

# SLF First Friday Series: Journalist Josh Frank moderated by Professor Emeritus Dr. Peter Andersen - "The Hanford Dilemma: The Untold Story of America's Most Toxic Place"

**Bart Ziegler:** [00:02:18:15] Good morning and welcome. Good morning in California and good afternoon in the East Coast. And for those of you who stayed awake in Europe, thank you very much, everyone, for taking your valuable time to attend this very special webinar. I'm Bart Ziegler, president of the Samuel Lawrence Foundation. Today, we have the distinct privilege and honor of hearing from two extraordinary experts on the nuclear waste issue. Recent events in Ukraine with the militarization of the radioactive waste shows it's certainly one of the most pressing global issues of our time. Let's all welcome the investigative journalist Joshua Frank, author of *Atomic Days: The Untold Story of the Most Toxic Place in America*. Now, I'll turn the microphone over to Dr. Peter Anderson, a world-renowned communications expert, author, research scientist, member of Sierra Club's executive committee, He helped write their 140-page nuclear waste policy, and finally, our moderator for today's webinar. Without further ado, thank you, Dr. Peter Anderson.

**Dr. Peter Andersen:** [00:03:38:00] All right. Pleasure to be here. My video is not yet enabled, but I'm going to proceed anyway. We're delighted to have Joshua Frank, who originally was from Montana. He's an American investigative journalist and he covers political and environmental topics. His work has been honored by the Society of Professional Journalists. He's won numerous awards, and he's just written his fifth book. And that's the one we're going to talk about today. *Atomic Days: The Untold Story of the Most Toxic Place in America*. And that is the Hanford Nuclear Waste site. So, Josh, I'm going to turn it over to you. Why should people in the West be concerned about Hanford?

**Joshua Frank:** [00:04:28:06] Well, first of all, thanks so much for having me. Really honored to be here. And the Samuel Lawrence Foundation and everybody tuning in. It's

really great to spend a Friday morning with everybody on Cinco de Mayo. To answer your question, you know, so I don't know what everybody knows about Hanford. I will say, Oh, here, it looks like we can start our video.

**Dr. Peter Andersen:** [00:04:53:06] So I'm Peter Anderson, and this is Bart and Joshua. Hey.

**Joshua Frank:** [00:04:59:18] Good to see everybody. So, you know, Hanford is a very complicated saga. I think in order to really kind of understand where we're at today with it and why everybody should be concerned about it, we need to understand how it got to where it's at now. Hanford was one of the three locations chosen during the Manhattan Project. Each different site was chosen for a different purpose. Hanford was chosen for to produce plutonium for atomic weapons, which it did for a long, long time. That process began way back at the World War II days, right? And Hanford is located in Eastern Washington State. It is sort of out of sight, out of mind for a lot of people that live in sort of the more urban areas of Seattle, Portland. But it's located near the Tri-Cities area, which Richland is right next to Hanford, right along the Columbia River. Beautiful, beautiful area not far from Walla Walla, Washington. One of the best wine growing regions in the Northwest. It's a really beautiful landscape. And in Hanford is smack dab right in the middle of this place in Hanford. Just to give you a kind of a perspective of like how big this place is, you know, it's a 586 square mile region. It was chosen because of its remoteness. It was also chosen because it had access to water. The nuclear reactors that were built along the Columbia that produced plutonium, they needed to have access to clean cold water.

**Joshua Frank:** [00:06:36:28] The Columbia was perfect for that. And they also needed to have constant electricity, which is produced from the dams on the Columbia. So it was kind of this perfect marriage for at least in the minds of those of the Manhattan Project, to create this atomic beast, essentially. And it was for decades producing plutonium. A lot of people didn't even know what it was really doing. I mean, you could say workers that worked at Hanford might live next to their neighbor, who might work at Hanford, but they didn't share information. They didn't even know what their neighbors were working on. This was a very covert military operation for decades. Just to fast forward during that time, Hanford produced literally millions of gallons of chemical waste, millions of gallons of radioactive waste, and the quest to produce atomic bombs

and fuel for those atomic bombs really superseded the importance of storing this waste properly. So today what we're dealing with at Hanford is what's left over from this whole atomic operation, right? We're dealing with a huge, huge, huge amount of radioactive waste that's sitting out there in these tanks. Hanford has two thirds of all high level radioactive waste in the country. It's stored in 177 huge underground tanks. I think 149 of those tanks are single shelled tanks. The rest are double shelled. And those tanks were really only supposed to last a few decades.

**Joshua Frank:** [00:08:19:14] We're going on 80 years now. So it's a big, big problem. I mean, even at the onset of the project itself, engineers and scientists were very concerned and issuing warnings and reports about this isn't a good way to store this stuff. It's going to create a lot of problems down the road. You know, radioactive waste, plutonium in particular. It's virulent for 250,000 years. So this is a problem that's going to far outlive these tanks. And they were worried about it in the 50s and 60s. Well, now fast forward to 2030 or 2023, and they're looking into the future. Now, they still haven't done anything with this waste. They've emptied some of these tanks. But right now, most of that waste is still sitting right where it's always been. Hanford was producing plutonium up until the late 80s, the end of the Cold War, and almost overnight became a massive cleanup project. I want to sort of buffer that clean up is sort of like this idea that, oh, it's going to just be completely remediated and safe forever and no problems, right? Well, that's not really the case. I guess when I use the word cleanup or the term cleanup, I'm really just talking about trying to keep this stuff safe so that we aren't on the verge of an atomic explosion, which is quite likely if we don't take care of this. Right now there are two of these tanks that are leaking—the Department of Energy, which oversees the project, they're really controlled by the contractors.

