:5,13,19 20:5 26:4 49:15 58:12 59:7,12,24 63:13 64:24 66:10 68:21 107:5 110:21
<b>home</b> 41:3 88:21	<b>humidity</b> 79:3	<b>immediately</b> 22:14 29:23 111:7	<b>indefinite</b> 12:24	<b>inspected</b> 26:24
<b>honest</b> 50:5	<b>hundred</b> 75:3 76:4,18 78:7,11	<b>impact</b> 86:19 102:15	<b>indefinitely</b> 59:17	<b>inspections</b> 107:2
<b>hope</b> 29:16 50:20			<b>independent</b> 4:1,11 16:1 62:14 71:22 96:11 110:19	<b>install</b> 18:4
			<b>indestructible</b> 65:22	<b>Installation</b> 4:2 16:2
			<b>index</b> 13:25	

<b>installations</b> 96:11	<b>intermediate</b> 53:5 60:15,25 90:10	20:13,21 21:14 27:10 28:7 29:17 31:2 101:19,22	<b>justice</b> 102:3	<b>laid</b> 86:16,19
<b>installed</b> 18:3,10, 12	<b>internal</b> 87:25	<b>island</b> 76:11,21, 22 77:9 79:11	<hr/> <b>K</b> <hr/>	<b>lake</b> 41:21 56:14
<b>instance</b> 107:16	<b>international</b> 7:7 42:14,17 51:14 58:23	<b>isolate</b> 30:19 84:25 109:15	<b>Kansas</b> 8:19	<b>land</b> 112:16
<b>Institute</b> 45:9	<b>interval</b> 32:8	<b>isolating</b> 8:23	<b>Kara</b> 73:21	<b>language</b> 84:10
<b>instrument</b> 49:25	<b>intervenor</b> 87:5	<b>isotopes</b> 26:13	<b>Keeper</b> 103:8	<b>languages</b> 71:12 72:5
<b>instrumentation</b> 26:2	<b>interview</b> 52:7 73:17,20 84:21	<b>issue</b> 29:8 31:17 51:21 93:2 98:2,3, 10 101:17 103:10 104:11 106:6	<b>keeping</b> 31:25 81:16	<b>large</b> 8:4 9:2 11:17 20:6 28:8 50:18 55:6 57:20 66:13 110:11
<b>instrumented</b> 40:8	<b>intimately</b> 3:22	<b>issues</b> 34:4 85:7 96:5,8 97:3 105:21 106:21	<b>key</b> 26:6 95:20 96:8 97:3 99:3	<b>largely</b> 58:25
<b>integral</b> 25:20 26:6 31:11 32:3	<b>intractable</b> 72:19	<b>item</b> 32:13 51:11 108:4	<b>keyword</b> 98:15	<b>larger</b> 4:9
<b>integrity</b> 26:4 50:19	<b>introduce</b> 3:11 4:18 51:11,16 52:5,11 61:14,18 94:25 100:7 102:10	<hr/> <b>J</b> <hr/>	<b>kid</b> 90:4	<b>largest</b> 52:17 110:17
<b>intelligence</b> 72:3	<b>introduced</b> 103:16 106:19	<b>J-A-N-E</b> 114:24	<b>kids</b> 52:20	<b>Las</b> 10:9
<b>interaction</b> 5:1 20:5	<b>introduction</b> 13:23,25	<b>Jane</b> 113:23 114:19,24	<b>kill</b> 63:11 64:17	<b>lasting</b> 94:5
<b>interest</b> 35:15 38:21,23 41:23 44:9 45:25 55:25 102:22 103:10	<b>intrusion</b> 93:1	<b>Japan</b> 67:10	<b>kilometer</b> 77:13 79:5 92:7	<b>lasts</b> 66:6
<b>interested</b> 13:18 38:25 40:4 45:25 55:17 84:23	<b>inventory</b> 47:5, 15	<b>Jason</b> 51:23 52:12,13 61:10,19 73:24 85:22 86:1 89:15 91:24	<b>kilometers</b> 7:4 79:10,15,16 84:3	<b>late</b> 34:1 46:13 50:21 69:24
<b>interesting</b> 20:9 22:10 53:1 54:8 61:20 71:19 75:14 81:24	<b>investigations</b> 8:21 10:3 78:15	<b>job</b> 34:7 90:17	<b>kind</b> 6:22 14:6,10, 20,22,23,24 15:3, 7 16:18 18:7,13 22:10 28:18 77:1 84:9,10 85:1,13 87:12 90:18 93:9 96:6,7 97:22 100:17 104:3 106:2	<b>LATHROP</b> 104:2 105:17
<b>interests</b> 85:14	<b>investments</b> 110:25	<b>join</b> 100:8	<b>kinds</b> 26:2 65:3 104:15,25	<b>laval</b> 107:4,18
<b>interfere</b> 85:11	<b>invitation</b> 61:9	<b>joined</b> 33:22 34:1,2	<b>Kingdom</b> 33:17	<b>law</b> 9:10 11:2 12:15 73:3 87:15 88:13 89:12 96:18,19
<b>intergenerational</b> I 69:5	<b>invite</b> 45:11	<b>joining</b> 2:9 101:8 102:6	<b>knew</b> 68:3	<b>lead</b> 97:14
<b>interim</b> 4:11,12, 13 7:17 11:12,15, 20 12:4,11 29:20 36:24 37:7,11 39:3,11,13,23 43:18 45:23 58:7 77:6 95:13 96:9 97:8 98:17 99:23 104:24 105:25 114:14	<b>inviting</b> 33:14 52:16	<b>joint</b> 98:20 101:1 110:23	<b>knowing</b> 89:10	<b>leaders</b> 97:15 100:6,19,22
<b>interlinked</b> 44:6	<b>involved</b> 17:11 105:15	<b>JONES</b> 16:12 29:25	<b>knowledge</b> 68:8 69:7 71:3,5,25 72:7 104:14 112:1	<b>leak</b> 69:25 106:2
	<b>iodine</b> 63:18 64:2,6,9	<b>journalism</b> 73:13	<hr/> <b>L</b> <hr/>	<b>leakage</b> 69:23 93:8
	<b>iodized</b> 64:3	<b>July</b> 38:20	<b>labor</b> 100:2	<b>leaking</b> 113:1
	<b>ionizing</b> 57:21	<b>June</b> 38:18	<b>laboratory</b> 31:20 87:15 107:22	<b>learn</b> 42:15 72:16 104:22
	<b>iron</b> 78:25	<b>jurisdiction</b> 88:2	<b>lack</b> 104:14	<b>learned</b> 92:5
	<b>ISFSI</b> 4:3,5,8 14:8 15:25 16:7 17:1,4, 10,12,16,17,23,25			<b>learning</b> 55:18 92:4
				<b>learnings</b> 100:5
				<b>leave</b> 37:15 72:10 77:17

