

Spring 2023

Dreaming of Nuclear Futures: History, Toxicity, Panic, and Motherhood in Contemporary Pro-Nuclear Advocacy

Mikel Rand Inchausti
Bard College

Follow this and additional works at: https://digitalcommons.bard.edu/senproj_s2023



Part of the [Social and Cultural Anthropology Commons](#), and the [United States History Commons](#)



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](#).

Recommended Citation

Inchausti, Mikel Rand, "Dreaming of Nuclear Futures: History, Toxicity, Panic, and Motherhood in Contemporary Pro-Nuclear Advocacy" (2023). *Senior Projects Spring 2023*. 236.

https://digitalcommons.bard.edu/senproj_s2023/236

This Open Access is brought to you for free and open access by the Bard Undergraduate Senior Projects at Bard Digital Commons. It has been accepted for inclusion in Senior Projects Spring 2023 by an authorized administrator of Bard Digital Commons. For more information, please contact digitalcommons@bard.edu.

Dreaming of Nuclear Futures

History, Toxicity, Panic and Motherhood in Contemporary Pro-Nuclear Advocacy

Senior Project Submitted to
The Division of Social Studies
of Bard College

by

Mikel Rand Inchausti

Annandale-on-Hudson, New York

May 2023

Dreaming of Nuclear Futures;

**History,
Toxicity,
Panic,
and**

**Motherhood in
Contemporary
Pro-Nuclear
Advocacy**



Mikel Inchausti

For my parents, Sylvia and Dave, who showed me, in more ways than I can say, how it's done. I
love you both to the stars and the moon and all the way back.

* * *

Thank you to Yuka Suzuki for reminding me, every time we meet, how much I love learning. You encourage me that, above all, kindness, excitement, and honesty are essential in not only learning but teaching. Your guidance throughout this project has changed the way I see my own future, and I look forward to continuing a practice of meaningful, excited collaboration for years to come.

Thank you to Sophia Stamatopoulou-Robbins for your inadvertent help this semester. Toxicity and Contamination has been one of the best classes I've ever taken and has shaped this project incalculably. Your love for this field is infectious.

Thank you to Laura Kunreuther for your valuable comments half way through this project. That meeting encouraged me to push myself in thinking what I, myself, could bring to this conversation.

Thank you to Cole Heinowitz for introducing me to Ursula K. LeGuin exactly when I needed her.

Thank you to April Smock for daring me, at seventeen, to think bigger.

Thank you to Felix, Esmeralda, Olivia, and Isabella for introducing me to what working on senior projects looked like. I miss you all.

Thank you to Benny for introducing me to fatherhood. It's fun so far. Thank you to Ilira, Jason, and Ian for generously caring for him every break. He and I are lucky to have met you.

Thank you to Will Carey, Diego Rodriguez, and Grant Liberman for talking about tombs with me. I love you all deeply.

Thank you to Sarita Bradshaw for being my buddy. Thank you, also, to everyone I see for domestic office hours—we did it!

Thank you to my parents, Sylvia and Dave, my family, Alix, Sam, Brooklyn, Scott, Melissa, and Patrick, and my wonderful niece, Sadie, for encouraging me with a smile everytime I get something from my fridge. (And thank you to Alix and Scott for the pictures).

Thank you to Fiona Binzen for everything you are. I think about what you said a few years ago—that we weren't only on the same page, but that we were writing the book together. I feel that more everyday.

Thank you to Faye Thompson for loving, thinking, sharing, and being, with strength, curiosity, and kindness. God only knows what this would be without you.

Table of Contents

Introduction.....	9
1. “Clean. Safe. Reliable.”.....	23
2. Nuclear Motherhood.....	51
3. The Waste of It All.....	83
Bibliography.....	97

Gethenians could make their vehicles go faster, but they do not. If asked why not, they answer 'why?' Like asking Terrans why all our vehicles must go so fast; we answer 'why not?'

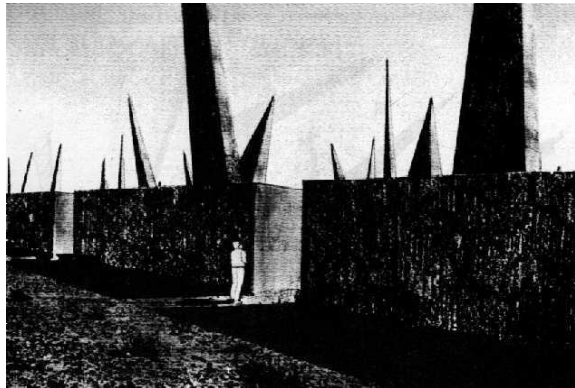
Ursula K. LeGuin,
The Left Hand of Darkness

A jagged spike erupts from the sand. Another, another, another, and another, and a field of what can only be described as frozen, bolded, concrete lightning stands, alone, for what may as well be eternity. Whatever is left finds no home here. Whatever is left only finds relief in the cool shadows of the barbs—too much shade for this deep in the desert. If the jagged projections work right, you should know something is wrong.

I first saw the spike field when I was eighteen. It nearly changed my life. The only image, the only mock-up the architects could muster when they introduced the design is grainy, hideously contrasted, almost like the drawing itself is radioactive.

We're all sitting in bed when we talk about what it would sound like. My friend tells me, excited, that there's a plan where the room with the message plays a note when the wind hits it. A haunting, beckoning note. One that drags you to a warning.

But where it's actually buried—the ground hisses, calling you back. Calling you away. I'm twenty when I'm sitting on a bed with friends I've just made, talking about tombs.



...

In the 1970s and 1980s, the Department of Energy had three problems. The first—radioactive waste from nuclear power plants, weapons manufacturing sites, and a scatter of other places required permanent management. At the time and still today, the best solution was deemed to be burial. Deep, isolated waste. The proposed construction of the Waste Isolation Pilot Plant (WIPP) in southeast New Mexico was to be one of many solutions. Now, the second. The waste that was to be stored at WIPP was going to remain radioactive, and therefore potentially dangerous, for hundreds of thousands of years. WIPP has been described as a mass burial—a tomb for refuse. How to let people know, now and into the future, that something harmful is buried there? The DoE decided they required a warning system that would ideally last a fraction of that time. Finally, the third—what would that system possibly look like?

In the early 80s, the DoE recruited dozens of anthropologists, linguists, archaeologists, authors and others to propose various plans for message systems that would last ten thousand years into the future. The oldest writing we have is five thousand years old. Clearly, this would be a monumental task.

Gregory Benford details his experience working for the DoE as a recruit with a background as a science fiction author and physics professor in his book, *Deep Time: How Humanity Communicates Across Millennia*. Benford and his colleagues were to write a number of proposed futures, people, civilizations, and even religions that could potentially interact with the site.

It is important to note that ten thousand years is a completely arbitrary figure. In reality, the waste will be dangerous for much, much longer, but the government figured that asking their recruits to plan for anything longer than three hundred generations ahead was outside the realm of possibility.

The work of what became known as the Human Interference Task Force spawned the field of nuclear semiotics, dedicated to thinking of language, messaging, and communication over the course of ten millennia. This new field was bold in shaping the scales it asked people to think at—suddenly, we had to think about what lasted about our societies, our worlds. What will last as long as our waste? What language do we possibly have to warn these beings? How quickly does information fade into non-relevance? How *do* we forget? And, are we being *good ancestors*? (Macfarlane 2019).

This was the DoE's main problem. The very nature of a message is fallible to time, in ways we fail to anticipate for. This is where the anthropologists and speculative fiction authors fit in. Their job is to answer the questions we don't know to ask. Benford, in an interview for the popular design podcast, 99% Invisible, describes the complexity of this challenge. Symbols change. There's no guarantee that the same languages will be spoken. There's no guarantee that, even if they used pictures, symbols, images to demonstrate the danger of the site, that they would be legible to future generations.