**Joshua Frank:** [00:09:54:03] So the Department of Energy hires these contractors that are doing all the dirty work, right? They're the ones on the ground. They're the ones building these facilities. The big one out there is Bechtel. Bechtel has a horrible track record. Numerous reports have by the Government Accountability Office have said these guys are not doing a good job. They're wasting money. They're milking taxpayers to the tune of billions of dollars. I mean, the price tag for this thing right now is \$677 billion. It's really astronomical. Just five years ago it was 300 billion. I think by the end, by 2030, I bet it's going to be over \$1 trillion. It's just absolutely insane how much profits going on yet very, very little work is being done. One of the big facilities is called the

Waste Treatment plant. And the idea is to get this waste out of these tanks and vitrify it and turn it into glass and store it safely. Well, if you were to read the press releases and I have back in the 90s when they were talking about this, they should have been done about 20 years ago with this. They haven't vitrified anything at Hanford and we're you know, now going on 40 years later or 30, 35 years later. It's just a crazy situation.

**Joshua Frank:** [00:11:16:07] These two tanks that are leaking right now pose a really great danger to the Columbia River. These tanks are only about seven miles, some of them from the Columbia River. And there's groundwater that goes underneath these tanks that feed the Columbia River. Well, the longer this waste continues to leach into the soil and make its way to the groundwater supply, it will eventually make its way to the Columbia River. We know over the course of Hanford's lifespan, while it was in operation, there were 67 leaks from these tanks. These tanks are in horrible, horrible shape. I explore a lot of that in the book. I interview a couple of whistleblowers, one in particular, Donald Alexander, he's a PhD, and he worked for the Department of Energy. He's now retired. One of his big concerns was that these tanks could explode. So these tanks that have a lot of this horrible, highly radioactive waste in there are literally bubbling right there, creating heat. They constantly have to be kept cool and they're off putting gases. In this case, hydrogen, and hydrogen is very, very flammable. If there were to be a build up of hydrogen that a spark ignited, you could see a horrible, horrible explosion. And they are producing hydrogen now and they're off gassing and they have to basically release this gas so it doesn't, you know, explode.

**Dr. Peter Andersen:** [00:12:52:09] Hey, Josh Yeah, state of the art supposedly today is dry storage and casks and canisters. Right? But you're telling us at Hanford it's still in tanks.

**Joshua Frank:** [00:13:05:02] That's right.

**Dr. Peter Andersen:** [00:13:06:03] Are those like cooling pools at a nuclear plant?

**Joshua Frank:** [00:13:10:14] There's a lot of different aspects at Hanford. Most of that waste is sitting in those tanks and some of those tanks, they have extracted, strontium and cesium out of those from the waste, and that is stored right now. These big, huge tubes are floating in like Olympic sized pools. That was one way to try to make these

tanks safer. But in the when they did this, of course, as we know with waste issues at this level, this never really safe right so they put it in this these pools to keep these big rods clean and they're just floating there. There's a problem. That facility where these rods are floating around in these really highly radioactive waters is on a fault line. So if there's an accident, if it loses electricity, if there's any kind of seismic activity, you could see an explosion or some kind of release just there. And that's not even talking about these tanks, right? The waste that's in these tanks right now, I would argue is posing the biggest problem for the for the cleanup.

**Dr. Peter Andersen:** [00:14:22:03] And what is the risk to say downstream from Portland down to Vancouver, Washington, Portland, Oregon, if one of these were to rupture and drain into the Columbia, how much of a risk does that portend?

**Joshua Frank:** [00:14:39:09] Well, we know, for instance, that during its operation there were intentional releases of radiation, some of them for testing. There were accidental releases, but constantly a lot of these bottom feeding fish were being monitored in the Columbia right near the Hanford site, as well as at the mouth of the Columbia River, which dumps into the Pacific Ocean. You know, and this is the main river of the Pacific Northwest. I mean, this is where all this water is pouring out of coming up from the from the Rockies in Canada. They were finding fish that were radioactive at the mouth of the Columbia River. The Columbia River, because of Hanford, is and was a radioactive river. It could be much, much worse if we see some kind of release. And it would destroy the Pacific Northwest. I mean, tens of thousands of Northwest farmers rely on waters from the Columbia. There are dozens of commercial fisheries along the Columbia River. Not to mention who wants to live next to a river that's boasting high levels of radiation, right? That's one problem. Another problem is if we do see some kind of accident that releases radioactive particles into the air, in the worst case scenario, a massive explosion.

**Speaker3:** [00:15:59:16] That waste is going to follow the jet stream and it's going to spread across the United States. Richland, which is adjacent to Hanford, where most of the people that work at Hanford live and Richland was born out of this whole project. It didn't really exist before. Before Hanford it would be a place that you wouldn't want to live. I mean, it would be a ghost town. I think depending on wind currents, Boise, Idaho, might not be a place people want to live. Parts of Montana. I mean, think about when

Mount Saint Helens erupted. There was ash that made its way all the way to the East Coast. Even the fires a few years ago, the massive fires up there, they were finding smoke was covering Washington, D.C. So there's no reason to believe that radiation wouldn't spread far and wide in the worst case scenario. It's a really important issue for everybody to be kind of concerned about.

**Dr. Peter Andersen:** [00:16:55:02] Josh, you've done fabulous investigative journalism. Are the various agencies that should be regulating this, including the Nuclear Regulatory Commission or the Department of Energy or the EPA? Are they asleep at the switch or are they proactively trying to do something about this?