<b>leaves</b> 11:1	<b>librarians</b> 71:23	<b>load</b> 5:17 47:19 110:21	99:10 103:17 104:19	<b>major</b> 68:8 70:15
<b>leaving</b> 71:12	<b>license</b> 24:1,12 27:8,14 28:23 29:15 39:14 43:18 78:20 111:6	<b>loading</b> 17:4,5	<b>lots</b> 25:22 55:7 59:24 71:25	<b>majority</b> 56:25
<b>led</b> 89:8 99:8	<b>licensed</b> 12:3 30:11	<b>lobby</b> 100:20	<b>love</b> 16:1 111:18, 19 113:10	<b>make</b> 19:2 24:9 38:24 45:13 46:1 47:13,16,24 60:10 62:6,19 65:1 69:14 77:15 90:6 94:9,11,13,16 96:3 97:17 98:13 102:9 104:19 105:23 113:19,20, 24 114:12
<b>left</b> 5:6 6:23 19:11 56:2 60:4 84:4,5, 13 110:1	<b>licensee</b> 39:16	<b>Loby</b> 75:9	<b>low</b> 13:21 24:24 53:4 60:14,19,25 76:23,24 90:10 109:7	<b>makes</b> 13:11 58:1,15 63:13 64:15 106:8
<b>left-hand</b> 14:18 18:5 38:12	<b>licenses</b> 30:6 110:9 111:6	<b>local</b> 12:10 13:19 85:14 97:9,10 100:3,23 102:20	<b>low-burning</b> 50:15	<b>making</b> 11:7 24:6 43:23 44:7 49:5 86:9 87:15 90:1 95:14
<b>left-upper</b> 77:23	<b>lid</b> 18:9,10,18 19:24	<b>locally</b> 100:17	<b>lower</b> 106:19	<b>manage</b> 35:10,11 58:19 104:16 112:13
<b>legacy</b> 66:6 70:23 71:11 110:2 112:20	<b>lid's</b> 18:12	<b>location</b> 14:8 21:4 23:10 25:25 30:5 47:12 104:9	<b>lowers</b> 18:13	<b>management</b> 4:25 6:9 7:19 12:16 27:4 43:3 54:3 62:8 76:20 95:5 97:21
<b>legal</b> 12:9	<b>life</b> 34:15 50:7,9, 13 84:24 86:7 111:14 113:7	<b>locations</b> 21:2, 20	<b>LUCAS</b> 26:23 27:5,25 28:13 44:16 45:5	<b>manager</b> 74:10 95:1
<b>legislation</b> 100:7 102:10 103:16	<b>lifetime</b> 30:13	<b>log</b> 59:9	<b>Luis</b> 96:20 98:20 100:24 110:3 111:15 114:25	<b>managers</b> 42:17
<b>legislative</b> 98:18 99:2	<b>limit</b> 87:9	<b>London</b> 84:4	<b>Lyons</b> 8:19,25	<b>managing</b> 9:10 36:13
<b>legislators</b> 98:19 101:5	<b>Limited</b> 63:25	<b>long</b> 7:12,18 9:24 15:6 23:22 25:15, 16 30:4 40:19 43:13 50:10 59:13,14 65:7,10, 11 70:25 72:17,25 74:15,18,20,21 77:24,25 78:4 79:8 80:3 83:22, 24 85:3,16 87:3 92:21 94:3 98:5	<b>M</b>	<b>mandated</b> 3:19
<b>legislature</b> 98:21	<b>linchpin</b> 7:20	<b>long-lived</b> 2:4 69:2 88:24	<b>M-C-C-L-I-N-T- O-C-K</b> 108:18	<b>Manes</b> 110:18
<b>Lemieux</b> 3:11,12 13:8 24:19 45:7 46:8	<b>Linda</b> 2:7 13:13 24:18 30:1 33:1 46:17 51:11,17 52:5 61:13,17 89:17 94:18	<b>long-term</b> 25:8 40:18 96:21 110:4	<b>machine</b> 80:4,19 81:4	<b>manifested</b> 26:10
<b>length</b> 53:21,23	<b>lines</b> 38:9	<b>longer</b> 30:13,14 58:14 65:13 66:16 68:13 92:12	<b>machinery</b> 80:24	<b>Manitoba</b> 87:13, 17
<b>letter</b> 100:18	<b>linkage</b> 99:23	<b>looked</b> 30:9 74:18	<b>machines</b> 80:14	<b>manner</b> 22:18
<b>letters</b> 102:7	<b>lip</b> 88:18	<b>loose</b> 96:7	<b>machining</b> 81:5	<b>Manuel</b> 31:5 94:25 95:13,17 106:1 108:3
<b>level</b> 3:23 4:6,8, 13 8:10,20 9:5 25:1 26:11,13,17, 20,21 33:8 34:20 35:3 36:13 37:2, 13,22 51:8 53:4,5, 6 60:15,19,21,25 76:23,24,25 81:6 87:20 88:9,23 90:10 91:18,20 96:4 98:7,9 100:23 102:20 106:18 109:7,23	<b>list</b> 63:23,24	<b>lost</b> 86:23	<b>Madam</b> 109:5	<b>manufacturer</b> 25:4
<b>levels</b> 3:20 4:17, 19	<b>listed</b> 3:8	<b>lot</b> 2:12,13 4:20 5:1 7:24 9:17 23:2 24:14 25:18 35:5 40:19 44:17 53:8, 10 54:5 55:8 58:14 59:4 60:20 79:21,24 85:7 87:4 92:4 95:21	<b>made</b> 4:10 8:18 34:24 35:9 45:3, 13 46:7 61:2,3 64:20 66:13	<b>marina</b> 30:22
<b>liability</b> 36:8,9, 12,15,18 39:7 43:8	<b>listening</b> 89:19	<b>looked</b> 30:9 74:18	<b>magic</b> 80:9	
<b>liberty</b> 52:9	<b>literally</b> 27:3 40:25 63:14	<b>loose</b> 96:7	<b>magnetic</b> 107:16	
	<b>live</b> 13:17 108:16 111:14 113:7	<b>lost</b> 86:23	<b>main</b> 70:17	
	<b>lived</b> 7:12 76:5 111:14	<b>lot</b> 2:12,13 4:20 5:1 7:24 9:17 23:2 24:14 25:18 35:5 40:19 44:17 53:8, 10 54:5 55:8 58:14 59:4 60:20 79:21,24 85:7 87:4 92:4 95:21	<b>maintaining</b> 30:20 73:1	
	<b>lives</b> 52:2 95:6	<b>lot</b> 2:12,13 4:20 5:1 7:24 9:17 23:2 24:14 25:18 35:5 40:19 44:17 53:8, 10 54:5 55:8 58:14 59:4 60:20 79:21,24 85:7 87:4 92:4 95:21	<b>maintenance</b> 97:22	
	<b>living</b> 64:24 84:9 101:19 112:19			

<b>mark</b> 83:23 84:11	<b>meetings</b> 37:23 95:11 103:1	<b>mid-70's</b> 68:7	<b>money</b> 9:15,17 11:4 35:12 38:5 82:2 99:15 112:22	<b>mud</b> 85:10
<b>mass</b> 63:6	<b>meltdown</b> 66:20, 24 67:2 111:24 113:9	<b>middle</b> 76:12 79:20	<b>monitor</b> 50:19,22 69:14,20 84:17	<b>multi-barrier</b> 78:17,23
<b>massive</b> 16:22 18:21 21:1	<b>members</b> 24:17 38:7 43:1,22 82:23 113:16,21	<b>miles</b> 10:9	<b>monopolize</b> 112:2	<b>multi-purpose</b> 15:1
<b>master</b> 84:18	<b>memory</b> 71:5 72:1	<b>military</b> 108:23, 24 109:2,12	<b>month</b> 38:4	<b>multiple</b> 4:10 103:17
<b>mat</b> 59:9	<b>mention</b> 26:24 46:20 93:16 105:14	<b>million</b> 36:17 37:25 47:1 65:17, 19 79:14 81:15,19 86:8 89:23 96:14 112:8	<b>months</b> 17:16 34:2 44:3 56:19, 21	<b>multipurpose</b> 16:21 18:2,5,9,17 19:5,14,15,19 20:14 22:7,9,10, 15 25:5
<b>material</b> 6:25 8:1 26:12 58:24 65:9, 16 78:5 83:16	<b>mentioned</b> 6:6 21:21 22:4 24:22 31:11 55:16 73:18 88:13 93:17 102:1 108:18	<b>millions</b> 63:10 65:18 66:3 92:7	<b>Montreal</b> 61:25	<b>municipal</b> 86:10 87:7
<b>materials</b> 65:24 68:20	<b>mess</b> 70:8	<b>mind</b> 45:17,18 83:14 101:18 103:15	<b>moot</b> 10:14	<b>municipalities</b> 55:5,6 60:8 75:12
<b>mathematics</b> 61:24	<b>message</b> 2:11 42:24 75:15 82:16,19 101:3	<b>mine</b> 6:23,24 7:8 56:7 90:11 92:10 105:7	<b>mop</b> 60:15	<b>municipality</b> 56:22 57:5
<b>matrix</b> 18:6	<b>met</b> 113:7	<b>mining</b> 88:22 105:21	<b>moral</b> 12:9	<b>Murray</b> 33:6,11, 13 44:15,16,21 45:23 46:12 47:3 48:8 49:11 50:12 51:3 90:25 91:2 99:24 105:19
<b>matter</b> 63:11 72:19	<b>metal</b> 5:18,19 25:16 66:22 106:9 107:23	<b>Minnesota</b> 56:17	<b>mothballed</b> 112:1	<b>museum</b> 71:23
<b>Mcclintock</b> 108:10,15,17	<b>metallic</b> 106:5	<b>minute</b> 14:2,9 15:17 80:1	<b>Mothers</b> 114:25	<b>muted</b> 93:4
<b>meaning</b> 98:3	<b>metallurgy</b> 31:17	<b>minutes</b> 4:24 44:14 60:4 73:21 79:25 84:19 108:7	<b>Mountain</b> 9:24 10:3,8,16,25 11:5 12:20 35:20,22 43:8 45:19 48:8, 10,13 88:16 99:18	<hr/> <b>N</b> <hr/>
<b>means</b> 4:3 5:17 14:9 25:14 29:1 71:1 79:7 94:6 109:22	<b>metals</b> 69:2	<b>mission</b> 44:7	<b>move</b> 3:4 15:15 17:12,21,24 21:12,17 22:6 26:22 29:22 32:12 37:4,8,9,12,13 39:1,19 42:21 47:8,12,25 51:10 54:7 58:24 67:22, 23 78:3 81:14 91:24 94:8,20	<b>name's</b> 4:23
<b>meant</b> 4:5,12,14 56:6	<b>meters</b> 59:13 79:8,14,23 80:3 93:20	<b>mistake</b> 61:2	<b>moved</b> 17:3 28:15 31:23 33:21 35:23 43:4 91:9	<b>narrowed</b> 88:15
<b>meantime</b> 12:2 70:22	<b>method</b> 11:24 57:22 68:14 106:2,3	<b>mitigate</b> 98:1 106:2,20,21	<b>movement</b> 22:25 23:1	<b>nation</b> 33:5 60:18
<b>measure</b> 26:3	<b>Mexico</b> 12:6 91:11 93:17 114:15	<b>mobile</b> 51:4,7	<b>movements</b> 79:4	<b>national</b> 4:14 8:2 11:2 33:4,5 45:17 69:1 87:24 91:2 95:7,12
<b>measures</b> 69:17	<b>Michael</b> 24:18 30:18 44:15	<b>mock-up</b> 49:24	<b>moves</b> 81:1,5	<b>nations</b> 73:6
<b>meat</b> 64:12,17	<b>microphone</b> 62:3 112:6	<b>modify</b> 30:4	<b>moving</b> 20:8 24:14 33:3 35:2 36:18 37:1,3 40:1 41:2 51:13,14 99:19	<b>Native</b> 100:3 105:7
<b>mechanical</b> 49:14	<b>mid</b> 9:1	<b>module</b> 107:6,8	<b>moment</b> 42:12 46:4 47:21 61:14 68:13 76:15	<b>Native's</b> 105:1
<b>mechanism</b> 16:9	<b>mid-1970's</b> 68:3	<b>Mojave</b> 10:9		<b>Natrium</b> 67:14
<b>media</b> 46:16 75:1		<b>molecular</b> 106:10 107:25		<b>natural</b> 16:11 92:10
<b>medias</b> 75:1		<b>molecules</b> 64:25		<b>nature</b> 31:19 63:7,21 64:15
<b>medical</b> 2:19		<b>Moltex</b> 67:16		
<b>medium</b> 58:7 76:23,25				
<b>meet</b> 110:21,24				
<b>meeting</b> 3:5,8 13:6 32:21 108:9				