Again, in 1993, a report from Sandia National Laboratories refined the field, and addressed several design problems of years past. What if people kept digging, closer and closer to the radioactive waste? Now, the plan was to, at WIPP and other similar sites, have degrees of warning systems the deeper one went below the earth. The message on the surface (or whatever remained of the surface) would be simple, but ultimately, the most powerful. What if the ground above the waste represented the danger of what was buried below, almost shifting into a form finally visible to the eye? What if the ground itself erupted in what would resemble a landscape of thorns? (Benford 1999). What if the ground was decorated with exploded, destroyed concrete—a rubble landscape—one that reminded you of a bombed-out city, or a town toppled

by an earthquake? All of these plans found something vile in the waste itself. It was not to be celebrated. A nuclear, atomic, radioactive world was something to fear and manage only out of terrified necessity. *Something was destroyed here, something happened here, don't you want to leave?*

This form of “hostile architecture,” a type of spatial design created to scare people away, to be unlivable, fascinated me. This experiment in landscaping is what initially brought me to learn about nuclear semiotics, and to wonder what else thinking through nuclear timescales could introduce to our lives, today. The images stood in my mind—the designs, the words Sandia proposed to mark the walls of the repository’s structure. The words, planned to be written in English, Navajo, Spanish, Chinese, Arabic, and Russian, are now well-known in circles fascinated by “deep time” thinking:

This place is a message... and part of a system of messages...pay attention to it! Sending this message was important to us. We considered ourselves to be a powerful culture. This place is not a place of honor... no highly esteemed deed is commemorated here... nothing valued is here. What is here was dangerous and repulsive to us. This message is a warning about danger. The danger is in a particular location...it increases towards a center... the center of danger is here... of a particular size and shape, and below us. The danger is still present, in your time, as it was in ours. The danger is to the body, and it can kill. The form of the danger is an emanation of energy. The danger is unleashed only if you substantially disturb this place physically. This place is best shunned and left uninhabited. (Trauth, Hora, and Guzowski 1993).

These words, this poem secured my interest, tying it down. The images that stuck in my mind now had words guiding their purpose. What is the state of this hostile landscape today? How is the world before this, the world that produces this waste, picturing its own future? How do nuclear plants and those that power, support, and fight for them create and contribute to nuclear imaginaries? What had changed in the years since these designs (for long term nuclear

waste repositories) were commissioned?¹ How has the face of the nuclear industry changed in the last few years, and who is responsible?

Pro-nuclear, anti-fear.

In 2016, the last nuclear power plant remaining in California—Diablo Canyon—was on course to be shut down within ten years. The state and the governor, Gavin Newsom, wanted to move more firmly toward renewable energy to address climate change in the coming years, and keeping the plant running was deemed uneconomical. In the last few years, this decision has nearly completely flipped. Not only has the plant’s decommissioning been pushed another five to ten years, but various organizations, including the California Energy Commission, have argued that the state could have an energy crisis without Diablo Canyon’s continued operation. (CEC 2023).² Indeed, it would be a lengthy and expensive decommissioning process, however, the hole that was left in this argumentation was that of the plant’s place in a climate-forward future for California. Even if it was unwise to spend so much money taking the plant apart, wouldn’t this be good for the image of a green California?

Here is where the contemporary nuclear movement enters the picture, filling the hole with the rhetoric and power of hundreds of activists, fighting against the plant’s closure. For them, nuclear energy was more than a look into a carbon-free world—it was a promise, a world

¹ The field of nuclear semiotics has been of recent interest to many online (especially in memes and video essays on YouTube). (See: Gellar 2020). A 2014 episode of the popular design podcast, *99% Invisible*, titled “Ten Thousand Years,” exploded the popularity of the topic. Further, in the decades since the field’s inception, the shutdown of the proposed Yucca Mountain repository during the Obama administration leaves the United States without a stable, designated long-term storage solution for high-level radioactive waste from power plants. (See: Beaver 2010).

² My interlocutors also mentioned that they believe that power outages are bad for candidates politically. They argued that if Newsom wanted to stay with his plan, he would be leading the state into an unreliable power grid without the stability that Diablo Canyon, as a 24/7 power plant, provides.

in itself to grab onto before it was too late. This carbon-free angle has given the pro-nuclear movement, in many ways, a new lease on life.



Photo from 2008 of Diablo Canyon's twin reactors with the Pacific in the background. (Adams 2008).

Newsom and the state of California's decisions have paralleled the recent influential rise of a newly reinvigorated nuclear advocacy movement in California and the greater United States. This movement has been documented and spoken about for decades already—the question of nuclear energy's position in spheres of clean energy has its own storied history. Stewart Brand is the writer and editor of the crunchy, planet-focused, *Whole Earth Catalog*, of the late 60s and early 70s, “a publication which basically provided access to the tools and technologies necessary for the development of new lifestyles in tune with nature.” (Munster and Sylvest 2015: 796). The publication's motto— “we are as gods and we might as well get good at it” —is echoed through rhetoric in today's climate discourse that aims to utilize human technology for the proposed, dual purposes of 1. Solving climate change and 2. Living life how we want to live it. This motive is

alive in the current push for “eco-modernism,” a belief system that will be returned to again and again as we disentangle how this movement works.

Brand was one of the first cases of someone who embedded himself within “planetary holism” turning toward nuclear power. In the last ten years, and with the release of his widely influential pro-nuclear film, 2013’s *Pandora’s Promise*, Brand and others like him have worked to bring together a nuclear movement powered by environmentalism. Or, perhaps, an environmental movement powered by nuclear energy.

This movement has already been the object of interest to a few scholars for a few reasons. The most obvious being that putting nuclear power and environmentalism together does not exactly seem to fit naturally together. A fascinating emergence, however, in the last few years of this push for the maintenance of nuclear power’s presence is the movement as one that is run, more and more, by women.

Women and Nuclear?

The nuclear industry has been historically masculine, and women, specifically mothers, have been among the groups least likely to support any form of nuclear energy.³ (Eschle 2013; Koen and Swaim 1980). The New Yorker, in their article, “The Activists Who Embrace Nuclear Power,” profiles the two co-founders of the international organization, “Mothers for Nuclear.” On the surface, the group seems simple to understand. “Mothers for” is a common frame for an advocacy group, and often helpful for getting women’s feet in the door in a sea of organizations led by men. However, as I learned more and more about the Mothers and their colleagues in similar groups, I was met with more questions about how their rhetoric and worldview worked in a world of so many seeming contradictions. As mothers, especially ones that present themselves

³ A claim frequently made by my interlocutors as well.

as such so immediately in their work, I expected the future to be central to their mission. *What* that work looked like was my first question. How do the Mothers,⁴ and other female nuclear advocates, work in the current landscape of nuclear imagination? What is their place, what is their position—where are they needed and how? What narratives are they integrating themselves into, and what narratives are they pushing away?

Instinctually, you may think of nuclear as a contaminating, consuming power that is inextricable from its charged, radically violent history. On the other hand, you may go into this conversation seeing it as a climate solution like any other—it has its drawbacks, of course, but what doesn't?

What I didn't anticipate was a nuclear world that was leagues different from any image I had seen. Looking up photos of Diablo Canyon before a public tour I had signed up for in the summer of 2022, they stood against everything I had expected, but somehow, the images made complete sense. What I saw, flat on my screen, was a gray, concrete facility against a backdrop of green mountains and blue sky. The double, round domes of the plant were miniscule, put to scale by a breaching whale in the image's foreground. This is not the place I anticipated. Still, it seemed right that *this* was the last nuclear power plant left in California. It didn't feel centralized, it didn't feel totalitarian in the ways we may expect from nuclear imagery. The vibrancy of the sea, of the fog-soaked hills, all reminded me of the land near my parent's home in a springtime in the Bay Area. I didn't expect to feel nostalgic looking images of a power plant.