**Joshua Frank:** [00:17:16:17] Well, they are caught in a system that is a perpetual wheel of profits for these contractors. One of the whistleblowers that I talked about earlier, Donald Alexander, and another one that I wrote a long piece about ten years ago that's also included in the book, Walter Tamosaitis, who was a very high level, probably the biggest whistleblower in the last 20 years at Hanford. What they talk about is the Department of Energy's lack of oversight. And it's not a lack of will. It's a lack of personnel, it's a lack of funding on the side. You have these contractors that essentially run the show out there. Every aspect of the cleanup has to go through review process. Bechtel, for instance, with this waste treatment plant, there's, you know, literally hundreds of different aspects to this project. Each one of those aspects has to go through a review process. Well, at the end of the day, the Department of Energy gets the green light or not. When they don't have the right amount of staffing to look at this stuff, the amount of technical staff, Bechtel can just push through bad ideas after bad idea and obviously that's been the case. We haven't seen this stuff being cleaned up. So I don't think it's a lack of expertise necessarily among those that actually work there, but it's a lack of people in general, just headcount, right? And it's the fact that Bechtel runs the show. That's one of the big concerns that under the Trump administration, just like the EPA was gutted, the Department of Energy was gutted, the funding being slashed. Meanwhile, the contracts keep ballooning. It's a really, really big problem. And the whole system out there needs to change if we're going to see this get to a better place one day.

**Dr. Peter Andersen:** [00:19:19:21] So you think there actually are technical solutions to safely storing this waste?

**Joshua Frank:** [00:19:28:19] I think we all have to hope that there is—I don't know if there is. There's not obviously an easy answer or else this would have been done already. Just last Fall, they spent millions of dollars to build this facility that was going to do a test run for vitrification for turning this into glass. They had a ribbon cutting ceremony. It was a big deal, right? Well, one week in, the thing overheated and they had to go back to the drawing board. And this is just one instance. I mean, it's case after case of this kind of botched work. I think that we all have to hope that it gets to a place where this stuff is stored safely, that we need to get this waste out of these tanks. There are a lot of really, you know, I'm very obviously very critical of the cleanup operation and Bechtel in particular, and the Department of Energy hasn't always done a great job, obviously. But I think at the end of the day, we all want the same thing, right? I don't think anybody would say, Hey, if it costs \$1 trillion to clean this up, let's spend it, you know, let's get this stuff so we don't have a horrible accident out there. However, if instead of that happening, it's just about profit motives—getting paid not to get the job done, as Walter Tamosaitis has told me that's a problem. It's a problem because we're paying for it. Taxpayers are paying for it.

**Dr. Peter Andersen:** [00:20:56:06] Now, Hanford is not the only nuclear waste storage site. There's 90 nuclear reactors that have waste stored on site. Each of them has problems with erosion or earthquakes or terrorism or whatever. And you hear people making the claim that nuclear power is the solution to our climate crisis. What's your response to that?

**Joshua Frank:** [00:21:28:02] Well, even if we are supposed to just for a minute believe hypothetically that everything that nuke boosters tell us is true, that everything about it's safe, which it isn't, that it doesn't have any carbon emissions. In any part of the life cycle. If that were true, it isn't. But let's pretend that it is. If uranium mining is totally safe. Let's pretend that that's true. It's not. You still have nuclear waste. If there is an answer for the waste. Right. There's not an answer for the waste. But let's pretend that there is. Even if all of these things. Let's just give them give them all of that. It's still not going to be done in time, right? You can't rule out enough plants fast enough to impact the climate crisis. It's just not going to happen. It's too expensive. It takes 10 to 15 years to get these things online. There's a big push for small modular reactors. Even those are very, very expensive. And there's a lot of questions about if they're going to get up and

running in time. They're not. I mean, I can throw the kitchen sink at it, but there's a lot of issues. But in relation to Hanford, for me personally, the waste issue is something that just there is no answer for yet.

**Joshua Frank:** [00:22:59:00] There is nothing—no place that you can put this stuff for hundreds of thousands of years and keep it safe. If we're concerned about the future of the planet because of the climate which we ought to be, we ought to be also concerned about leaving a toxic legacy behind. If we can save the climate with nuclear reactors, which we can't, you're going to create so much waste that you're going to poison the planet anyway, right? So what? Why? How can that possibly be a solution? Yeah, you have a plant. You know, I think it's in Connecticut right now. They have waste that they've been trying to figure out what to do with for a long time. They just came up with this plan to store this stuff safely, right? It took them a long time to come up with this plan. Lots and lots of money. And they admit that it's only a temporary solution and that these facilities aren't going to be ready for storage for 15 to 50 years. You mean there's no answer for this stuff? And that's a really, really big problem. And that's what I take away from the Hanford mess, is that any solution still comes with a lot of question marks.

**Dr. Peter Andersen:** [00:24:09:11] So in terms of the climate crisis, if we spent the amount of money that we would need to spend on nuclear to make a dent in it on things like wind and solar, could we have a much quicker solution?