92:14 105:9	<b>northeast</b> 103:5	105:21 108:19	<b>on-site</b> 5:13,17	<b>option</b> 62:21,24
<b>naval</b> 91:21	<b>northern</b> 64:11	110:6 111:24	70:16 96:10,16	<b>options</b> 22:22
<b>Navy</b> 33:16 36:14	<b>note</b> 88:7	112:9	97:18 98:6 109:1, 23	24:3 42:12 57:13
37:4,14 40:6	<b>nothing's</b> 40:25	<b>nuke</b> 108:25	<b>one-slide</b> 3:14	<b>order</b> 10:21 24:9
41:12,13 44:21,22	41:7	<b>number</b> 5:18 8:4	<b>one-third</b> 18:19	85:13 96:3,6
45:2	<b>noticed</b> 55:8	25:12 35:23	<b>ongoing</b> 8:22	97:11 100:17
<b>Navy's</b> 44:18	<b>November</b> 111:7	55:22,23 56:16	17:7 71:8	107:2
<b>NC2</b> 107:2	<b>nozzle</b> 107:3,4,18	80:8 102:19	<b>online</b> 8:13 84:21	<b>ordinary</b> 64:1
<b>NE</b> 43:4	<b>NRC</b> 10:16,17	<b>numbers</b> 44:17	94:15 113:12,13, 24	<b>org</b> 3:7 113:15
<b>nearby</b> 63:11	12:4 39:16	<b>NWMO</b> 54:4 55:1, 9,14 60:23 87:17	<b>Onofre</b> 95:1	<b>organization</b>
<b>necessarily</b>	<b>nuclear</b> 3:18,25		101:23	35:25 54:3,4 62:8
60:22 87:1,2	4:7,13,15 5:8,24	<b>O</b>	<b>Ontario</b> 56:8,12	<b>organizational</b>
<b>needed</b> 12:25	7:21,24 8:8,13	<b>obey</b> 39:15 71:16	89:1	39:17
18:22 24:5	9:3,8,10,15,19	<b>obeyed</b> 96:17	<b>open</b> 37:7,12,15	<b>organizations</b>
<b>neighbors</b> 73:11	10:11,13 11:1,3, 22 12:16,21	<b>Obispo</b> 96:21	41:5 45:1 82:21	82:1
<b>Nesbit</b> 4:18,22,23	13:10,19 14:4	98:20 100:24	<b>opening</b> 20:3	<b>orient</b> 14:11
14:14 45:10 96:4	15:5,11,14,25	110:3 111:15	97:6	<b>orientation</b> 25:6
<b>Nesbit's</b> 24:25	17:22 20:15,16	114:25	<b>opens</b> 39:8	<b>originally</b> 33:17
<b>neutron</b> 31:17	21:3,17 22:14	<b>object</b> 69:8	<b>operate</b> 39:18	88:5,14
49:7	24:15 28:7,11	<b>objection</b> 114:15	72:18	<b>outage</b> 5:13
<b>Nevada</b> 9:24	33:18,23,25	<b>occurring</b> 93:9	<b>operating</b> 34:8, 15 72:23 76:22	<b>outer</b> 78:25
10:4,10	34:12,14,18 35:7, 10,12,13,16,18,24	94:2	91:11	<b>output</b> 19:16
<b>newer</b> 80:17	36:3,5,7,11,14,24	<b>ocean</b> 55:3	<b>operation</b> 10:22	<b>outreach</b> 48:21
<b>newest</b> 76:14	37:3,5,8,10,21	112:17	28:23 74:13 78:21	100:17
<b>news</b> 37:20	39:9,13 40:1,4,5, 8,13,24 41:12,14	<b>October</b> 74:18	81:13 91:14	<b>outset</b> 70:10
<b>nice</b> 32:3	42:1,9,13 43:16, 25 44:21,23 45:2, 9 48:12,16 49:13, 15 50:14 51:15	<b>off-site</b> 98:6	109:22,24 110:16	<b>outstanding</b>
<b>nickel</b> 106:8,18	53:3,16,22,23,24	<b>offer</b> 100:11	<b>operational</b> 51:7	36:18
<b>nightmare</b> 90:18	54:2,3,7 55:13,20	101:1	<b>operations</b> 111:5	<b>overcome</b> 85:13
<b>Nikola</b> 109:18	56:5,9 57:16,20, 23 59:12,17 60:2, 6 61:22 62:7,9,10, 14,16,23 63:1,4,7, 8 64:5,15 66:1,12, 13,16,17 67:3,11, 17 68:3,4,5,9	<b>office</b> 33:7 35:23	<b>Operator</b> 110:19	<b>overflows</b> 49:16
111:10 112:1	70:18,23 71:20	43:3 50:16	<b>operators</b> 9:15	<b>overlapping</b>
<b>no's</b> 61:8	72:14,15,18,22	<b>Officer</b> 2:16,17	<b>opinion</b> 98:23	102:21
<b>nobody's</b> 101:18	73:4,5 74:4,12	<b>officers</b> 2:16	101:6,16	<b>overlay</b> 106:5
<b>non-dangerous</b>	75:8,11,15,17,20, 24 76:6 77:15	53:25	<b>opinions</b> 104:25	<b>overridden</b> 10:6
78:5	82:18 85:3 86:6, 20 91:7,17,20,21, 22 92:10 95:1,25	<b>official</b> 108:8	<b>opportunities</b>	<b>overseas</b> 33:20
<b>non-profit</b> 61:23	96:5,18,24 97:20	<b>offload</b> 15:19	87:4	<b>overview</b> 4:24
<b>nonradioactive</b>	99:12 103:13	<b>offsite</b> 103:13	<b>opportunity</b> 13:7	13:16 20:20
63:20		<b>Ojibway</b> 60:18	94:13 97:5	<b>overwhelming</b>
<b>normal</b> 28:18		<b>older</b> 80:18	<b>opposition</b> 10:19	57:4
<b>north</b> 41:3 56:17		<b>oldest</b> 76:2	12:2,9 82:8	<b>owned</b> 53:18
73:11 82:13 88:7, 12		<b>Olkiluoto</b> 74:4,14	<b>optimistic</b>	62:9
		76:11,12,13	103:15	<b>ownership</b> 36:20

<b>Oy</b> 73:14	<b>participating</b> 102:25	4,25 39:22,24,25 41:11,25 42:2,14 43:6,11 47:23 48:20,24 49:19 50:23 53:22 54:1 55:4,6,7,8 56:25 57:3 62:18 63:2 68:5 71:13 75:7, 15 77:14 78:5 80:1 82:12,17,22 83:17 84:8 92:20 93:10 95:11 98:8 100:4 102:19,23, 24 104:22 105:23 107:10,11 111:23 112:2 113:2	<b>perspective</b> 7:6 53:2,3 104:13	111:22 114:8
<b>P</b>	<b>particles</b> 19:3 77:2		<b>perspectives</b> 73:11	<b>planned</b> 65:23 70:9 76:4
<b>P-E-T-E-R</b> 111:13	<b>partner</b> 97:9		<b>Peter</b> 111:10,13	<b>planning</b> 35:2 44:10 95:1
<b>pack</b> 77:3	<b>partnered</b> 97:10		<b>PG&amp;E</b> 2:20 9:16 13:21 25:2 28:2	<b>plans</b> 8:25 9:2 13:20 30:19
<b>package</b> 6:16 26:1 32:2 41:15, 19,20 44:10,24 70:11	<b>Partnership</b> 33:24		<b>phase</b> 109:7	<b>plant</b> 4:15 9:15 14:10 76:15,24 80:6 81:18,22 82:24
<b>packages</b> 41:16	<b>parts</b> 110:22		<b>phases</b> 73:4	
<b>packaging</b> 69:17	<b>Pasi</b> 52:8 73:13, 14 74:2,6,9 85:17 94:22		<b>phasing</b> 62:23	<b>plants</b> 3:25 4:7, 11 5:24 8:13 33:20,21 64:5 72:24 73:5 75:6, 18 79:12 82:16 96:24 102:24 103:1,4 111:25 113:3
<b>packed</b> 59:21	<b>Paso</b> 109:20		<b>Phd</b> 51:25	
<b>pad</b> 20:13 21:8, 21,22 29:12 30:5	<b>pass</b> 72:7 73:3 96:25	<b>percent</b> 46:23 56:8 75:25	<b>philosophical</b> 83:22	
<b>pads</b> 58:8 110:7	<b>passed</b> 9:8,20 39:4 53:16 65:5 87:15 98:20 101:2 103:16	<b>percentage</b> 75:19	<b>physicist</b> 58:11 87:8 112:10	
<b>pages</b> 52:21	<b>passing</b> 69:6	<b>Perfect</b> 3:16	<b>physics</b> 51:24,25	
<b>paid</b> 35:11 36:16, 17 102:2	<b>past</b> 13:10 23:6 48:7,8 56:18 67:21 101:13	<b>perform</b> 98:22	<b>picked</b> 48:17 86:25	<b>plateau</b> 30:17
<b>pain</b> 19:1	<b>patient</b> 10:23	<b>performance</b> 41:19	<b>picking</b> 35:18 36:4,7,10,13 37:2	<b>pleasure</b> 94:25 95:8
<b>panel</b> 3:7 11:14 24:17 44:14 61:17 73:21 76:7 89:16 100:16 101:10 103:24 111:18 113:10,15,16,20	<b>Patrick</b> 3:11 4:22 5:6 6:6 11:15 13:15 24:18 44:15 45:6	<b>period</b> 22:1 24:4 29:20 42:4 94:3,6, 17	<b>picture</b> 10:8 14:18,23 16:4,5 17:13 18:1,4 19:11,23 20:18,24 28:6 76:10 77:23 80:18	<b>plenty</b> 15:21
<b>panel's</b> 104:4 113:14	<b>Paul</b> 33:6,10 45:8 46:18 51:14 90:25 91:1 96:4 99:24	<b>periodically</b> 15:15 26:24	<b>pictures</b> 79:18 80:2	<b>plutonium</b> 65:12, 14 66:2,8,9,12,14, 16,17 67:4,6,7,16, 18 77:3
<b>Paris</b> 84:4	<b>pay</b> 9:16	<b>periods</b> 89:11	<b>piece</b> 97:14	<b>podium</b> 32:19
<b>parking</b> 2:12,13	<b>paying</b> 36:3 96:15	<b>permanent</b> 6:3 7:19 12:25 20:17 70:2 88:3 89:21 99:24 110:5	<b>pieces</b> 63:17	<b>point</b> 5:16,25 8:6 10:14 12:8 16:3 19:18,22 20:1 21:16 24:4 26:5 27:12 30:2 35:4 43:8 45:21 62:19 74:15 87:3 90:8 95:21
<b>parliament</b> 53:14,20	<b>PDF</b> 54:15,18,21	<b>permanently</b> 55:14 72:17	<b>pills</b> 113:2	<b>points</b> 12:14 107:18
<b>part</b> 24:5 30:1,8 33:23 55:21 60:11 85:16 95:22 97:7 98:11,22 105:17 106:11 108:8 114:15	<b>pellet</b> 59:2	<b>permit</b> 29:16	<b>pinholes</b> 68:22	<b>poisons</b> 63:6,22
<b>partial</b> 36:4 66:20,24 67:2	<b>pellets</b> 59:4 78:24	<b>permits</b> 30:6	<b>place</b> 2:15 6:25 10:12 20:23 21:23 35:8 42:4 75:9 82:12,20 85:18 92:6,8,12 93:21	<b>police</b> 2:14,17 48:3 53:25
<b>participants</b> 71:20 100:22	<b>penetrating</b> 67:20	<b>permitted</b> 30:12	<b>places</b> 75:6 114:4	<b>policy</b> 9:9,11,19 11:1,22 35:8 42:13 43:16 44:1 48:12 95:7,10 96:5,18 99:12 108:19
<b>participated</b> 84:21 102:23	<b>people</b> 6:19 8:23 9:21 13:17 16:13 23:3 27:6 32:21 35:23 37:25 38:1,	<b>perpetual</b> 96:22	<b>placing</b> 114:11	
		<b>perpetuity</b> 59:17	<b>plan</b> 29:14 30:8 61:1 77:11 85:1, 18,20	
		<b>persistence</b> 71:5	<b>planet</b> 110:5	
		<b>person</b> 33:15 105:7		
		<b>personal</b> 44:8 79:23		