It could not be less similar to the images of spike fields and gnarled stone faces I had originally associated with the long life of nuclear energy. The questions of deep time and temporality, washed away in Diablo Canyon's coast in favor of a verdant, green, clean

⁴ This is how I will be referring to the organization, but mainly to the two co-founders, Heather Hoff and Kristin Zaitz, who will be introduced more thoroughly in the second chapter.

interconnected *now*. It made sense why this new aesthetic vision would be so compromised by the hostility of long-term plans of the 70s and 80s. Why would you use such grisly, frankly terrifying media when you're proposing your own, practical, ready-made, beautiful plan for the future? Hostile architecture, too, has no place here. What about a *green* nuclear world makes sense? What work did and does Diablo Canyon need to do to place itself into its landscape?

I aim to detail Diablo Canyon's public face as well as outline the various ways that nuclear power and weaponry have affected national anxiety, leading to a country used to living with atomic panic. That tour led me to ask questions about what the landscape of the plant does for the plant's public image. What does it mean for California's last power plant that it sits in such a stunning location? How does the plant take advantage of its context, and how does it re-create the public's relationship with nuclear power? Does the tour anticipate a fearful audience and in what ways does that panic still manifest today?

To that point, it is important to outline my work with contemporary nuclear advocates—all women, working for two organizations: Mothers for Nuclear and Stand Up for Nuclear. Both have deep roots with author and outspoken advocate for nuclear power and *against* liberals running cities and climate panic, Michael Schellenberger. Stand Up for Nuclear prides itself as the first international pro-nuclear initiative, and supports a number of smaller organizations across the world.⁵ After reaching out by email on Mothers for Nuclear's website in early 2022, I got a response from one of the founders, eagerly accepting my request for communication. We spoke a few times over the course of the summer, and I was able to get a few more people to contact through their connections to other organizations.⁶

⁵ They support organizations and initiatives in the Philippines, Canada, Italy, Slovenia, Finland, Sweden, the Netherlands, France, Poland, Denmark, the UK, South Korea, Indonesia, Estonia, Turkey, and Brazil. This is not a complete list!

⁶ These conversations all took place on Zoom, as that would be easier for my interlocutors. Often, I caught one of the cofounders in between press meetings, demonstrations in Sacramento, and documentary interviews. Needless to say, they are busy people. My conversations all took place, also, in the summer of 2022, as that year, in particular,

My gratitude for their willingness to speak with me fundamentally painted our conversations. It was my first time speaking with interlocutors working in such active circles, and their candidness made me excited to get to know exactly where they were coming from. They are fantastically engaging speakers, a testament to their own ability, in recent years, to get their foot in the door of the contemporary nuclear movement.

Some consider this current push to be nuclear energy's "fourth wave," or a "nuclear renaissance." Indeed, Stand Up for Nuclear and associated groups led the first pro-nuclear booth that the United Nations Climate Change Conference had ever seen at COP26 in Glasgow, Scotland. The Mothers have been interviewed on various podcasts, are soon-to-be featured in the sequel to the 2019 documentary, *Juice: How Electricity Explains the World*, and have been profiled in the New Yorker. There is excitement bubbling just under the surface for "nuclear" to rise as, at the least, a transitional energy source in the move toward a country relying on exclusively carbon-free energy.

To explain, the contemporary pro-nuclear movement, by and large, refers to nuclear power as "nuclear." You will hear this said by politicians, non-governmental organizations, grass-roots fundraisers, and pro-nuclear scientists. This specific turn, shifting "nuclear" from adjective to noun, may sound wrong to the ears of those unaccustomed to the movement, however, this decision is one that is necessarily totalizing. It demonstrates, perhaps counter-intuitively, a push for nuclear power to absorb the public nuclear imaginary. Teaching a public to embrace nuclear power comes with an embracing of a different language; one that accepts and reifies nuclear power as *the* nuclear. Weapons are not the first thought; they are not

was extremely important to the pro-nuclear movement with a number of successes for keeping Diablo Canyon open past originally scheduled decommissioning dates.

even *a* thought. If nuclear energy absorbs the adjective, it absorbs the thinking and therefore the ability to control its own story.

This is what is fundamental to the current groups of advocates—a grand reframing movement that encompasses nearly everything about nuclear energy. As a named carbon-free energy source, advocates give themselves the ability to ease nuclear power plants away from narratives of leakage, contamination, and accidents. How are these places reframed, redefined as “clean”? How is waste managed in a world of nuclear reevaluation? What time scales are at play in a conversation that compares threats of waste contamination to threats of climate change? Where does safety sit in a nuclear-powered world?

Integrated into conversations about shifting timescales is, of course, a focus on the future. That is, after all, one of the things we expect from advocacy movements. What future do *you* want to create? What future am I signing on for if I want to support you? In framing this project, initially, around what futures looked like for my interlocutors and for Diablo Canyon, I failed to really realize how the future is constantly in conversation with the past, and what is lost in “forgetting.” Ursula K. LeGuin refers to author Milan Kundera in her phenomenal essay, “A Non-Euclidean View of California as a Cold Place to Be” when she writes on “organized forgetting,” quoting Kundera in saying that, “people are always shouting they want to create a better future. It’s not true. The future is an apathetic void of no interest to anyone. The past is full of life, eager to irritate us, provoke and insult us, tempt us to destroy or repaint it. The only reason people want to be masters of the future is to change the past.” (LeGuin 1982: 4). “Organized forgetting,” for LeGuin, is the attempt of a power to “repaint” the story of a smaller power. “One of our finest methods of organized forgetting is called *discovery*.”

I refer to LeGuin and Kundera to place this project in conversation with the idea that we create futures to disguise pasts, and that, in my excitement to talk about what the future looked like for my interlocutors, what they expected for their children, and what they expected for their country, I realized that at the core of my interlocutors' work was the goal of re-discovery. It feels, hearing some of these women speak, that nuclear power has been discovered again, bright and ready for a world that is just out of reach of understanding its full potential.

Drawing on conversations of the last few decades looking at an ethnography of the nuclear imaginary, Joseph Masco's work in understanding nuclear futures, pasts, and presents has been invaluable to my own thinking in bringing Diablo Canyon to a wider, entangled history. Alongside a number of other scholars working to understand nuclear power in its contemporary iterations, I argue that there is a certain short-sightedness in these works regarding the actual contemporary palpability of atomic fear. Maybe we have been so caught up in defining what the fear looks like—what it consumes, how it shows itself, where it comes from—that we fail to ask how it still exists today. Further, Diablo Canyon, in all its beauty, stands against many of the country's other nuclear power plants as, truly, a face of the ability for nuclear energy to be *clean*. What about the plant allows and forms that story? What about it *feels* carbon-neutral? (What would that mean, anyway?)

Nuclear fear's history has risen and fallen alongside seemingly logical historical moments. In the wake of the bombs, duck-and-cover drills, and, of course, large-scale disruptions and evacuations at Chernobyl, Three Mile Island, and, most recently, Fukushima, fear of radioactivity, of invisible, pulsating waste has remained a baseline for much of the world. However, a recent turn, and even, in Japan, a more robust push to continue and expand the reach and capabilities of nuclear power plants, is all reminiscent of worlds that already have been

knowingly and actively “letting their guard down.” Additionally, the amount of toxicity presumed to already exist in our environments (one example being the common understanding of microplastics among Gen Z and Millennials), means that younger generations have been born without specific, ingrained fear of nuclear power plants in the same way as their parents or grandparents. How, then, do groups work with and against the remnants of nuclear panic still present in our society? Where is the place of mothers in the nuclear imagination? What can we learn from the tactics and positions of women in the nuclear movement? And finally, what about the material reality of nuclear power, its mechanisms, its production, its waste, needs re-discovering?

1 . . . “Clean. Safe. Reliable.”