**Joshua Frank:** [00:24:26:12] Oh, certainly. But that's not to say that those don't come with problems as well, especially when we are—this gets into a different type of conversation perhaps—but we need to decentralize the grid. I think that we can't let these companies put solar panels in areas of pristine habitat. We need to be very concerned about the mining of minerals. Lithium mining and those sorts of things have really grave impacts. The thing that we really need to talk about really is de-growth. We need to talk about the fact that we've reached our limit with consumption in this country and the world, that we need to reassess and reevaluate our habits. I'm very excited that we're going to get rid of combustion engines. In California, we're going to have EVs. Great. That's fantastic. But if we're replacing those with batteries and the mining of which is in Chile, Brazil, in Bolivia, is causing environmental devastation in those communities or even here in the Sierra Nevada or out in the Salton Sea in California. Is



that a good answer? We need to think about restructuring our cities. We need to think about getting out there and making walkable communities, bikeable communities and really a restructuring of our whole society. Clearly.

**Dr. Peter Andersen:** [00:25:49:25] Clearly a circular economy where we recycle more and consume less is a great idea. But in terms of lithium production for batteries right here in Southern California, out in the Salton Sea, we have a very clean source of lithium. It doesn't require deep mining. It's available in the waste product of an energy plant out there that is a geothermal plant. And so there and it could be a great prospect for a renovation of the economy out in a very impoverished area. I personally have some optimism about gaining lithium from that. I think disposal of batteries and such is a problem. But when it comes to climate change or it comes to nuclear waste, that seems like a pretty small problem, doesn't it?

**Joshua Frank:** [00:26:48:26] At this point it does. But for instance, I don't necessarily disagree with you about the Salton Sea, but there is a problem with how much water they're going to have to use for that. Meanwhile, they're opening up prospective mining in Thacker Pass this very pristine habitat up in the Sierras. So it still is an extractive process. And while the good thing is in this country, we do have very good regulations, they could be a lot better. But a lot of the places where they're sourcing this material, in the South America, that's where two thirds of lithium is held right in reserves there and deposits and copper as well, which is a huge product and horrible mining goes in. Copper mining has horrible effects, especially open pit mining. There's just a lot of these kind of things that we need to talk about as environmentalists as well. But going back to the to waste and nuclear waste, none of this poses the same long term problems as storing or dealing with waste. Not only can it be leaking underground, leaking and getting into groundwater supplies, you can also be using this stuff in a dirty bomb, you know? And what is the global landscape going to look like in 20 years? 100 years, let alone, you know 10,000 years if this stuff can be refined and used in atomic bombs, which it can mean once it goes through the fission process in a reactor for energy, it doesn't have much further to go to be made into a bomb. So you're doing all the legwork for these places. That's a that's a big concern of mine as well.

**Dr. Peter Andersen:** [00:28:35:18] Okay. For those that are just joining us, our guest today is Joshua Frank. He is an award-winning journalist and also has graduate

degrees in environmental conservation. So we think he probably knows what he's talking about here. He's just written a fabulous book called Atomic Days: The Untold Story of the Most Toxic Place in America, which is the Hanford nuclear site in western Washington. Bart is holding up a copy of the book. I urge you to pick it up. It's a fabulous piece of journalism, and it is journalists that often are the whistleblowers and the watchdogs over private companies and government agencies that are really not doing the job they need to. So I'm going to turn it over to Bart. Bart, do you have a question or do we have any other listeners that are potentially asking questions now?

**Bart Ziegler:** [00:29:32:09] Yeah, let me see the Q&A. We have a couple of questions. I'll start with an anonymous attendee. Has the Hanford site impacted nearby communities? And what are some of the long-term effects, which is what you've already sort of addressed? And I'm thinking, have they measured radioactivity in the wine yet? Is there monitoring on the river in continuous manner so that people can know when it spikes up or whatever?

**Joshua Frank:** [00:30:08:16] I'll talk a little bit about that in a second. But I think it's really important to understand how radioactive materials accumulate in the body, right? So it bioaccumulates in your muscles and in your tissues and your bones. Over time, the more that you're exposed, you're the greater your risk of developing a myriad of different types of cancers, other types of types of illnesses. During the operation of Hanford, as I mentioned before, there was intentional releases of radioactive materials. The big, big one that we know about was called the Green Run, where they intentionally released Iodine 131 into the air. There's still a lot of debate about the real intention of why they did this. But ultimately it was for testing purposes. Now whether or not it was to test it as a weapon or if it was to test its impact on people. we don't really know. But this release was a huge mess, obviously, and the downwind communities were completely unaware that this was happening. We know from some of those at least anecdotal studies and qualitative research has shown that the communities that were impacted by the green run and then also just living in the vicinity of Hanford, had high levels of thyroid cancers and rheumatoid arthritis, especially among the Yakama nation, indigenous peoples that lived very close by.

**Joshua Frank:** [00:31:50:14] The government hasn't gone in and done the really long, long longitudinal studies. One of the problems is, like a lot of this stuff, the people from

back in the 60s, a lot of those people that were exposed are no longer around. That's a big problem. Um, as far as research goes. And of course, the government doesn't want to admit any of this stuff. The information about the green run, this didn't even come out until the 80s. We didn't really know about it and that wasn't the only intentional release. Then of course, we have all these accidental releases as well. That's not even just talking about living around something like this today. They do monitor, but they monitor mostly on site and it's for safety purposes for the workers. There are thousands of workers out there that are working in the most dangerous jobs we have in this country. I would argue. They are working around or in facilities that are radioactive. They're exposed consistently to chemical vapors. There were hundreds of millions of gallons of chemical vapors produced or chemical products were produced that were dumped literally into the soil out there.