<b>political</b> 12:20 34:6	<b>potentially</b> 34:25 113:1	74:14 77:5 82:9 105:11	<b>producing</b> 53:22 63:6 66:23	<b>province</b> 87:13, 16,21
<b>politically</b> 42:25	<b>pounds</b> 40:12 47:1	<b>prevent</b> 64:4 70:1	<b>production</b> 7:25 73:4 76:16 91:12	<b>provinces</b> 56:5
<b>pool</b> 4:4 5:13 11:18 14:14 15:20 16:5,6,13,16 17:25 18:3 19:25 20:13 21:25 22:4 23:17,19 49:17 110:12	<b>power</b> 4:10 5:24 8:13 9:15 28:9 30:22 56:5 58:9 62:23 63:1,4 64:15 66:18 68:9 75:6,8 76:15,24 79:11 82:15,24 102:24 103:1,4 110:25	<b>previous</b> 55:16	<b>productive</b> 12:19	<b>provincial</b> 86:10, 17,22 87:7
<b>pools</b> 5:15 12:22 14:17 15:14,15,18 17:13 21:14,20 24:10 29:12,16,21 57:20 77:7,8 110:9	<b>power's</b> 68:5	<b>previously</b> 88:19	<b>products</b> 63:18 66:1 92:11	<b>proving</b> 68:14
<b>pops</b> 81:2	<b>Powerpoint</b> 54:15,18	<b>primarily</b> 12:1 35:24 44:4	<b>professor</b> 51:24 61:24	<b>public</b> 8:14,24 34:5 37:21 41:17, 24 43:1,22 48:19 50:17 68:7 93:7 94:9,11,14,16,17 104:5 108:4,7,15
<b>popular</b> 101:22 114:4	<b>practices</b> 57:24	<b>primary</b> 4:6	<b>program</b> 11:25 34:5 37:16,17 42:9,11 44:3,4,5 50:18 52:10 91:13 99:7,14,19	<b>published</b> 36:9 38:3
<b>population</b> 87:19	<b>pre-recorded</b> 52:7 61:15 73:16	<b>principal</b> 94:25	<b>programs</b> 91:8,9	<b>Pulido</b> 2:16
<b>pose</b> 6:18	<b>precedent</b> 111:19	<b>principle</b> 78:23	<b>progress</b> 9:20 43:23 44:7 96:8	<b>pull</b> 93:3 106:23
<b>position</b> 103:11 105:1 110:20	<b>predicated</b> 71:5	<b>priorities</b> 99:10	<b>project</b> 12:20 23:8 35:20,22 39:5,6 40:16 43:14 79:14 86:4 93:16	<b>pulling</b> 112:14
<b>positioned</b> 97:14	<b>prepare</b> 38:18	<b>private</b> 12:3 48:15	<b>projected</b> 50:7, 13	<b>pumps</b> 16:8
<b>positions</b> 17:19	<b>prepared</b> 38:22	<b>pro</b> 104:10	<b>projection</b> 65:20	<b>pure</b> 18:23
<b>Posiva</b> 73:14 74:10	<b>preparing</b> 38:13	<b>problem</b> 12:1 13:1 30:3 32:21 37:24 41:10 51:9 68:9 69:4,11 70:3 72:1,2,19 87:6 92:19 93:5 97:1,2 101:17,18,24 102:22 104:20 105:17 106:16	<b>projects</b> 42:18 43:11,13	<b>purpose</b> 9:13 66:8 98:5 99:11
<b>possibilities</b> 2:3 45:21	<b>present</b> 96:8 100:7	<b>problems</b> 52:24 62:17 86:11	<b>prominent</b> 13:11	<b>pursued</b> 74:5
<b>possibility</b> 20:4 21:16 62:23 94:1, 2	<b>presentation</b> 3:13,15,17 24:16, 20,25 25:4 45:7 49:5 52:5,6 54:22 61:13	<b>proceeding</b> 39:6 62:24	<b>promise</b> 92:24	<b>push</b> 41:21
<b>possibly</b> 6:4 90:23	<b>presentations</b> 51:21 89:19	<b>process</b> 15:3 17:24 19:17 20:10 23:22 25:20,24 27:12 45:14 46:3, 10 55:11,21 62:18,20 74:17,21 81:16 87:4,18 107:24 111:4	<b>prone</b> 72:21	<b>put</b> 5:20 6:7,16 7:3 20:22 22:19 23:17,21 27:23 29:15 35:8 41:7,9, 18,21 43:14 44:24 51:1 57:14 62:15, 16 68:15,25 71:14 76:6 77:2,12 78:13 84:13,14 90:11,19 92:2,17 105:3,5,12 112:15,16
<b>post</b> 57:5	<b>presenters</b> 85:6	<b>processing</b> 88:22 112:14	<b>pronuclear</b> 103:11	<b>putting</b> 15:20 105:8
<b>post-decommissionin g</b> 24:4	<b>presenter</b> 88:14	<b>produce</b> 62:10 64:6 66:7	<b>proponents</b> 67:3	<b>pyramids</b> 65:14
<b>postulate</b> 49:19	<b>preserving</b> 71:25	<b>produced</b> 53:13 65:21 72:22 77:9	<b>proposed</b> 67:15	
<b>potassium</b> 113:2	<b>president</b> 10:2 13:10 53:15 61:21	<b>producers</b> 62:9, 17	<b>protected</b> 5:21 70:17	<b>Q</b>
<b>potential</b> 6:18 24:14 41:4 45:16, 17 46:8 60:14 98:2 105:24 106:15	<b>pressure</b> 98:12 101:25 102:5,6	<b>produces</b> 67:6	<b>protocol</b> 2:6	<b>Q&amp;a</b> 61:16 73:22 84:18
	<b>pressures</b> 49:16		<b>proud</b> 3:10	<b>Q&amp;a's</b> 73:24
	<b>pretty</b> 5:2 10:14 12:7 22:24 60:3		<b>prove</b> 23:11 52:2	<b>quarter</b> 47:1
			<b>proven</b> 12:24 31:19	
			<b>provided</b> 11:23 75:20	