Anxiety Management and History Handling at Diablo Canyon Power Plant

“See For Yourself”

The PG&E Education Center could easily be confused with a state park’s visitor center. When I walk in, I notice that most of the information on the walls points to the numerous trails and local wildlife. This is where PG&E’s tour of Diablo Canyon Power Plant starts—an orange building right off of the highway in the hills above San Luis Obispo, California. A mural of the Pecho coast, (with the power plant noticeably absent), features a handful of interactive squares at the bottom, each with a local sight—fossils, otters, seals, flowers, swallows. Turning around, an entrance to an exhibit on the power plant continues the blue and orange signage, despite its radically different subject matter. On a stand, just before the entrance are postcards with photographs of the plant - “Clean. Safe. Reliable. See for yourself.” —and seasonal calendars with scenes of the Pecho coast. I’m late to walk in—the group is already starting introductions.

John, our tour guide, is a tall older man with shaggy gray hair and tired eyes. He has been working at Diablo Canyon since the 90s and is retiring on Thursday. In his introduction, he states that Diablo Canyon is “one of the strongest structures ever made by man” which is, at the least, a jarring statement to hear as someone who only recently learned of the site’s existence. Even more surprising are the numbers. In a state with 40 million people, Diablo Canyon powers 9% of the energy grid. (Tuhus-Dubrow 2021). He describes the methods used to test the structural integrity of the reactors and spent fuel rod containment vessels including—but not limited to—driving a train into them, flying missiles into containers, and sending unmanned jets into buildings. I take

note of their methodology. I understand needing to test the strength of the feet of concrete that keep spent fuel rods, but a *jet*?

John is a meteorologist, (he has a radio show in nearby San Luis Obispo predicting the weather), but much of his work at Diablo Canyon has centered biology, specifically at the site's output cove. John shares that the water, upon exiting the complicated systems of cooling and heating needed to power and regulate the temperature of the plant, is around 15 to 20 degrees hotter than it is when it enters. He walks us through a diagram of the plant's intake, reactors, and outtake.

Put simply, Diablo Canyon has two pressurized water reactors, which means that water is taken in from the Pacific, where it is heated by the energy created during fission. A pamphlet on how the plant produces electricity explains that fission occurs "when uranium atoms absorb an extra neutron, the atom splits into lighter atoms and more neutrons are released. These neutrons are then absorbed by other uranium atoms, creating a self-sustaining chain reaction. This process, called fission, generates heat energy." Water is heated, getting to temperatures over 600 degrees Fahrenheit without boiling, due to the pressure in both systems. The water then moves through and heats a second supply of water, turning to steam. That steam then "spins a turbine, which drives a generator that produces electricity." While the pamphlet ends here, John continues. The water, after being heated at radically high temperatures, is emitted back into the Pacific at Diablo Canyon's "outtake cove," at temperatures about 20 degrees higher than the surrounding ocean. This process, as the pamphlet is proud to share, powers "nearly 3 million Northern and Central California homes" annually. This system, importantly, does *not* produce greenhouse gasses, the primary reason why advocates consider the energy source to be clean, safe, and carbon-neutral. After describing the process, John says with a deep monotone—"God bless Nicola Tesla."

When he began at Diablo Canyon, John's job was to measure and record the species alive in a meter square on the outtake cove's floor. He tells us that southern Californian species make their home in that pocket of hot water—they are more accustomed to the temperature. I take note that he does not share what happens or happened to the species native to the area. This is one of the first instances where I notice something easily glossed over, without any question or even space for confusion. His statement that southern Californian species make their own ecosystem there, instead, excites my fellow tourists—there's an allure to the ways we imagine animals not only survive but enjoy living in these environments. A young boy with parents that met their senior year at CalPoly runs to each exhibit, pulling tabs and pushing buttons. He talks over John a few times—John smiles through his mask—and his dad apologizes. “He's really into nuclear plants right now, sorry.” We leave for the half hour long drive to the plant, only a mile or two away. As we pull out of the PG&E Education Center, a sign, “Have a safe day! Look both ways before exiting.”

We drive through scenic Avila Beach, a California surf town that doesn't tell you much about it other than that it's a California surf town. Turning right at a trailer park, we see the surprisingly short barbed wire gates at Diablo Canyon's entrance. A guard puts his hands on his thighs and pushes himself up. He asks how many there are. We're eleven people, including John, apparently a big group. We each get passes and continue on our way.

The drive through the hills is only comparable to driving in a state park. John makes sure we feel that. There's something unspoken when he talks about the employees role in the conservation of the land, nearly going so far to frame the plant's staff as Diablo Canyon's stewards. John mentions that he always has a different favorite animal every tour, today it's the canyon's mountain lions. It's late June in California, we drive around bends in the hills and

canyons that curve like rivers; everything yellow, dead, dry grass. John turns back, eyes on the road, and says that Diablo Canyon is a “predator friendly ranch,” meaning that they welcome bears, mountain lions, and coyotes on their land. “Keep an eye out!”

The yellow hills give way to a winding road downward and we’re face to face with the Pacific. I had been here before, I swore I had been there before. In an instant, I was on highway 1, driving north to Stinson Beach for the day. The ocean to my left, hundreds of feet below the cool pavement. It was indistinguishable. John’s voice breaks through my lapse in spatial awareness and calls for us to notice “the monoliths” away from shore. I press my nose to the glass to see the towering vertical spires of rock jut from the swirling coastline of fog. These towers, we learn, are seasonal homes for peregrine falcons who come to eat swallows who come to eat dried kelp. I am surprised I have to remind myself I am on “no trespassing land” - John is sure to remind us to take no pictures. It’s surprising, even now, that a drive to a nuclear power plant didn’t feel new. I had taken identical drives dozens of times as a teenager to state parks, up the coast, down the coast, and back again. The landscape that the plant rests on is extremely important to Diablo Canyon’s image. Historian John Wills begins his book on protest at the plant with a description of Highway 1, the road that stretches vertically across California’s coast and is, therefore, essential to the state’s tourism. The road diverts from the coast at the foothills of Diablo Canyon, instead leaving that shoreline to the plant. Wills writes that

tourists treat California’s premier scenic highway as a drive-by nature theater, (...) Winding south, the road cuts through redwood forests, Point Reyes National Seashore, the San Francisco Presidio, and Big Sur. Then, at Morro Bay, 200 miles south of San Francisco, Highway 1 turns inland. A range of hills abruptly rises to block the accustomed coastal view. Hidden behind them is Diablo Canyon. (Wills 2006: 14).

Just miles from Highway 1’s diversion inland down to Los Angeles, the lone road to and from Diablo Canyon serves as a scenic replacement—a road that runs exactly as the rest of the

highway does, curving around tight turns above feet and feet of rock, yet markedly absent from tourists, buses, or families pulled over at the shoulder. Instead, the road to and from the power plant is a silent mirror of California's Highway. With the way the plant is positioned, out on the coast amongst 2,400 acres of land, Diablo Canyon's complex is unseen from Avila Beach, San Luis Obispo, and Highway 1. The only way the public can even access a *view* of the plant is from miles-long walking trails around the Pecho coast. The facility hides away from public view, despite its relatively massive output.

Ten minutes past Diablo Canyon's gates, we drive by a small shed planted on the cliff, with two large octagonal shapes of metal. A small transmission tower juts like the monoliths next to the shed. John tells us that these ping to the lower and mid atmosphere, telling scientists at the plant what upper level winds are doing. He parks and turns the ignition off. "Listen." He opens his window and, even from the van, we hear small pings, delayed every few seconds, matched to a red light pulsing on the boxes. The morning fog is starting to burn off the hills to the right, and the sun shines beautifully on the sea below. We stay in pinged silence for a minute before continuing on. John points to the hill above and tells us about Green Peak. As he says, there is a "mini stonehenge" there used centuries ago as a sun/season dial by indigenous groups. I'm reminded of an archaeology exhibit back at the Education Center on Diablo Canyon's historic indigenous activity and settlement. He doesn't say anything else about it.