**Joshua Frank:** [00:33:08:20] So we have that problem. But no, there isn't consistent testing of radioactive soil contamination in and around the region that there should be. You have that the central Washington area and then also over into Idaho, huge agricultural region, not just wine—obviously wine is one that I'm probably most fond of, but they're not testing the wine. And it's a problem. I think if we had more of an awareness, we would know that this is still around. I mean, cesium for example, that was released into the environment. It grows up in these plants, right? It's in plants on the Hanford Reservation that are being eaten by coyotes, the coyotes and the deer on the reservation have shown high levels of radioactivity. Maybe they're not as high as the dogs around Chernobyl, but they're still pretty high. So what is that exposure for people in the region? But there's a lot of denialism as well. And then there's this fervent patriotism that runs through the culture of Richland. It's a very conservative town, but it boasts the most PhDs per capita in the entire country.

**Joshua Frank:** [00:34:29:22] It's a very educated town, but it's bizarre. It's kind of a bizarre place to go and spend time in. The high school mascot is the bombers. They celebrate the atomic age and they really believe, especially the older generation, that no matter how bad Hanford is now, it was worth it because it ended World War II. It produced the fuel for the bomb that was dropped on Nagasaki. So they still believe, even though, of course we can get into all of that, if that was even necessary. It wasn't, of course. There's no memorial for the Japanese that perished. It's almost runs like a covert military town today because it is, in many ways, still a covert military operation.

It's now a cleanup, but it was shrouded in secrecy for so long that that has carried over into the culture today. It's a really a bizarre, bizarre thing. But to go back to your question, I think because of that sort of cultural apathy to the potential dangers, there isn't an appetite to test and to be concerned about exposure because that would really challenge their whole worldview in a way.

**Dr. Peter Andersen:** [00:35:52:17] These nuclear issues turn up again and again at Santa Susanna and at Hanford and at Rocky Flats and at nuclear plants throughout the United States. Hypothesize with me, which is the problem here, is it ignorance on the part of government officials? Is it collusion on the part of political officials? Is it too controversial to touch or some of all of those?

**Joshua Frank:** [00:36:25:18] I'm talking about the atomic project in general. Well, at the government level, to really address this stuff would be to address American supremacy, right? I mean, the Cold War was propped up by nuclear powers and that arsenal still, even though it was cut in the 80s, it's still very large today. We have a potential confrontation with Russia and NATO. Not to mention the risks of Zaporizhzhia and depleted uranium that is going to be shipped from Britain. All of these issues benefit Western supremacy because they are propped up by our nuclear arsenal. To challenge this stuff is to challenge that. Then I think at a very basic level, there is a lot of ignorance and there is a lot of control of the information by those that want to prop this up. Scaling back a little bit on the energy issue, I do like to give people the benefit of the doubt. I mean, we can go back to what we were talking about with atomic energy as a potential answer for climate change. I think a lot of people, especially the younger generation, are captivated by the idea that there's a technical solution to this problem. Let's make these plants, let's get them up and running and get rid of coal and natural gas. This is great, right? This sounds like something out of *The Jetsons*. Like the future is right here. And we've had this technology all along. Why aren't we utilizing it? So I think that that's captivating for people because they're rightfully scared about climate change.

**Joshua Frank:** [00:38:19:28] However, they don't know all of the history of the anti-nuke movement or what they accomplished. They don't truly understand the risks. They don't really understand what happened at Chernobyl. We have cover up after cover up with Fukushima. And you fast forward to Ukraine. There are just so many problems. And that goes to the fact that nuclear energy and weapons. It's very, very complicated

stuff when it gets down on the scientific level, it's a lot easier to understand even a combustion engine. But what happened? What is fission like? What is fusion? How does this work? What is waste? What do you mean there's waste? I thought there was. There's a lot of components to it that I think a lot of people aren't aware of. Of course, the boosters don't want to talk about waste. If you read I know there was an op ed in The New York Times last week of this, you know, somebody I think it's called The Green Nuclear Energy Deal, The Green New Deal, Nuclear or whatever, something crazy. And it's just completely full of propaganda. Oliver Stone just released a new documentary talking about how great nuke energy is. Completely bonkers stuff and he's at least honest that he's like I'm not put no critics in my you're not going to hear any of the dissenting voices in my film about this. Right. So it's pure propaganda. But a lot of people eat that up.

**Bart Ziegler:** [00:40:01:08] Josh, would you just say that the reasons that we have problems right now with the development of nuclear energy is that number one, it's uneconomic to date, right? It doesn't compare with what Lizard said a year or two ago that solar, wind and batteries are 3 or 4 times cheaper. Also, there's no way that nuclear energy could be deployed in 2035 in time for the for the global warming to really kick in in a serious manner so that we mean we have ten years to solve the problem. And you put up a solar farm or a wind farm in a couple of years. The other thing is we still don't know what to do with the waste. I'm open for nuke energy and fission and fusion to happen, but they just need more research. But for a solution oriented wind farm, you're talking about 584mi<sup>2</sup>. I mean you're talking about this would be some of the biggest solar farms. There's not a lot of wind there, but I'm sure I mean, a lot of sun. What do you think could be a solution to provide enough energy to help? Transform Hanford from the most toxic place in America, probably rating in the world. To something that can be cleaned up while they produce clean green energy. What do you think?