<b>quarters</b> 57:3	<b>radioactivity</b> 109:6	<b>ready</b> 52:14 56:22 57:1 74:12 76:1	<b>reducing</b> 112:11, 13	<b>relocated</b> 104:7
<b>Quebec</b> 56:9 87:22,25 88:3	<b>radionuclides</b> 6:18,21 7:11 92:15	<b>real</b> 32:15 42:14 65:25 68:10 74:13 80:2 94:1	<b>redundancy</b> 59:24	<b>remain</b> 19:19 31:11 32:3 56:13 65:7,17 66:2 96:1
<b>quest</b> 70:3	<b>radon</b> 59:11	<b>realistic</b> 70:5 89:14	<b>refer</b> 53:6	<b>remainder</b> 57:1
<b>question</b> 23:12 27:19 30:23 31:10 32:17 39:20 46:19 47:4 49:3 83:14, 20 85:4,16 90:20 100:13 104:3 106:1,24 109:3 110:1 114:13	<b>rail</b> 46:19,21 47:9, 12	<b>reality</b> 26:10	<b>reference</b> 105:24	<b>remained</b> 26:6
<b>questions</b> 13:3,4 24:16,18,21 32:12 44:12,15 45:20 47:24 84:20 89:16 103:24	<b>railcar</b> 40:6,7,9, 10,12 44:7 47:18	<b>realize</b> 54:17 85:6	<b>referred</b> 5:11 95:2	<b>remaining</b> 56:12 59:1
<b>quick</b> 32:15 44:2 46:18 47:24 75:1 89:18 106:1	<b>railcart</b> 41:22	<b>realtime</b> 50:20	<b>referring</b> 53:7	<b>remains</b> 9:14 34:12 50:12 65:6 71:8
<b>quickly</b> 5:2 42:21	<b>railroad</b> 47:2	<b>reason</b> 7:20 22:9, 19 70:17 109:14	<b>reflect</b> 89:13	<b>remember</b> 23:23 29:3 30:6 91:19 93:23 111:2
<b>quirky</b> 99:22	<b>Railroads</b> 40:11	<b>reasonable</b> 83:5	<b>reform</b> 98:18 99:2	<b>remind</b> 94:10 113:13
<b>quit</b> 11:6	<b>rails</b> 41:17 47:20	<b>reasons</b> 12:20 55:24 56:1 88:12 92:3	<b>refueling</b> 5:12 21:23	<b>remote</b> 94:1 107:1,4
<b>quo</b> 24:2 73:1	<b>railways</b> 114:17	<b>received</b> 26:3 91:13	<b>regions</b> 48:22	<b>remotely</b> 80:7
	<b>rain</b> 50:2	<b>receiving</b> 79:20	<b>regulated</b> 50:14	<b>remove</b> 15:19 23:21 44:23 51:1 66:15
	<b>raise</b> 94:16 113:25	<b>recent</b> 101:11 110:23	<b>regulator</b> 53:23 78:9	<b>removed</b> 16:10 18:18 19:6,17,21 22:2 23:20 64:9
	<b>raised</b> 113:12	<b>recently</b> 49:20	<b>regulatory</b> 29:25 39:14 50:14 53:25 97:20	<b>removing</b> 90:14
	<b>raising</b> 37:21 98:22 101:16	<b>recognize</b> 38:21 41:17	<b>reiterate</b> 12:14	<b>renewable</b> 110:25
	<b>ran</b> 31:2	<b>recognizes</b> 50:17	<b>rejected</b> 87:20	<b>repackage</b> 44:25 51:9 69:16
	<b>rated</b> 58:13,15	<b>recognizing</b> 61:5	<b>related</b> 96:5	<b>repackaging</b> 51:4,7,8
	<b>raw</b> 16:16	<b>recollection</b> 102:24	<b>relates</b> 96:9 103:12 106:12	<b>repair</b> 69:16 98:3
	<b>reach</b> 37:24 38:1	<b>recommend</b> 91:16 100:24	<b>relations</b> 8:24 93:7	<b>replacing</b> 67:5
	<b>reactions</b> 93:21	<b>recommended</b> 62:13 91:3,6	<b>relationship</b> 85:8 104:17	<b>replicate</b> 101:15
	<b>reactor</b> 5:12,21, 22 11:16 12:17,22 15:20 21:24 23:16 25:11,13,15 34:17 40:19 44:24 47:6 49:15 53:9 63:9 65:20 66:1,18,20, 21,23,25 67:1,2,5, 12,14,16 92:11 96:1,20	<b>record</b> 75:9 108:8	<b>relative</b> 24:6 50:10	<b>replicating</b> 101:8
	<b>reactors</b> 5:8 6:11 34:9,10,11,15,16, 17 40:21 66:7,10 67:7,8 72:18,22, 23 75:22 76:12 91:21	<b>recorded</b> 52:7	<b>release</b> 110:12	<b>reporter</b> 32:9,14, 15,18,23 108:12 111:12
	<b>read</b> 83:3 104:5	<b>records</b> 71:25 72:11,12	<b>released</b> 38:21	<b>reporting</b> 53:20
		<b>recovery</b> 93:15	<b>releases</b> 72:21	<b>reports</b> 53:19 68:8
		<b>recurrence</b> 70:1	<b>releasing</b> 44:8	<b>repositories</b>
		<b>recycle</b> 7:9,14 57:13,16	<b>reliability</b> 110:23	
			<b>reliable</b> 99:13	
			<b>reliably</b> 110:21	
			<b>reliant</b> 16:8	

---

**R**


---

**R&d** 36:1 42:14  
44:5 50:18

**racks** 14:21

**radiation** 15:12  
49:7 50:10 57:21  
58:15 63:12 65:2  
67:20 110:11

**radioactive** 2:4  
6:21 8:20 9:5 19:2  
50:12 58:5,24  
62:22 63:6,10,15,  
19,21 64:3,6,9,14,  
15,16,18,21,23  
65:7,9,16,17 66:2,  
6,11 67:17 68:4,7,  
20 70:12,23,25  
71:11,24 72:16  
80:17 87:16,20  
88:2,10,21,23  
90:10 93:19,24  
109:23 114:11

9:12 42:7,15 99:17,21	<b>residual</b> 19:2,21	<b>rid</b> 10:13 53:14	<b>S</b>	<b>scared</b> 82:24
<b>repository</b> 4:15 6:3,23 7:15 9:1 10:1,16 11:8 12:20 33:5 36:25 37:1,4,5,11,13,15 39:23,25 42:8,11, 21 43:19,20 45:1, 18 46:6,15 48:10 52:18 56:6,10 58:22 61:16 73:16 74:4 76:21,23 79:6 86:18 89:9, 21 90:15,23 91:7, 9,10,16 93:10 95:12 99:7 108:25 110:6	<b>resins</b> 60:16	<b>right-hand</b> 16:19 18:16 19:23	<b>S-H-E-I-L-A</b> 114:3	<b>SCE</b> 98:1
<b>representation</b> 100:3	<b>resolution</b> 87:23 88:1 98:21 101:2	<b>ring</b> 14:24	<b>S-W-A-N-S-O-N</b> 114:25	<b>scenario</b> 24:11 27:5,7 28:24 50:2 90:18
<b>reprocess</b> 6:10 7:9 8:21	<b>resolutions</b> 87:24	<b>risk</b> 43:5 58:19 71:8 106:20,21	<b>safe</b> 15:10 18:20, 22 39:16 45:14 63:5 69:8 70:22 78:11,22 90:20 97:19 101:24	<b>scenarios</b> 23:14
<b>reprocessed</b> 6:13	<b>resounding</b> 61:7,8	<b>risks</b> 42:23	<b>safely</b> 8:3 12:21 17:3,9 23:7,11 25:25 31:23 40:2 45:3 63:8	<b>schedule</b> 38:13 39:7 43:1,4
<b>reprocessing</b> 6:8 8:11 9:3,6 26:12 33:19,21, 23,24 34:22 67:19	<b>resoundingly</b> 60:19	<b>River</b> 35:1	<b>safest</b> 40:7	<b>schedule's</b> 43:6
<b>reproductive</b> 65:4	<b>resources</b> 3:8,9 69:7	<b>road</b> 47:9	<b>safety</b> 2:5,10 10:17,19,22 53:23 69:17 82:15,22 86:20 104:15	<b>schedules</b> 38:9
<b>requested</b> 11:5	<b>respect</b> 4:16	<b>Robles</b> 109:20	<b>Saiid</b> 75:9	<b>school</b> 52:3
<b>require</b> 52:24	<b>respond</b> 38:23	<b>robot</b> 107:5,17	<b>sake</b> 22:22 25:13	<b>science</b> 61:24
<b>required</b> 93:2 96:6	<b>response</b> 56:24	<b>robotic</b> 80:13,15 107:10	<b>salt</b> 8:18 64:2,3 90:11	<b>Sciences</b> 8:2 69:1 91:3
<b>requirement</b> 78:8	<b>responsibility</b> 86:15	<b>robotically</b> 67:19	<b>San</b> 49:22 95:1,14 96:20 98:20 100:24 101:23 110:3 111:15 114:25	<b>scientific</b> 68:14 89:10
<b>requirements</b> 39:15 43:24	<b>responsibilities</b> 86:15	<b>robotics</b> 107:2	<b>Santa</b> 66:25	<b>scientist</b> 91:25
<b>research</b> 8:9 25:22 31:21 35:25 70:2 78:19 87:14	<b>responsibility</b> 9:13 61:22 69:6 77:16 84:24 95:4	<b>robust</b> 6:16 49:9, 11,12 70:14 96:10	<b>Saskatchewan</b> 56:6,11 87:18	<b>scientists</b> 71:21 91:5,15 92:1,13 110:11
<b>reside</b> 111:15	<b>responsible</b> 8:7 12:15 34:13,20 36:22,23 37:1,2 90:3 104:17	<b>rock</b> 78:12,13 79:4 92:5	<b>satisfactory</b> 28:3	<b>scorecards</b> 46:25
<b>residence</b> 108:13	<b>rest</b> 23:21 26:13 31:12 90:6	<b>rocks</b> 84:14 92:16	<b>Saugeen</b> 60:18	<b>Scott</b> 105:14
<b>resident</b> 109:20	<b>restraint</b> 19:9	<b>rod</b> 78:24	<b>Savannah</b> 35:1	<b>scratches</b> 68:21
<b>resides</b> 16:21 21:25	<b>restrooms</b> 2:23	<b>rods</b> 31:16	<b>save</b> 3:4 24:22 112:22	<b>screening</b> 38:19
	<b>result</b> 7:24 60:12 93:21	<b>rolled</b> 59:9	<b>scalable</b> 39:10	<b>scrubbed</b> 113:4
	<b>resulting</b> 110:13	<b>rolling</b> 67:24 68:25 69:10,24 70:3,8,21 71:4 72:6 89:24 109:1	<b>scale</b> 9:2 15:8 58:11 78:14	<b>sea</b> 55:1,2 79:12
	<b>results</b> 50:1	<b>room</b> 15:21 27:6 29:22 80:8 98:8	<b>scan</b> 58:6	<b>seal</b> 20:2
	<b>retired</b> 61:24	<b>rooms</b> 79:21	<b>scandalized</b> 93:12	<b>sealed</b> 20:4
	<b>retrievable</b> 69:14,21	<b>round</b> 14:24 17:20 18:15		<b>seals</b> 106:10
	<b>revealing</b> 93:8	<b>routes</b> 47:17		<b>search</b> 87:18
	<b>reverse</b> 6:24	<b>routinely</b> 23:4		<b>seconds</b> 30:24 63:12 80:1 92:24 102:17 105:15
	<b>review</b> 2:5 10:17, 20 24:3 39:1 72:12	<b>run</b> 30:4 52:17		<b>secretary</b> 10:1 33:7
	<b>reviewing</b> 3:2	<b>running</b> 5:2		<b>section</b> 51:22 73:12
	<b>RFI</b> 38:15	<b>Russia</b> 109:12 113:7		<b>sector</b> 75:18
				<b>secured</b> 21:5