This is the first moment that I notice some confusion about the plant's temporality. I'm reminded that I was going to ask John what was on the land before the plant, but he moves quickly through his presentation back at the center, and I forget.

Redundancies.

The first things I saw, the first things anyone would see, are two massive concrete domes—the twin reactors. They rise above a scattered campus of buildings and fences and gates and their tops are obscured completely by fog. The size of them gives the effect of a drawn backdrop and the mist makes comprehending them difficult. The kid speaks up from the back of the van—“that’s about how big I expected them to be.” A PA system plays every so often with sounds John didn’t tell us about. He barely even notices them. The sprawl of the buildings and boxes (unsure what they were) spreads from the ocean to just below the incline of the hills to the right. The road continues up the hill to the right past the height of the reactors. This is the second time John refers to the land Diablo Canyon sits on as a “ranch.” He tells our group that the plant leases out the north and south parcels to local cattle farmers. Cows dot the landscape above and beside the colossal concrete structures. Where the fog had mostly burnt off on the drive in, mist still hangs around the ridges of the concrete, making the covered walkways and corresponding pointed chimneys difficult to parse.

John says that Diablo Canyon is like its “own city” —there are street names, each sign with a silhouetted drawing of the twin reactors. Our first stop is the town’s fire station. A showered, handsome man welcomes us and greets John. Usually, he tells us, the rest of the guys come down and say hi, but they just finished a workout. The firemen at Diablo Canyon work 48 hours a week - all at once. For two days, they sleep, eat, and work at the plant and spend the rest of the week at home. It seems that most of what they do is run checks on equipment. And work out.

The fireman absolutely loves his job. He walks us through a hallway, pictures of firemen through history dot the walls and he picks up candy wrappers on desks as he sees them. The

garage is massive and the trucks themselves are outfitted with everything they could need. The firemen that work at Diablo Canyon are specifically trained to handle chemical spills, radioactive waste and cleanup, and more.



A photo posted by us by John on his Twitter. In the firehouse. (2022)

The silhouette of the twin reactors is at the center of the firetrucks' doors in a gold, sparkling outline, next to a similarly golden glittering drawing of an atom. Both stickers are feet away from much larger "remember 9/11" murals on the side of the trucks. It's strangely jarring. In the hour of the tour so far, I had almost forgotten the place's context. Even without the fog, it would be near impossible to see any other building, city, or even manmade structure in the heart of Diablo Canyon. It was not as if the plant felt separate from America, more that it was like a child that didn't know its parents. There weren't any prominent flags, moments of marked national identity. The atom symbol felt like the country, the twin reactors like the city.

Diablo Canyon seemed to already live in a nuclear future - a prototype that's been working for decades. It was uncontroversial, natural, and forever. Hearing that a structure is one

of the “strongest ever built by man” confuses the mind’s idea of temporality. As stated previously, it would almost seem ancient if it weren’t so modern. Again, I think of Trouillot, Kundera, and LeGuin—the first thing to do in creating a future is manufacturing a past.

The ambient nature of the tour and the surprisingly laid back candor of our tour guide, made for an admittedly relaxing morning amongst curious folks. Diablo Canyon did not feel new. It did not feel urgent. It felt placed only in itself, like whatever questions I could have about its production, about its maintenance, were not only already accounted for, but unnecessary to ask. At the fire station, John took us through a hallway off of the garage and through the door was a warehouse. Each machine, vehicle, and tool were meticulously and clearly marked with boxes on the floor, overhead signs, and identifying letters and numbers. It was not cluttered, it was not overstuffed. It was as if it was used exactly like it was supposed to be. I note that its strangely odd to see a building in which the intended purpose and the current use completely align. John pointed to a sign near the door with a map of the warehouse itself.

Diablo Canyon was, in almost every way and at every turn, presenting itself as a beacon of “preparedness.” When we all had shuffled into the warehouse, John proceeded to tell us about the number of failsafes in place in case of emergency at the plant. There were backup generators, backup backup generators, and levels of “redundancies,” as he said, at least six layers deep. As a last resort, there were even systems in place to detail how employees would take the batteries out of their cars to power the facility.

It was here that various intentions behind the tour began to crystallize. From the start of the tour, it was clear it was important to take us through these facilities to answer the public’s questions, appeal to curiosity, and integrate with local (and national) communities. That was made clear. Yet, as the tour went on it felt imperative that we leave knowing Diablo Canyon to be

a markedly safe facility. Every stop framed itself through the prism of safety—John was telling us, over and over, that we should not be scared. What was most surprising about the tour was not that I saw things that terrified me, that I was somewhere unlike anywhere I had ever been—it was that I was never scared at all.

While John detailed layer after layer—“and if *that* doesn’t work...” with the same lowkey, almost bored tone, I noted what I felt. I was impressed, sure, but more than that I was comforted. Someone else had clearly done the worrying for not only me but John too. So many moments like this, of normalizing and therefore naturalizing the power plant *in* Diablo Canyon are only obvious after the tour. Once we were actually there, my mind was empty of any images I had seen of power plants prior. I think now of Homer tossing back and forth a glowing green rod in *the Simpsons*, or HBO’s hit *Chernobyl*, in which staff’s faces practically melt days after significant radioactive exposure. Not once did these images pass my mind in the last hour at Diablo Canyon—I only remember it as itself.

The work that John was doing, consciously or subconsciously, was to satiate any possible fear through explaining long, complicated, and admittedly slightly boring procedures. The amount of assurances we got began to repeat and repeat, to a point that makes me wonder why they only comforted me instead of worrying me. To look at Diablo Canyon as it stands today is to bring with us decades and decades of conflicting ideologies. On one hand, it may remind us of environmental catastrophe beyond perceivable scale. On the other hand, it may remind us of Cold War nuclear sentiment and the fear that wracked American minds on, again, an unimaginable scale and with unprecedented urgency. Diablo Canyon works to separate itself from both legacies in various ways that will reveal themselves as we look deeper into what fear means in different nuclear worlds. When fear is placated here, as seems important to both John

and PG&E, how does that play against a history of placating fear of nuclear war? Is it fair to conflate these nuclear imaginations—in war and in power? What are the intentions behind managing fear in both instances, and what does that mean for how Diablo Canyon, and other plants like it, stand in our own minds?

“Panic is Fissionable”.

America’s nuclear history is dependent on animating and emphasizing emotional self-control. In Joseph Masco’s 2021 book on nuclear futurism, *The Future of Fallout and Other Episodes in Radioactive World-Making*, Masco explores the ways that fear has been transformed as a tool to benefit nuclear expansion and production. To be clear, Masco writes by-and-large about nuclear weaponry and its effects on the American mythos and psyche. The connection between atomic power and atomic weaponry is complex, and cannot be diluted to either sameness or complete otherness. Many Americans think of nuclear weapons and nuclear energy at the same time. Even a local group dedicated to taking down Diablo Canyon, Mothers for Peace, simply shifted its perspective from fighting nuclear weapons to fighting nuclear power plants around the time of the Soviet Union’s dissolution. If we are to take Diablo Canyon at its face and take seriously these assurances of safety, of protection, and redundancies, it is essential to understand what not only brought the public to this state of nuclear fear, but what attempts have been made to mitigate this terror.

The US government, for decades, manufactured fear as a tool to control public movement, perception, and planning in the case of nuclear catastrophe. This is not uncommon—the government has, on many occasions, sensationalized a fear of drugs, for example, as an active effort on the part of changing and controlling public perception. In the case

of nuclear war, however, fear was not encouraged. “Panic,” as it was commonly named, was stated as fact to be a killer, a force stronger than any bomb. Val Peterson, the head of the Federal Civil Defense Administration⁷ at the height of nuclear public fear wrote that,

Ninety percent of all emergency measures after an atomic blast will depend on the prevention of panic among the survivors in the first 90 seconds. Like the A-bomb, panic is fissionable. It can produce a chain reaction more deeply destructive than any explosive known. If there is an ultimate weapon, it may well be mass panic—not the A-bomb. (Masco 2021: 168).