**Joshua Frank:** [00:41:31:24] I like your visionary idea. The site itself is so radioactive. But with that said, there still is a lot of biodiversity in the land. Once humans are removed from a landscape, animals and plants flourish. And I would be skeptical of just covering it all with solar panels. I don't know if that's a good solution. I don't know if it's a safe solution, honestly. I wish there was an easy solution. I know one thing that is a fact is that we have a lot of buildings in Southern California and all over the coast that could have solar panels. I don't think that we need to essentially pave over the wild regions,

especially in the West, because that's where they exist the most to solve the climate crisis. I think we need to work about on an efficiency. I think we need to scale. I think that we need to make it easier for people to put solar panels on their roofs. I mean, the Governor Newsom's done quite the opposite and made it harder. There's a lot of solutions I think that can have a minimal impact. And those would be the ones that I'd be the most interested in as far as Hanford. Hanford was never producing energy, right? It was producing fuel for bombs. And I get this question a lot. Well, isn't that different than producing energy? I mean, it's a completely different thing. No, it's really not. Plutonium is a byproduct of the fission process. So, whether you're producing energy or you're producing it for fuel purposes, it's still being produced through the fission process.

**Joshua Frank:** [00:43:19:00] It's being produced in all reactors in the world today and all reactors in the future. Small modular reactors, anything else still produces plutonium. The ones at Hanford were extra refined. So it was better for fuel for a bomb. But they all produced this stuff and it's all going to be around for 250,000 years. It's crazy just you know, I think that sometimes numbers sort of like cloud reality and we you know, they just kind of like, you know, get washed over us and we don't really think about what does that really mean? Well, to put it in perspective humans have only been roaming outside of Africa for like 60,000 years. And think of all the societies that have risen and fallen and crumbled. And that's only 60,000 years plutonium. If it had been around then would still be, you know, radioactive for another 190,000 years from now. Right? So it's crazy, crazy stuff. And I think from a human perspective, a very human perspective and our great energy revolution that is happening now, I think we need to really look at who profits from this. I think that we really need to be advocates for the least impactful solutions possible. And I think that we need to come together and oppose the most horrific of those ideas. And one of those is atomic energy. Atomic energy has no place in any green portfolio for our future whatsoever.

**Bart Ziegler:** [00:44:51:29] Well spoken. Josh—oh, Peter, were you going to say something?

**Dr. Peter Andersen:** [00:44:56:02] Well, I was just going to say I was a co-author, along with 12 others of the National Sierra Club guidance on nuclear waste. And I would concur exactly with what you say. The risks are monumental. And with regard just to

nuclear sites that generate energy, we've got 90 of those around the country all stored with nuclear waste, either in cooling pools or in dry storage that are vulnerable to earthquakes, tsunamis, climate change, sea rise, terrorism. I could go on and on with that list, but they're very vulnerable. The odds of all of them surviving, even our remaining lifetimes, are not great. So I would completely concur, based on our extensive research at Sierra Club, with what you're saying.

**Joshua Frank:** [00:45:55:02] Well, thanks so much for your research, and I've sourced it quite a few times in different projects I've worked on. You know, I think this conversation changes a lot, too. If we were to see a disaster at Zaporizhzhia tomorrow. Again, even if all of the propaganda that they throw at us is true, the matter of fact is, atomic energy plants in the war zone pose great, great risks. Terrible. And, you know, Taiwan might be the next frontier for some kind of conflict. They have nuke plants. However, this is a whole new tool of war now, and Russia is using it to their advantage to control and potentially, you know, take that region. But what are the impacts? And if there is an accident, if and it doesn't have to be that one of these plants gets hit with a projectile, it could be that they lose power and their backup generator fails. And I've written about the potential for these really old school Soviet diesel generators that aren't that efficient that could poop out. And then what? Then you have a meltdown. Then you basically have what happened at Fukushima. Of course, Russia knows this because they're going to get a lot of the radioactive fallout from that kind of accident. But these are grave risks. Nuke plants in general are grave, grave risks. The Diablo plant up the coast from us. Extension of that was one of the greatest failures of the Gavin Newsom administration, in my view. And if tomorrow there's an earthquake and we see something horrific happen in San Luis Obispo and off the coast and spreads to central California and across the country, it changes again, right?

**Dr. Peter Andersen:** [00:47:46:15] A little dent at any presidential aspirations?

**Joshua Frank:** [00:47:49:03] Absolutely. And if you go back even to all of the great things that the anti-nuke movement accomplished in this country and putting the brakes on essentially the entire plan to build hundreds of nukes across the country. They were also aided by the disaster at Chernobyl. I fear that I don't want to see that happen. I don't want to see an accident happen. And that be the reason why more people come

on our side. Same with Hanford. I would probably be on CNN tomorrow if there's a big accident out there and I don't want to be, I'd rather not be.

**Bart Ziegler:** [00:48:27:14] Josh Speaking of accidents waiting to happen, I'm talking to you about 35 miles from a place called San Onofre. And there's a whole group of people down here working on that. There's even outreach from Mothers for Peace who have their own problem with Diablo Canyon restarting. But there's, you know, San Clemente Green and Public Watchdogs and there's just there's a lot of people trying to deal with that. Let me get some questions from the audience about containment. There's a masterful woman named Donna Gilmore who's about the containers that have a 25 year warranty. There are five A's in stainless steel. How do those containers compare to the single wall containers at Hanford?

**Joshua Frank:** [00:49:17:13] Well, they are a lot newer. That's one of the problems. Also one of the biggest problems with the Hanford tanks is that the stuff in these tanks and each one of these tanks is different. So it's not only the radioactive stuff that's eating away at the bottoms of these tanks, it's all the chemical waste as well. Just the leaching problem in these tanks varies from tank to tank. Whereas these new tanks that she's talking about, I would say they're probably made better. They still have their problems but the ones at Hanford are literally sitting in soil that that's been sitting in now for since the 50s and they're corroding. I mean, the bottoms of these single shelled tanks are corroding. That's why they started making the double shelled tanks. But that wasn't until the 70s. They just had these single shell tanks. And they're creating so much waste when they're making plutonium that these tanks were literally like overflowing and fill up and fill up the next one and fill up the next one and fill up the next one. It was just constantly overflowing, basically. And today we're just dealing with the aftermath of that.