<b>SEELEY</b> 3:1 13:14 28:14,21 29:11,14 33:3,12 46:18 47:22 51:13 61:19 62:4 67:22 68:1 73:8 89:18 94:21 104:1 106:1,23	<b>seven-page</b> 95:10 <b>Severance</b> 30:23 31:8 49:4 50:7,25 73:23 74:1 84:23 92:23 94:24 100:12 102:16 103:19,23 105:14 107:8 108:1 112:5	<b>show</b> 15:3 25:24 31:23 41:6 43:23 47:11,13 50:23 77:20 84:25 <b>showed</b> 8:22 17:13 39:7 <b>shown</b> 31:21 <b>shows</b> 18:5 19:23 38:10 <b>shut</b> 34:10 43:4 <b>shutdown</b> 47:6 <b>side</b> 2:11 5:7 9:22 14:18 18:5,16 19:23 38:12 48:23 <b>sight</b> 89:25 <b>sights</b> 39:14 <b>sign</b> 71:14,15,17 86:21 100:9 <b>signals</b> 84:10 <b>significantly</b> 43:7 <b>silver</b> 18:13 <b>similar</b> 57:25 58:17,20 59:5 72:2 107:15 <b>simple</b> 89:5 <b>simply</b> 66:15 69:4 72:18 93:14 <b>simulated</b> 49:21 <b>simultaneously</b> 67:6 <b>single</b> 36:5 99:11 <b>single-purpose</b> 99:5,7,20 <b>sir</b> 32:9,18 <b>sit</b> 34:3,13 <b>site</b> 4:4,5 8:19,22 9:25 10:3,10 11:24 12:1 24:15 26:8 29:6 45:18 47:9,10,16 48:10, 17 56:20 60:14 74:22,24 75:13,23 78:15 81:10 82:11	84:11 87:1,22 88:10,12 104:7 110:3,4 <b>sites</b> 8:4 11:17 12:17,22 21:7 34:12 38:13 39:24,25 41:4 45:16 46:9 47:7 48:11 58:9,10 59:1 75:3,11 86:25 88:6,15 96:1,20,23 97:24 <b>siting</b> 38:6,7 39:21 46:3 48:4 55:11 60:8,12 61:2 98:24 99:17 105:25 <b>sits</b> 59:12 <b>sitting</b> 21:8 57:20 58:8,12 89:18 <b>situation</b> 6:3 11:2,16 51:18 89:14 93:18 97:18 110:20 <b>six-meter</b> 81:8 <b>size</b> 59:8 <b>sized</b> 39:8 <b>skeptical</b> 82:16 <b>skip</b> 58:18 <b>sleeve</b> 107:9 <b>slide</b> 5:3,4,5 6:13 7:5,21 8:16 9:7 10:6,13 11:10 12:13 14:1,2,11 23:13 28:22 34:7, 18 35:4 36:7,21 37:18 38:2,9,16 39:2,18 40:15 41:10 42:6,22 52:23,24 54:7,9, 11,24 56:23 57:7, 12,17,25 58:3,6, 17,18 59:1,6,11, 19,25 <b>slides</b> 62:6 95:18 <b>slightly</b> 58:16 <b>slip</b> 43:2 88:17	<b>slipped</b> 43:5 <b>slipping</b> 43:6 <b>slips</b> 107:11 <b>slow</b> 43:23 <b>small</b> 28:9,10 35:23 55:5 78:1 105:4,8 106:11,12 111:15 <b>smaller</b> 63:16 <b>smart</b> 92:20 112:9 <b>snoop</b> 109:9 <b>social</b> 75:1 <b>societies</b> 72:11 83:25 <b>society</b> 13:10 72:10 <b>sodium</b> 66:22 67:1,8,14 <b>solar</b> 77:17 <b>solid</b> 26:16 49:14 59:8 <b>solidified</b> 8:20 <b>solution</b> 7:19 10:19 12:25 60:21 68:11 69:3,10,12 70:2,7,21 72:25 97:8 104:24 <b>solutions</b> 85:11 97:12 100:8 101:7 102:18 103:21 <b>solve</b> 92:21 97:2 103:12 <b>solved</b> 68:9 104:21 <b>solving</b> 52:23 102:22 103:10 <b>SONGS</b> 95:2 96:2 98:1 100:15 107:15,19 <b>sort</b> 53:14,20,24 63:22 87:8 95:20 97:21
<b>seepage</b> 93:5 <b>seeping</b> 93:6 <b>seismic</b> 19:8 21:9 109:24 <b>selected</b> 10:2 <b>selecting</b> 48:11 <b>selection</b> 74:22, 24 82:12 <b>self-deception</b> 70:6 <b>self-defense</b> 68:10 <b>sell</b> 64:12 <b>senator</b> 101:14 <b>send</b> 4:9 42:16 46:2 101:3 <b>sense</b> 85:3 102:9 104:19 <b>sensitive</b> 42:25 43:1 <b>separate</b> 16:14 30:11,21 61:1 <b>separated</b> 7:12 26:12 <b>September</b> 36:15 38:20 <b>septic</b> 112:20 <b>series</b> 49:21 <b>serving</b> 95:8 <b>session</b> 11:14 <b>set</b> 41:20 86:14 111:19 <b>sets</b> 71:1 <b>setting</b> 86:13	<b>sewer</b> 112:18 <b>shaft</b> 79:23 <b>shaker</b> 49:23 <b>shape</b> 19:12 <b>share</b> 46:10 62:6 <b>sharing</b> 104:12 <b>sheep</b> 64:12 <b>Sheila</b> 113:23 114:1,2 <b>shell</b> 106:7,9,17 <b>shelved</b> 8:25 <b>shielded</b> 16:22, 25 18:17,20 19:13 20:12,16,17 <b>shielding</b> 15:12 18:22 <b>shields</b> 57:21 <b>shift</b> 11:11 <b>shining</b> 55:1,2 <b>shipments</b> 41:14 44:19 45:2 <b>shipping</b> 46:19 <b>shirt</b> 32:10 <b>shook</b> 49:24 <b>shore</b> 56:14 <b>shores</b> 70:16 <b>short</b> 31:9 57:19 66:5 76:5 78:23 92:23 94:6 95:9 <b>shorter</b> 53:11 59:14 <b>shortly</b> 114:23			

<b>sorts</b> 78:13 98:23	14,18 35:10,12,18	<b>standstill</b> 99:18	107:9	77:7 79:21 81:6
<b>sounded</b> 108:23	36:5,7,11,14,23	<b>start</b> 19:4 22:2	<b>step</b> 20:11 25:23	95:13 96:9,10,11,
<b>sounds</b> 70:4	37:3,4,8,10,21	23:18 34:3 35:18	26:6	12,16,21,22 97:8,
109:9	39:9 40:1,4,7,13,	37:21 39:1 43:14,	<b>steps</b> 45:13	19 98:6,17 99:23
<b>source</b> 62:25	24 41:12,14,20	25 74:12 78:20	<b>Steve</b> 4:18,23	101:24 102:22
<b>south</b> 35:2 56:20	42:1 44:23 48:16	81:13 82:20 84:9	13:8,9,14 14:14	103:13 105:25
60:14	49:13 51:15 53:6,	111:12	21:16 24:13,25	109:2,23 110:4,17
<b>Southern</b> 95:3,17	8 55:20 57:20	<b>started</b> 3:18 8:8,	42:8 45:10 48:14	111:1 114:14
97:10	60:1,6 65:23 74:4,	11 9:14 10:20	<b>steward</b> 111:3	<b>storages</b> 77:13
<b>southwest</b> 88:6	12 76:2,6,18 77:4,	36:3 54:4 63:3	<b>stewardship</b>	<b>store</b> 7:4 12:21
<b>space</b> 15:13,17	7,11 78:10 80:11	66:19 74:19 75:2	67:24 68:25	21:8 22:13,17
29:4	81:13 82:1 88:24	78:14,17	69:10,24 70:3,9,	24:9 28:3,11
<b>Spain</b> 42:10 91:8	91:17,19,21,22	<b>starting</b> 16:19	21 71:4 72:6	29:21 44:25 48:15
<b>speak</b> 108:6	95:4,7,25 96:11,	38:1 61:1 95:20	84:25 89:24 109:1	78:4 86:6
<b>speaker</b> 3:11	15,22 97:12 99:6	<b>starts</b> 17:25 18:2	<b>stick</b> 13:3,5 14:2	<b>stored</b> 4:4 13:20
4:18 14:14 51:16	100:8 101:7	38:19	49:17 61:11 85:10	14:4,15,22 15:22
55:16 58:21 61:21	102:18 103:13,21	<b>state</b> 10:4,19	<b>sticking</b> 21:1	16:9 17:9 22:16,
94:17 108:10	104:19 110:9,12	12:2,8,12 27:9	<b>Stockholm</b>	17 83:13
109:16 111:9	112:11	34:25 46:16 85:9	71:10,19 84:5	<b>storing</b> 110:9,10
114:19	<b>sperm</b> 65:5	98:21 101:5	<b>stop</b> 13:2 44:11	<b>story</b> 12:9 37:20
<b>speakers</b> 35:6	<b>spigot</b> 99:15	108:11 110:20	69:25 70:20 111:5	60:7 61:15 74:7
84:20	<b>splitting</b> 63:16	111:10	114:9	<b>straightforward</b>
<b>speaking</b> 12:23	<b>spoke</b> 114:23	<b>state's</b> 110:24	<b>stopped</b> 36:2	74:22
33:6 52:12 71:13	<b>spokesperson</b>	<b>statement</b> 95:10	99:15	<b>strategic</b> 95:1
<b>special</b> 80:12	114:25	<b>states</b> 4:1 6:10	<b>stoppers</b> 47:14	<b>street</b> 41:24
<b>speculative</b> 5:25	<b>spontaneous</b>	7:10 8:5 12:4 34:9	<b>stopping</b> 34:4	<b>strides</b> 11:7
<b>speeds</b> 106:8,18	94:2	46:13 48:21 51:18	<b>stops</b> 59:22	<b>strings</b> 98:15
<b>spell</b> 108:11	<b>spot</b> 107:18,19	52:2 67:15 73:6	<b>storage</b> 3:18,20,	<b>stroke</b> 31:22
109:20 111:11	<b>spray</b> 106:4,11	85:7,12 88:5	24 4:2,6,10,11,12,	<b>strong</b> 22:25
<b>spend</b> 4:23 27:3	<b>spring</b> 45:10	89:13 109:12	13,20 5:17 6:5	46:25 60:10 104:6
<b>spending</b> 38:5	<b>square</b> 79:10	110:11,19 114:13,	7:17 11:12,15,17,	105:2
<b>spends</b> 101:12	109:8	14	18,19,20,21,23	<b>strongly</b> 104:22
<b>spent</b> 2:4 3:17,24	<b>stable</b> 6:17 92:18	<b>station</b> 2:14	12:5,11,22,23	<b>strontium</b> 63:19
4:1,6,9,15,24	105:11	79:21 80:11,24	14:7,13,16 15:2,	<b>structural</b> 50:19
5:11,13,15,18 6:2,	<b>staff</b> 38:7	81:3 95:2	16 16:2,3,7,17,21	<b>structure</b> 14:25
9,10,12,15 7:14,	<b>stakeholders</b>	<b>stations</b> 80:10	17:1,2,4,6,23	16:14 26:16 32:4
19 8:12 9:3,6	38:22 43:12	<b>status</b> 24:2 73:1	21:10,13,14,20,24	49:14 79:19
10:13 11:16	<b>stalemate</b> 96:7	<b>stay</b> 2:1 5:14	22:5,7,19,21 23:1,	<b>structures</b> 20:7
12:16,21,22 14:4,	<b>stalled</b> 12:8	6:19,21 25:20	22 24:3,7 25:8	49:8
14,21 15:5,11,20	<b>stand</b> 4:16	68:15 89:10	27:10,20,21,23	<b>struggling</b>
16:1,13,16 17:13	<b>standing</b> 20:24	<b>stayed</b> 92:6	28:15 29:3,6,7,8,	111:21
20:15 21:3,17,25	<b>standpoint</b> 105:6	<b>stays</b> 5:22 92:17	12,22 30:3,5,7,10,	<b>studies</b> 27:25
22:13 23:17,18	<b>stands</b> 35:14	105:11	20,21 33:4 36:24	47:11
25:3,22 28:11,15	66:20	<b>steady</b> 43:23	37:7,11 39:3,11,	<b>study</b> 8:2 47:5,16
33:4,8,25 34:12,		<b>steam</b> 77:2	13,23 40:18 43:18	
		<b>steel</b> 18:21 31:18	45:24 49:18,24	
			51:15 58:7,8,13	
			69:8 70:16,18	