Masco emphasizes this sentiment - *panic is fissionable*. This idea, that fear and the “chain reaction it causes” were more destructive than atomic destruction was ripe in FCDA messaging and metaphor. Another FCDA poster organized by Peterson states boldly at the top—“Panic Stoppers: How to keep from being a victim of panic.” (Masco 2021: 167). The page lays out in two twin columns 8 steps to avoid “panic,” ranging from “3. Put away a three-day emergency supply of food and water—enough to take care of the whole family and its special needs” to “1. Talk to your family about the dangers you face. Work out practice drills so you all know what to do—at home, at work or at school.” (Masco 2021:167).

The moment when practice meets reality is something that is perhaps never possible to really prepare for. There is a discrete discomfort that comes with talking about the possibility of tragedy, specifically in talking about preparing for the possibility of tragedy. If you live in California you are encouraged to think about “the big one” —the earthquake that, according to who you ask, is almost a century overdue. People joke about it, talk about it, live with it. The moment of discomfort comes with actually preparing for it. I’ve never been more scared of the earthquake than when I’m in my backyard with my mother, filling a waterproof container with cans, dog food, flashlights, and enough water to last three days. Reality steps into the scenario in

⁷ A branch of the government began by President Truman largely responsible for informing public responses to nuclear catastrophe. From here on will be referred to as the FCDA.

the moment of practice. Of course, facing the reality of the disaster is going to introduce fear. For example, the FCDA's multimedia initiative, Operation Cue, consisted of a film made for the public as well as a series of tests. One was to introduce a group of civilian volunteers to the reality of the bomb; live and in action. The mission was to test "the cognitive effects of a nuclear blast on civilians;" to begin to document, understand, and determine exactly what needed to be addressed in terms of how the bomb's detonation could divert Americans from their ideally rehearsed and repeated plans in the case of nuclear devastation. (Masco 2021). The ultimate goal of the program was to urge an American populace to understand nuclear annihilation as "incorporated into the known universe of emergencies and treated alongside natural disasters such as hurricanes, earthquakes, and floods. The overt message was that emotional self-discipline and preparation are the key to surviving crisis—whether that crisis is a Soviet nuclear attack, fire, or bad weather." (Masco 2021: 210). *Incorporated into the known universe of emergencies*. This move is key to not only normalizing the nuclear threat, but naturalizing it.

To choose (or be forced) to live with the fear, to work it into daily life, is to accept the creation and proliferation of nuclear weaponry in place of other alternatives. It transforms the citizen into a nuclear subject, moving the question from the system to the individual. How do *you* want to behave when the time comes? The system has already made the decision for you that the possibility of war is natural, therefore making its demanded preparation rational. Masco comments on this overlooked juxtaposition - the situation was set up to imply that the country was

not able to pursue the atomic bomb *and* to protect citizens (in the classic sense of not exposing them to damaging health effects), the United States chose instead to normalize the nuclear crisis as a new form of nature. In effect, Cold War officials minimized the health effects of the atomic test program while constantly inflating fears of a Soviet attack in order to create a perception-based form of risk management. It then told citizens

that the central problem of the nuclear age was just in their heads. Fallout was officially converted into a question of emotional self-control. (Masco 2021: 166).

The United States chose instead to normalize the nuclear crisis as a new form of nature. Think of Diablo Canyon, sitting on acres and acres of coastal land. Integration into its own environment is essential to the tour's success. The inability to see landmarks other than the hills, the sun, and the shore makes the tour tonally detached. The only structures in view from the front of the firehouse are the fence surrounding the "protected area" (the innermost part of the facility), the twin reactors, one or two more buildings dedicated to preparation and training, and miscellaneous rods, poles, lights, boxes, and shapes that dot the hills like the cows. It exists in its own world in which the nuclear future has already become the nuclear present. John has explained the purpose of enough of the structures that they *all* somehow feel explainable. By the time we leave the firehouse and walk toward other buildings, I've already assumed that everything I am seeing has a very specific rational purpose. At the same time, I know very little about everything that factors into a working nuclear power plant, and assume I will be given the information I need to know before I complicate things too much for myself. I look back on the tour and really wonder: why didn't I ask more questions?

The trust that you want to have in these greater structures is easy to access when your tour guide is so nonchalant. In a paradoxical way, the more relaxed he is the less I feel the need to ask him any questions—questions that I know he would happily provide. Upon reflection, I see my own moment of field work as a moment of witnessing my own calmness in the face of immense power, beyond any I had been in known proximity previously.

In his seminal book, *Silencing the Past*, anthropologist Michel-Rolph Trouillot reminds us to not only interrogate *what* that power is, but *how* the power exercises its ability. He writes

that power is always woven into the narratives and the histories that are created. Power cannot be “excised” from how a story is told, instead,

power is constitutive of the story. Tracking power through various ‘moments’ simply helps emphasize the fundamentally processual character of historical production, to insist that what history is matters less than how history works (...) A warning from Foucault is helpful: ‘I don’t believe that the question of ‘who exercises power?’ can be resolved unless that other question ‘*how does it happen?*’ is resolved at the same time.’ (Trouillot 1995: 28).

A nuclear future is made through manufacturing a nuclear present. I ask myself, why I didn’t ask questions, why I was so taken by the tour, even with clear intention to carry my curiosity in with me. In emphasizing the way the plant is continuously maintainable, seemingly indefinitely, it projects that future *and* that present backwards. The space of the past is taken up by the full, infinitely rational, completely thought-through *now*. I think, here, of the “ancient, mini stonehenge” that John pointed out on the hill on our way into Diablo Canyon. Even that instance of an older, indigenous, spirituality and instance of space-making is absorbed into the tour. Historical production, for Trouillot, is processual, continuous, always re-created and always re-inscribed.

This is not unseen in California of course—organized forgetting has been woven through every aspect of Californian history. LeGuin writes, again, on this in her essay—when she reads books on Californian history, she notices that first chapter, the chapter on the land *before* colonization, is always the shortest.

Chapter One of the American history—South or North America, national or regional—is usually short. Unusually short. In it, the ‘tribes’ that ‘occupied’ the area are mentioned and perhaps anecdotally described. In Chapter Two, a European ‘discovers’ the area; and with a gasp of relief the historian plunges into a narration of conquest. (LeGuin 1982: 5).

With the time-frames that we expect to think with in the nuclear imaginary, deep time becomes rightfully complicated when we think to the past—the things that have been forgotten (centuries,

decades, minutes old) in favor of a ten thousand year long future. Everytime the tour passes that gathering of rocks, just out of view of those of us in the van but already in the mind and memory of our guide, that site is even further encroached on, even if ever so slightly. Is this the place for indigeneity in the nuclear future? As an addendum? What is this world willing to give to these moments of poignant, dreadfully empty silence?

Simulation.

The center of Diablo Canyon is its “protected area,” a zone with fences easily three times as high as those that we passed entering the facility’s acreage. Barbed wire and multiple check points indicate early-on that we won’t be able to pass through. Still, despite the high walls and clear “off-limits”-ness of the area, it’s eerily unmanned. The towering PA systems are scattered across the fence, and every entrance is guarded with two layers of barbed wire walls. John tells us it’s a Friday—barely anyone works on Fridays. He tells us an offhand comment about how the employee cafeteria is catered by Magic Johnson’s company as we walk up to a white rectangle of a building—the simulation and training center.