**Bart Ziegler:** [00:50:34:06] So we've learned nothing—I mean, what has San Onofre learned? What has Diablo Canyon learned from Hanford?

**Joshua Frank:** [00:50:43:18] That's a good question. I think what we've learned from the outside is that this stuff poses really grave risks to us all. Sano is one of my favorite places to surf. I'm paddling out at Old Man's and you look up at the plant and I worry, you know, did they just flush water out of that thing? I don't know. I just hope for the best.



It's a problem. But imagine if the pro nuke folks had their way, we'd have these plants up and down the coast. We'd have them along rivers. But I would remind, I'm sure we're in unfriendly territory now. But when these conversations come up, remind people, look, look at what happened to France last summer. France is looked at as like the ideal nuclear power, you know, country in the world. Last summer they had to take half of their plants offline during an enormous heat wave. And why? Well, some of them were corroding, so they had to take those offline because they weren't safe. But a lot of them were taken offline because the rivers that they were drawing water from were too warm and too low to cool the reactors down. So you're going to make plants to combat climate change, yet climate change is going to heat the rivers. So you can't use the reactors. It's like science fiction stuff. It's crazy.

**Dr. Peter Andersen:** [00:52:14:16] With regard to the water off San Onofre, Yeah, Bart and the Coalition for Nuclear Safety has documented dozens of liquid batch releases from San Onofre into the Pacific Ocean under the theory that dilution is the solution. That is one issue. But the other issue is that there is not a long term solution for storage, as Bart has said at San Onofre and at other nuclear power plants throughout the country. These thin-walled casks do not last forever, especially in marine environments subject to corrosion and such. Finally, the threat of terrorism is omnipresent with all of these nuclear sites. We think San Onofre is guarded well, but in all the guard houses, you don't know if they're occupied or not necessarily.

**Joshua Frank:** [00:53:20:13] Well, think about that with Hanford. I've thought about it for a long time with Hanford, even though it's very secure. I mean, what was it just a few months ago? We had the crazy Chinese weather balloons, right? Or the balloons that came over and you think, well, what if something what if a drone went in there and attacked one of these tanks? Then what happens? You know, there's just so many different scenarios for stuff to go wrong with this. I mean, no other energy source poses these kinds of risks.

**Dr. Peter Andersen:** [00:53:53:13] And risk management requires understanding the worst-case scenarios. That's right. Panaceas and BS.

**Joshua Frank:** [00:54:03:14] But if you're if we were to listen to the Nuclear Regulatory Commission about all of the risks, I mean, they say something like there's a one in

whatever 154 chance that a plant's going to have a meltdown. Well, we've already had how many meltdowns since we started this whole project in for human society. We've had like five, if you include, you know, each reactor that melted down at Fukushima. So what does that mean for the future and what did we learn from this? We certainly didn't learn much. I'm really concerned right now about India and they have horrible, horrible regulations which actually made nuke energy cheaper than other stuff like solar, for instance, per kilowatt hour. The reason is because they don't have really any strict regulations whatsoever. There's a reason why we don't drive cars made in India in this country. They don't all have any of the you know, some of them don't have seatbelts. Some of them don't have airbags. So constructing new plants under these kind of scenarios is really frightening stuff. It's really frightening stuff and it doesn't solve the climate crisis.

**Bart Ziegler:** [00:55:19:08] Josh, we have let me let me integrate some of the audience. There's some fantastic questions coming in, some that you that you've already answered. Like in your research, did you come across any evidence of efforts to cover up the dangers posed by the Hanford site or downplay the severity of the environmental contamination? Do you have a quick answer for that one that you haven't already? Please share with us.

**Joshua Frank:** [00:55:44:01] Yes, there was. So in the late 80s and early 90s, Hanford was being considered as a site that they wanted to send more waste to, even though they already had all this waste. I think they were kind of like, Well, it's already so bad. Let's just keep shoveling stuff over there, right? Well, the local Yakama nation basically was like, Wait a second, hold on. We're right here. You're not going to come through our lands to come and drive through and dump this stuff. One advocate, Russell Jim, who I have a chapter dedicated to him in the book, who was a wonderful man. He died maybe five years ago now. And I had the chance of meeting him and interviewing him. He almost single handedly is the reason why we know about the Green Run and all these other accidents and events that happened out there. When he was fighting to stop Hanford becoming a garbage bin for more waste, he was out in Washington lobbying. He spoke on Capitol Hill, and he essentially stopped Hanford, along with other advocates, from becoming a future waste depository. Unfortunately, that waste went to Rocky Flats and elsewhere, but it stopped Hanford for the moment. But because of that

and because of a lot of lawsuits and a lot of the accountability that came out of his efforts, we learned about a lot of this stuff, a lot of these cover ups.