<b>stuff</b> 42:15 66:12 80:17 114:11	42:16 98:16	53:11 54:24 55:9, 10 57:15,24 62:25 92:4 97:15 100:13 109:13 112:5	66:5 70:25 98:5 106:5	<b>thousand</b> 78:7, 11 83:11 85:1 86:8 89:23 92:12
<b>subject</b> 42:25 49:18 70:15	<b>supposed</b> 11:3 35:17 54:12	<b>talked</b> 5:6 7:8 13:12 14:15 20:12 25:9 27:17 45:12 46:19 48:14 55:4, 5,6,7 58:21 62:20 94:4 95:21 96:4 99:24 109:7 113:18	<b>terminated</b> 9:2	<b>thousands</b> 6:20 110:13
<b>submarines</b> 44:22	<b>surface</b> 7:1,5,18 72:20 73:3 90:15 92:7 93:3,20	<b>talking</b> 25:4 27:4 31:10 34:4 46:25 74:3 108:24 109:10,11	<b>terminology</b> 31:9 48:3 53:4	<b>three-day</b> 71:9
<b>submit</b> 113:13,15	<b>surfing</b> 101:22	<b>talks</b> 53:1	<b>terms</b> 76:2 97:14 99:4	<b>three-year</b> 28:18
<b>submitted</b> 10:15	<b>surgically</b> 64:9	<b>tall</b> 34:24	<b>terrible</b> 64:4	<b>throats</b> 49:1
<b>subset</b> 26:14	<b>survey</b> 19:1	<b>tapping</b> 87:9	<b>Tesla</b> 109:18	<b>thrower</b> 93:19
<b>substance</b> 114:5	<b>Susana</b> 66:25	<b>taxpayer</b> 43:2	<b>Tesla's</b> 112:1	<b>thyroid</b> 64:4,6,8
<b>success</b> 10:23 60:7	<b>suspended</b> 15:4	<b>taxpayers</b> 77:18	<b>test</b> 10:10 31:20 49:23 107:19	<b>time</b> 3:4 6:22 7:18 8:8 19:20 22:22 24:8,22 25:15,16, 22 28:15 29:7 35:21 37:6 38:9 40:14,19 41:1 44:19 46:4 47:21 48:4 49:5 57:6,7 58:1 60:2 61:8,9 64:23 73:6,18 74:25 78:14 83:22 84:17 89:11 92:21 94:3,7,9 95:9 97:1,24 101:12 103:14
<b>successful</b> 27:1	<b>sustainable</b> 114:7	<b>team</b> 43:10 71:18	<b>tested</b> 107:21	<b>timely</b> 69:25
<b>successfully</b> 74:5	<b>Swanson</b> 113:23 114:19,21,24	<b>technical</b> 34:4 78:2	<b>testing</b> 25:18 80:21	<b>timer</b> 56:3
<b>suddenly</b> 63:13 64:21 68:7	<b>Sweden</b> 71:10	<b>techniques</b> 106:13	<b>tests</b> 31:20	<b>times</b> 25:12 63:10 65:13 73:3 92:12
<b>sue</b> 36:4	<b>Swedes</b> 78:16	<b>technologies</b> 27:16 28:12	<b>Texas</b> 12:5 114:14	<b>timing</b> 102:14
<b>sued</b> 36:6,20	<b>swells</b> 79:2	<b>technology</b> 12:24 67:18 71:3 72:8 81:21 107:3	<b>thank</b> 94:19	<b>title</b> 36:20
<b>suffered</b> 66:20	<b>Switzerland</b> 57:23	<b>temperatures</b> 49:16	<b>themes</b> 55:9	<b>today</b> 5:7 17:6 30:22 33:17 34:3, 13,16 35:13 41:13 72:6 95:14
<b>sufficiency</b> 107:25	<b>system</b> 22:20,21 25:3 49:21,22,24 78:17 107:16,20 110:19	<b>temporary</b> 20:16 27:10 70:19 77:13 94:5	<b>theoretical</b> 26:9	<b>told</b> 68:5 70:19 111:23
<b>suggest</b> 104:22	<b>systems</b> 12:23 29:9 50:21 97:19 107:14	<b>ten</b> 4:24 43:3 44:3 57:19 65:19 79:15 93:7,9	<b>thick-walled</b> 70:13	<b>tonight</b> 2:9 35:6 95:21
<b>suit</b> 73:7	<b>table</b> 36:8,9 49:23 64:1,3 105:13	<b>ten-year</b> 62:11	<b>thing</b> 18:15 23:7 24:24 26:23 28:5, 21 40:2 59:7 66:25 70:6 77:20 83:24 86:12 89:3, 6 90:3 92:24 99:11,22 111:21 113:5	<b>tonight's</b> 3:17 4:16
<b>suitable</b> 46:14,16 47:17 75:5,7	<b>tackle</b> 85:15	<b>tending</b> 85:10	<b>things</b> 8:7 14:20 16:4 25:16 26:14, 19,25 35:7 39:20 49:19 55:10 56:4 57:25 65:1 70:24 76:24,25 81:23 85:5 91:2 98:23 99:3 100:21 101:16 102:6,8 104:16 114:9	<b>tons</b> 34:13,18 37:8,9 39:9 41:2 79:6,7 91:19 109:10
<b>summarizes</b> 38:17	<b>takeaways</b> 38:8	<b>tioned</b> 21:5	<b>thinking</b> 28:5 70:6,20	
<b>summary</b> 12:14 44:2 95:20	<b>takes</b> 17:24 65:10 80:1 106:6	<b>term</b> 22:15 30:14 43:13 48:3,5 52:18 57:19 58:7	<b>thought</b> 8:23 107:11 108:20,22	
<b>summer</b> 40:9	<b>taking</b> 12:17 21:17 74:11 93:21 100:4			
<b>sunset</b> 41:22	<b>talk</b> 11:12,19 13:9 14:8,13 15:16 21:11,12 22:23 31:5 33:14 34:3 38:1 45:8 52:14			
<b>supersonic</b> 106:8,18				
<b>supplies</b> 110:17				
<b>support</b> 42:14 44:9 61:7 95:12 100:6,10,18 102:12,13				
<b>supported</b> 95:24				
<b>supporting</b> 33:20 40:17,22				