A colorful wall, a glassed-in seating area, and a short navy blue carpet easily confuse the interior with a university’s science center. A timeline on the wall across from the doors marks nuclear disasters of the last century, and acknowledges the needs that Diablo Canyon has met in order to operate safely. Diablo Canyon is argued as a departure from the mistakes of the past, all through a promise for not only a safer future, but an already safer present. The modern look of the building fades away as we walk through the halls to the heart of the simulation center—an exact replica of the real Diablo Canyon control room. Turning toward a door, John tries the handle and sighs. “It’s locked.” Typically he takes his tours through the control room and shows

off the technology at the very core of the plant. But again, it's Friday. We're not likely to get someone to unlock it for us. Luckily, this is the training center. Once employees set to work in Diablo Canyon's control room are ready for their final tests, they perform under various high-stress scenarios in the simulation. Diablo Canyon staff test the control room trainees through a two-way mirror adjacent to the room—behind the glass is where John takes us. A door opens to three carpeted hard rows of amphitheater seating. I turn to the left and through the glass, the obscured window frames what I see like a television screen and there is a bright white room with computers, assorted desks, and modern office equipment. Everything is surrounded by walls of mint green interface. It seems only the make of the desktop computers has changed since 1985. The glass flattens the room—the machine's lights are the only indication that we aren't looking at a still image.

Even when trainees finally become crew members, training in the plant's simulation center continues to be a core part of what it means to work at Diablo Canyon's control room. John tells us that every four weeks, employees in the control room take a week to run through drills and perform various simulated scenarios. Constant training emerges as an unquestioned ritual of maintaining nuclear infrastructure. For staff in the control room, where must the line draw itself between operating as a trainee and operating as an expert? Where does the possibility of expertise fall when dealing with such weighty and consequential materials? Diablo Canyon prides itself on its preparedness, on the redundancies already in place to ensure that every possible scenario of disaster can not only be mitigated but acknowledged. Unmanned jets have been flown into the concrete of the twin reactors. Trains have been destroyed by the spent fuel rod storage units. John even was sure to tell us that tsunamis were no issue—speaking from the fear of “another Fukushima,” he assured our group that the facility was on much higher ground

and would be safe from any attack, any natural disaster, and any power outage. Diablo Canyon isn't just its own city—it is its own fortress.

Like Diablo Canyon, the now defunct Titan Missile Base near Tucson, Arizona was built on foundations of nuclear preparedness when it was constructed in 1963. Literally—“the entire facility was built on giant springs to absorb the impact of nearby nuclear detonations. Even the electrical and plumbing systems were designed with enough slack to allow eighteen inches of bounce. The massive silo doors (...) are the only visible aspect of the silo from ground level.” (Masco 2021: 130). Titan and Diablo Canyon exist in moments of markedly complex temporality. Titan was built to send nuclear warheads across the world if called. Its entrance, as Masco describes, was covertly hidden under the earth. The facility itself was feet underground in an instance of preparing for both a possibility and an already existing present. *If* the country were to be attacked it could still (ideally?) retaliate. However, even in the time it was built, nuclear warheads were being tested less than 300 miles away. Trinity, the first atomic bomb ever set off, “exploded at 5:30 a.m. on July 16, 1945. Seismographs in Tucson detected the explosion from 280 miles away.” (Wilkerson 2021). Though the facility was built to prepare, *when* it is preparing for makes for a complicated question. Bombs were already going off in a country that was told to fear detonation everyday. In a similar vein, Diablo Canyon exists singularly as a moment of a working prototype. Standing in the confusing space between “in case” and “urgently needed,” again, the plant exists in its own iteration of a nuclear future. How do we imagine the scenarios we prepare for? Why do we imagine it necessary to drive a train into a two story tall concrete cylinder? Do we create these worlds into being in these moments of preparation?

Further, the secret entrances and covert silo doors of Titan reveal the necessities of their time. Satellite imagery has become crucial to the conduction of war in decades past, and keeping

facilities as hidden as possible (especially those that would be perhaps necessary in the event of a nuclear war) is understandable. In thinking of what makes it necessary for a structure to be hidden, we should ask what and who these facilities are hidden from. Diablo Canyon, in its case, stands away from Highway 1, from Avila Beach, from San Luis Obispo. It's tucked in the Pecho Coast, normally miles from civilian view, especially with the fog. However, unlike Titan, the facility is completely visible above ground. In the pocket of its own coastal view, it exists outside of strife, controversy, and protest. It stands proudly as itself, not hidden underground but backed by green soaring mountains. Despite all of that, Diablo Canyon is still hidden from the public. It's situated away from wandering sightlines, aiming only for the eyes of those it has approved to see it. The only way a civilian without a visitor's pass can get a glimpse of the campus is from one of a handful of long trails along the Pecho Coast (the ones advertised in the PG&E Education Center!). There, the facility becomes part of a hike, even further naturalized as another "sight of the Pecho Coast." There is no constant reminder for what it means to those around it. Its visibility is strictly on its own terms. Both Titan and Diablo Canyon take advantage of the remoteness of their sites, yet in different ways, for different purposes and different audiences.

Daily life at Titan makes clear that it is, at the least, an unusual job. Employees at the missile base were also expected to undergo training as a requirement in their 24 hour shifts. Staff working in the control rooms rotated between different silos while waiting for a call. Masco elaborates—"their job was simply to maintain the facility and to push the launch button without hesitation on order of the President." (Masco 2021: 130). Employees were never told where the bombs were going to detonate. All they knew was that "58 seconds after the launch keys are turned the engines would ignite." (Masco 2021: 130). *Where* was not in their job description. The job of "maintaining the facility" had much more to do with repetition and rehearsal than it did

scrubbing the floors. The four-person groups in the long shifts would “spend each working minute on alert checking and double-checking the equipment. This constant rehearsal of maintenance and launch sequences served also to make the crews robotic in their actions and thoughts regarding the facility.” (Masco 2021: 130). What do the shifts between preparing and executing occur?

Further, the crew members at Titan even carried “a pistol at all times on duty, marked as a necessity for site security but also to ensure that a reluctant crewman ‘did his job properly in case of a launch order.’” (Masco 2021: 130). *In case, in case, in case.* Even here, crewmembers, in the case of a reluctant coworker, must be prepared to threaten, shoot, or even kill someone they work day-long shifts alongside in the name of rationality. In the name of controlling your own emotions in the face of something much bigger than you could ever imagine. Or than you could ever know. Not that the crewmembers would likely ever find out where they had sent a missile, in the case it ever did happen. Manufacturing the rational nuclear subject is integral to every aspect of nuclear infrastructure, amongst civilians, staff, and those who work everyday to “maintain.”

Another proponent of emotional self-control in the face of nuclear apocalypse was Herman Kahn, specifically in his 1960 treatise *On Thermonuclear War*. Kahn’s influence in shaping nuclear policy in Cold War America cannot be overstated, even purportedly being the inspiration for Kubrick’s Dr. Strangelove in the 1964 film. (Masco 2021). In his work, Kahn sought to “calculate via cost-benefit analysis the economic, environmental, and health effects of different forms of nuclear war.” (Masco 2021: 160). The treatise is a document that could not be more of its time. Kahn, in writing to influence and inform countless people across the country, weighs the detriments and benefits of global nuclear war using examples of how many “defective

children" would be born, all with the haunting, hanging question of "what would it take for the survivors to envy the dead?" (Masco 2021: 160). Kahn's work goes hand in hand with the mission of Peterson's FCDA. If they have the evidence, if they have the "numbers" to rationalize the continuation of nuclear stalemate and therefore nuclear conflict, they have justification to encourage emotional self-control. They have justification to curb "panic," to tell citizens that fear is the true enemy to a rationally minded society.

This other piece, of the fissionable nature of panic, implies that it moves as a chain reaction - you are not encouraged to share your fear, you are not encouraged to express it to family, friends, and strangers. To fear near certain destruction in the face of actual, and quite possible, nuclear war, we must control ourselves and prepare. The gun that the crewmember carries becomes another tool in the nuclear arsenal to ensure the avoidance of fissionable panic. Fission splits, it explodes. It creates something uncontainable. Uncontainable in that we cannot imagine what must be needed to truly curb its overwhelming, energetic, and electric power. In this case, we rely on others to teach us. Even before we ask how we could ever learn to finally control ourselves, to stop worrying and love what it meant to prepare for the bomb, organizations like the FCDA create a world where we already are the rational nuclear subject. They create a world that tells us exactly how to be ready.