**Joshua Frank:** [00:57:24:14] But it wasn't until the 80s that we learned about this and in the late in the 90s when tens of thousands of documents were released and under the Clinton administration, even more were released. But the floodgates opened because of Russell Jim. I think it's important a lot of this stuff gets like it's pretty dire. You can get angry, you can get frustrated, you can get concerned. But there are a lot of people that are fighting the good fight up there, just like here in California, the work that you all are doing, The Columbia Riverkeeper is a great organization up there that's doing great work and trying to hold these agencies and these contractors feet to the fire. You have a Hanford Challenge up in Seattle that is helping and protecting whistleblowers and trying to draw attention to this issue. There are a lot of local organizations and not to mention the continued efforts of the Yakama nation that really embody the spirit of Russell Jim today and are still really concerned. There are there's no major decisions that can happen out at Hanford without a seat at the table for indigenous tribes.

**Bart Ziegler:** [00:58:32:27] Good. So that means that they won't take the San Onofre nuclear waste--3.5 million pounds—and put it on a barge and truck it up the Columbia to your dump site which is good. It reminds me of Ken Cook with the Environmental Working Group. How they helped shut down Yucca mountain was also because they did a study groups in Salt Lake City and said, Do you want to have a repository for nuclear waste? And everyone said, Absolutely, we do. And then they said, do you want to have thousands of truckloads of nuclear waste running, you know, within 50 miles of your community? That's when Yucca mountain was successfully closed. I have another question from Nathan Boutin. Can you expand on the closed cultural loop that exists within those circles of highly educated nuclear physicists? Do those scientists think that they can be the one to solve the problem, whether that be the cleanup, global warming, etcetera? And how does that hubris translate to today's billionaires now investing in nuclear energy? Which reminds me of the \$231 million that New York Times article I can't seem to find. But about two years ago, February, that Bill Gates—I mean he's done so much good but he is also involved with public relations for his nuclear power investment with the small modular nuclear reactors. Do you want to talk about the cultural loop at all?

**Joshua Frank:** [01:00:07:19] Yeah, I mean, that's a complicated question. First, I would say that not all highly educated scientists and engineers—even nuclear and physicists—are on board with atomic energy and atomic waste. A lot understand the dangers. They're not all Arnie Gundersen's that are whistleblowers and came around. Some of them are. But there is a divide, I think, in the scientific community on this stuff. Those, however, that are working in plants, those that are working on, you know, new advanced technologies like fusion. I do believe that some of them believe the bullshit that they are spoon fed in in schools. I think that they believe that there are technical solutions to the problems that we're facing, that we can continue to live in the comfort of our capitalistic societies without there being any ramifications. That's a big problem because it's not true. Resources are scarce. Uranium is scarce. Metals for green technologies in some cases are very scarce. There aren't those kind of solutions. But I think that a scientific mind sometimes fails to grasp the socio and economic realities that we face and the other factors that that play into all of this, whether the geopolitical or whether they're about waste, they would much rather talk about trying to find a solution for atomic waste than to talk about the dangers of it.

**Joshua Frank:** [01:02:05:15] For instance. It's a change in perspective that's needed because there are a lot of brilliant people that we need on our side to help us figure out what to do with the problems we've already created. A lot of them are working on that. But we need to do that and not create a whole new slew of problems as well. There's a cultural divide within the scientific community as well. But there's great organizations. One like Science for the People is a really great organization and has a lot of smart, intelligent scientists that isn't the state—Union of Concerned Scientists and lots of others that are really concerned about this stuff. It's not all that are pro nuke, that's for sure.

**Bart Ziegler:** [01:02:47:23] There's other question about what about the people who do not own their homes, who can't cover their rooftops with solar? What should lower income citizens and families do to play their part in saving our planet? I think since it's a little over an hour. Help me with this one, Peter. Let's end on like a positive note. Let's see what we can do to come up with knowing what we have. It's very important to know. And then the second thing would be, what solutions can we offer people? How do they go about attending to the awareness that you've just shared?

**Dr. Peter Andersen:** [01:03:24:14] In terms of solar in disadvantaged communities or highly dense communities, we have to have community solar projects which build solar collectors in over parking lots and on vacant land and over canals that bring water across California, which will both conserve water and generate power simultaneously. These are possibilities. We also need both government and private agencies to fund greenhouse gas reduction programs, as the Sierra Club is attempting to do through the San Diego Foundation, which gives people grants to, especially in communities of concern, to do things like retrofit their homes and to build solar or to get gas out of their homes and put in heat pumps and electric water heaters. There's a plethora of solutions. We're not out of ideas, and it's been a great conversation today. I want to put in one last plug for Joshua and his book. His book is Atomic Days: The Untold Story of the Most Toxic Place in America, The Story of the Hanford Nuclear Site in Western Washington. On behalf of Samuel Lawrence Foundation and Josh and I want to thank you, Joshua, for being with us today and sharing your expertise.

**Joshua Frank:** [01:05:02:27] Yeah, thanks so much for having me. Um, yeah, just one last thing I would add on to what you're saying about what we can do. Let's just remember that the biggest polluters in this world are billionaires. Let's also remember that the biggest single polluter in the world: military. So if we want to really look at the bigger problem, let's not blame individuals that are just trying to get by, too. Right. We do need those solar projects. We do need those things to happen. But the big, big polluters in this country are not most of the renters of the world.

**Bart Ziegler:** [01:05:41:04] This is just the beginning of a conversation because I could see a lot more information sharing this way. I think our job as foundation is to just bring awareness to the problem most people don't know about. Thanks to you and thanks to Peter and thanks to a whole slew of the partners that decided to support this recording. We're going to do this again. Thanks a lot. Thank you very, very much. Very honored to be here.

**Joshua Frank:** [01:06:14:03] Thanks so much for having me. Enjoy your weekends, everybody.

**Dr. Peter Andersen:** [01:06:17:03] Thank you.