<b>tools</b> 76:25	91:12		<b>units</b> 28:8	<b>Vegas</b> 10:9
<b>top</b> 16:5 18:14 55:3 84:3	<b>travel</b> 100:21	<hr/> <b>U</b> <hr/>	<b>University</b> 49:22 51:24,25	<b>vehicles</b> 77:25
<b>topic</b> 13:11,18 33:2 51:12	<b>tremendous</b> 104:18	<b>UK</b> 33:19	<b>unknown</b> 72:10	<b>Ventura</b> 108:16
<b>topics</b> 112:3	<b>tremendously</b> 40:24	<b>Ukraine</b> 42:10 91:8	<b>unloading</b> 23:18	<b>versus</b> 107:9
<b>total</b> 17:1,8,12,14, 17 19:4 21:19 29:3,24 35:2 36:15 43:10 44:21 81:9 83:3,4,6,9	<b>triangle</b> 55:3	<b>ultimate</b> 30:16	<b>unmuted</b> 62:2	<b>vertical</b> 25:7 49:21 107:16,20
<b>touch</b> 23:14 58:16 102:3	<b>tribal</b> 104:13	<b>ultimately</b> 4:14 6:1 12:17 18:12	<b>unnatural</b> 65:1	<b>vertically</b> 93:20
<b>tough</b> 102:11	<b>trigger</b> 66:14	<b>ultrapure</b> 14:19 15:9	<b>unnecessary</b> 109:25	<b>veto</b> 10:4
<b>toxic</b> 65:21 69:2 71:6 83:16 88:23	<b>trip</b> 95:14	<b>un-can</b> 22:19	<b>unsatisfactory</b> 70:18	<b>viable</b> 7:21
<b>track</b> 19:13 75:8	<b>trolley</b> 81:7	<b>unanimous</b> 87:23,24 88:1	<b>upper</b> 16:19 30:17	<b>vicinity</b> 72:24 98:19
<b>trained</b> 2:22	<b>true</b> 62:7 68:6 87:12 110:2	<b>unanimously</b> 62:13	<b>upstate</b> 35:1	<b>Victor</b> 95:23 97:4, 12
<b>transcript</b> 108:8	<b>trust</b> 34:6 43:21 82:21	<b>unburied</b> 73:2	<b>upwards</b> 80:25 81:8 93:20	<b>Victors</b> 95:6
<b>transfer</b> 5:16 20:13,14,16 51:2 80:19 81:7	<b>tunnel</b> 77:24,25 80:2	<b>underground</b> 6:17 57:14 68:15 69:16 74:20 77:12 79:20 80:4 87:14 89:9 90:15,19 93:18,23	<b>uranium</b> 56:7 63:16 66:9 67:5 78:12 79:7 88:22 92:6 105:11	<b>video</b> 50:5
<b>transferred</b> 22:14	<b>tunnels</b> 6:25 76:1 77:20 78:3 79:15, 16 84:14	<b>underneath</b> 80:5	<b>uranium-fueled</b> 66:10	<b>village</b> 78:1
<b>translate</b> 31:12	<b>Tuohimaa</b> 52:8 73:13 74:2,8,9,17, 24 75:21 76:10 77:6,22 78:8 79:18 80:15,23 81:12,20,25 82:5, 11 83:6,20	<b>understand</b> 28:25 71:15,16 72:5 84:10 97:23 108:21	<b>US-MADE</b> 81:3	<b>virtually</b> 5:23
<b>translation</b> 54:15,18	<b>turn</b> 47:15 74:6 87:9 94:18	<b>understanding</b> 52:24 100:15	<b>Utah</b> 12:5,7	<b>vision</b> 104:4
<b>transmission</b> 30:20	<b>turned</b> 34:22 44:4 89:7 93:19	<b>understands</b> 25:13	<b>utilities</b> 12:21 35:9,11,19 36:2,6 62:10 102:21	<b>visions</b> 104:6
<b>transparent</b> 82:22	<b>turning</b> 99:15 110:4	<b>underwhelms</b> 50:4,5	<hr/> <b>V</b> <hr/>	<b>visualize</b> 107:10
<b>transport</b> 11:16 23:9 40:2,11,12, 14 44:24 45:13 80:10	<b>turns</b> 9:24 65:15 90:21	<b>underwhelming</b> 68:12,13 89:6	<b>vacant</b> 17:20	<b>vitrified</b> 26:18 34:21 35:3
<b>transportation</b> 25:20 26:1 33:16 42:1 46:23 47:17 98:6 114:16	<b>twin</b> 14:6	<b>undisturbed</b> 110:10	<b>validated</b> 26:6	<b>vote</b> 56:21 57:1,2 58:10 60:22
<b>transported</b> 23:4,6,11 25:25	<b>twins</b> 63:22	<b>unique</b> 21:7	<b>Valley</b> 35:1	<b>voted</b> 56:18,25 57:3 60:18
<b>transporting</b> 36:23 40:7 41:12	<b>type</b> 16:8 21:6	<b>unit</b> 111:6,7	<b>valves</b> 16:8	<b>voters</b> 103:7
<b>transuranic</b>	<b>types</b> 106:12 107:13	<b>United</b> 4:1 6:10 7:10 8:5 12:4 33:17 51:18 52:2 67:15 85:7,12 88:5 89:13 109:12	<b>Vanier</b> 61:25	<hr/> <b>W</b> <hr/>
	<b>typically</b> 11:19 26:15		<b>Vanner</b> 41:3	<b>wait</b> 19:20
			<b>varieties</b> 63:15, 20	<b>waiting</b> 3:14 45:1 69:15
			<b>variety</b> 8:4	
			<b>vast</b> 56:24	
			<b>vastly</b> 70:8	

<b>Wales</b> 64:11	88:2,10,21 89:6 90:10,14,17,19 91:12,18,20 93:3, 6,14,23 96:5,18 99:12 108:19,25 109:7,24 110:6,8 111:4 112:8,12	103:5 110:23	91:15 109:13 110:18 111:20	73:2 74:19 76:5, 18 77:9 78:7,11 83:7,11,12 84:2 85:1,19 86:8 88:25 89:23 90:16 91:11 92:7,12 93:7,9 97:6,21 112:4,8
<b>walk</b> 85:19 95:18	<b>wastes</b> 45:14 65:7,17,21 68:22 69:2 70:11 71:6 88:23,24 90:11	<b>wet</b> 14:13,16 21:13,23 27:23	<b>world's</b> 52:23 66:14 73:15	88:25 89:23 90:16 91:11 92:7,12 93:7,9 97:6,21 112:4,8
<b>walking</b> 69:19	<b>watch</b> 50:5 67:12 85:3 90:5	<b>whatsoever</b> 16:9	<b>worldwide</b> 82:20	<b>yellow</b> 32:10
<b>wall</b> 19:10	<b>watching</b> 33:16	<b>wheels</b> 107:17	<b>worried</b> 39:24,25 41:11,18 42:1,3	<b>yin-yang</b> 49:25
<b>wanted</b> 3:20 9:21 16:3 23:14 26:23 54:6 55:11,12 62:6 83:2 92:22 104:3 105:12 109:4	<b>water</b> 14:19 15:9, 11 16:6,17 18:10, 11,14,18,24 19:7, 18,21 30:20 57:20,21 58:22 59:3,10,22 65:24 66:22 70:15 88:11 93:1,6 112:14,15, 18	<b>white</b> 14:24 18:7	<b>worse</b> 65:3	<b>York</b> 35:1
<b>wanting</b> 112:2, 21,22	<b>ways</b> 8:4 99:14	<b>who've</b> 48:17	<b>worst</b> 50:1 70:6, 24	<b>young</b> 55:7
<b>war</b> 7:25 10:11 66:13	<b>weapon</b> 66:16	<b>wild</b> 64:17	<b>worth</b> 15:14 17:2 21:19,22 22:4,8 28:7 29:3,6	<b>Yucca</b> 9:24 10:3, 8,16,25 11:5 12:20 35:20,22 43:8 45:19 48:8, 10,13 88:16 99:18
<b>warm</b> 58:16	<b>weapons</b> 7:25 10:11 66:13,15 91:12	<b>window</b> 97:5	<b>wrapped</b> 53:15	<b>Z</b>
<b>warn</b> 71:10,14 83:15	<b>webinars</b> 41:24	<b>wire</b> 113:5	<b>writing</b> 100:18	<b>zone</b> 106:15,16, 22 109:24
<b>wars</b> 111:24	<b>website</b> 38:3 100:9 103:19 113:14	<b>wise</b> 73:3 89:12	<b>written</b> 43:17 113:14,16	<b>zones</b> 112:24
<b>wash-down</b> 19:8	<b>weeds</b> 86:23	<b>withstand</b> 49:15	<b>wrong</b> 40:9 89:7	<b>zurcoy</b> 59:10
<b>washed</b> 18:25	<b>week</b> 73:17	<b>wonderful</b> 94:19	<b>Wyoming</b> 101:12,14	
<b>Washington</b> 34:25 37:18 51:25 100:21	<b>weeks</b> 101:13	<b>wondering</b> 24:23 25:7 85:21	<b>Y</b>	
<b>wasp</b> 50:3	<b>weight</b> 47:20	<b>WOODRUFF</b> 78:4 83:2,10	<b>yard</b> 5:21	
<b>waste</b> 7:24 8:3, 10,20,23 9:5,8,10, 19,23 11:1,3,22 13:19 25:1 26:11, 13,17,20,21 30:9 33:8 34:21 35:3,8, 13,14,16 36:3,13 37:3,14,22 42:13 43:3,16 44:1 48:12 51:8 53:3,4, 5,6,7,12,16,22 54:2,3,7 55:13 57:13,17,23 60:15,19,21 61:1 62:7,10,15,17,22 66:2 68:4,7,11,17, 19,20 69:3,4,11, 13,19,20 70:3,18, 25 71:11,24 72:15,16,20,22 73:2,5 76:20,21, 22,23 77:1,8,17 81:25 84:25 85:4, 18 86:6 87:16,21	<b>weights</b> 40:11	<b>word</b> 84:16	<b>yards</b> 101:22	
	<b>weld</b> 19:24	<b>words</b> 16:4 22:18 25:8 105:4	<b>year</b> 23:16 25:2 35:14 36:5,9,17, 19 37:9 38:3,14 39:4 43:25 50:20 76:16,17 81:16 86:6 100:8 101:2 102:10	
	<b>welder</b> 106:13	<b>work</b> 3:9,10 9:25 10:18 11:6 12:24 28:1 30:18 32:20 42:17,19 46:12 54:8 55:25 74:16 82:23 86:22 98:25 99:9,17,20 107:6	<b>years</b> 5:14 6:20 10:20 15:13,14 17:2 21:19,20,21, 22 22:1,3,4,5,6,8 23:2,20 27:14 28:7,16,17,23 29:2,3,5,12,23 30:1 31:1,2,15 33:18 35:25 37:9, 12,15,17 41:1 42:4 43:3,5 50:9, 25 57:19 58:5,14 63:8 64:11,19 65:13,17,18,19 66:3 68:2 71:13	
	<b>welding</b> 20:1 81:3,4 106:12	<b>workable</b> 10:18		
	<b>west</b> 35:1 41:14 45:3 46:15 75:23	<b>worked</b> 51:6 57:9		
		<b>workers</b> 15:9 18:20,22 20:24		
		<b>working</b> 33:19 35:21 38:7 59:19 92:3,20 97:3,7,15 98:11,24,25 100:6 101:5 102:20 113:3		
		<b>works</b> 15:3 16:11 73:14 95:3		
		<b>world</b> 3:23 51:20 56:8 67:9 74:25 82:1 84:7 90:7		