In the theater of nuclear availability, rehearsal is a tool perhaps as necessary as the weapons themselves. This rhetoric is everywhere in FCDA messaging from the 60s, especially in the previously mentioned list of "Panic Stoppers." As it says, the first step to curb our fear is to "work out practice drills." Civilians are encouraged to practice, to act "as if." (Masco 2021). The encouragement of repeating plans, of practicing drills, leads to a dual expectation: that a perfect performance is inherently possible and that every disaster and every outcome can be

predicted. Yet, the preparation is often where the fear bubbles to the surface. The FCDA, in its work on propagandizing against panic, acknowledges this complication: “Don’t be ashamed of being scared. If an attack comes, you will be scared and so will everyone else. It is *what you do* when you are afraid that counts. Fear can be healthy if you know how to use it; it can make you more alert and stronger at a time when you and your neighbors must act to protect yourselves.” (Masco 2021: 169). *If an attack comes, you will be scared and so will everyone else.* The “chain reaction” of fear is once again mentioned, a phenomenon that Kahn himself elaborates on in his treatise. Mass anxiety became “both a resource and a problem for the early Cold War state.” (Masco 2021: 167). Perhaps the reality could not be fully prepared for, but it could be practiced nonetheless. Fear was acknowledged to exist, it was not expected to be cast aside. The issue was in turning fear into *action*. If fear was paralysis, what would people have to feel to *move*? What would people have to see to move? Hear to move? Practice to move? If those with severe anxiety in daily life believe that rehearsing, that practicing every possible scenario will prepare them for reality, the FCDA was instilling this method of solution onto nearly an entire country, operating on nearly the same logics.

Another program set out by the FCDA in the 1950s involved staging “yearly demonstrations of nuclear attacks on the United States in which designated American cities would act out nuclear catastrophe. Local newspapers would run banner headlines such as ‘Washington DC, Detroit destroyed by Hydrogen Bombs’ - allowing civic leaders and politicians to lead theatrical evacuations of the city for television cameras.” (Masco 2021: 167). *Theatrical evacuations of the city for television cameras.* If we are to spend every second of our daily lives ready for the threat of nuclear annihilation, how do we know that we will act the same when the time really comes? Is it enough to know what moves to make, what number to call? This

example of simulated hydrogen bomb explosions across American cities is particularly astonishing to read for a number of reasons. Firstly, imagining this as a platform for civic leaders and politicians to practice their speeches in the face of near certain apocalypse is frankly laughable. Would there be cameras? Would it be filmed? Would the survivors envy the dead? The recording of these events, of being able to see them played out “for television cameras” works to prepare us, the viewer, for the possible. If it could possibly happen, perhaps we must make a world where we can see it follow itself through. In a similar vein, Diablo Canyon exists for itself, exists on its own. It already lives in a nuclear America. If we see the politician stand up and address a crowd after a headline prints that their city was destroyed, perhaps we can start to imagine these events as truly potential and as truly possible. Fear is perhaps sidetracked when there is a spectacle to witness.

Yet, at the core of this idea is a crucial paradox. The theatricality, the inherent performance that exists in rehearsal works on various “timelines.” In the world that the rehearsal *creates*—the world in which the politician is literally addressing a crowd after their city is destroyed—fear is controlled and overcome, notably by “civic leaders and politicians” acting as models for the average rational nuclear citizen. On the other hand, in the world in which we *see* the rehearsal as a rehearsal, perhaps even participate in it, the situation/cameras/press become a moment for politicians and local leaders to gain favor for staying strong through an event that, importantly, has not happened. These two worlds, in and out of the rehearsal, are both working with similar intentions - to model the process of controlling panic and to show the average citizen that, ostensibly, if it is possible for our leaders it is possible for you too. The paradox comes in the moment of attempting to reconcile either of these “timelines” with the moment of reality, the moment that the bomb would actually drop. The preparation, the practicing, the

repetition constantly copy and remake a world that does not exist and likely never will. Seeing what that process *would* look like is in a way exciting—there’s more than one reason cameras are there. The theatricality is meant to be viewed by an audience—why else would it be broadcast? Practicing for nuclear disaster is to rehearse for a play in which none of the cast ever wants to see opening night. This allows for leaders, citizens, and others to be the constant motions of practice without ever wanting or needing to follow through with their promises.

The FCDA’s 1955 film for their Operation Cue initiative is possibly the strangest fusion of the rehearsal and the opening night conceivable. Everything that makes it practice also makes it real, and everything that makes it real doubly makes it that much more fictional. The film tracks a nuclear detonation at the Nevada Test Site (one of over 1,000 nuclear detonations through the years in just that area) using mannequins and a mock home, “which was then incinerated on live television for 100 million viewers.” (Masco 2021: 205). The mannequins, “Mr. and Mrs. America,” are destroyed in order to, in theory, “test the effects of an atomic blast on the things we use in daily life,” as the narrator of the film states. (Masco 2021: 205). The mission of making a film to show the American public what a post-nuclear reality may look like works itself confusingly into the conversation of rehearsal. The film was “part of a larger campaign to make every American responsible for their own safety in a nuclear war.” (Masco 2021: 130).

Yet, here, a bomb really does detonate. A mushroom cloud really does rush toward a home. The millions and millions of people that saw Mr. and Mrs. America’s house destroyed were shown what it looks like when the thing they should be spending every day preparing for *actually happens*.



Mannequins, sitting at the dinner table, post-bomb. (FCDA 1953).

The FCDA in their creation of *Operation Cue* managed the mannequins' home meticulously, in a moment that Masco states gives us an opportunity to see how the military re-creates and therefore re-imagines the domestic "in an effort to militarize the domestic space of the home." (Masco 2021: 206). The plastic families of the film are posed, stuck in tableaux of "domestic normalcy—eating at the kitchen table, napping in bed, or watching television." (Masco 2021: 206). *Operation Cue* complicates the idea of the rehearsal at its core. How can a real detonation, a real megaton explosion constitute "practice"? How is this normal? In this attempt, on the part of the military, to simulate domesticity, how big are the circles of concern that one is expected to have? Why stop at destroying one home, with one family, with two children, with two parents?

The film is a particular mirror to the many instances of the politicians standing in front of cameras addressing false detonations. In one performance, you are met with the utter devastation

of the *real* image of the bomb. In the other, you are met with a human face, one you might even know, addressing a non-existent blast.⁸

Fear Now.

This is where fear starts to split. In conversations with Diablo Canyon staff, by-and-large, they named ‘fear’ as the plant’s biggest enemy, and therefore, its greatest weakness. In *Perils of the Peaceful Atom: The Myth of Safe Nuclear Power Plants*, two authors-turned-citizen-scientists Richard Curtis and Elizabeth Hogan outline the anti-nuclear argument as it stood in 1967.

Drawing on figures and stories of possible nuclear disasters at power plants across the country, the book is undoubtedly of its time. After *Silent Spring* changed the environmental movement forever, accounts in support of the environment, like *Perils of the Peaceful Atom*, began to rely on an ecological framework that saw the natural world as a deeply interconnected series of beings. Any interrupted instance could spell disaster for the entire system.

Perils of the Peaceful Atom, without question, relies on this model, as well as a near constant equivocation between nuclear weaponry and nuclear power. The introduction, aptly titled ‘In Defense of Fear,’ outlines arguments and case studies, particularly a plant outside of Detroit that led to acute public discomfort. (Curtis and Hogan 1969). As Curtis and Hogan argue, despite government claims that the plant was perfectly safe,

few took much comfort in these reassurances. All they knew was the building would house enough nuclear material to flatten dozens of Hiroshimas. That much lethal material sitting in a neat little pile thirty miles southwest of one of the world’s industrial capitals simply wasn’t calculated to inspire ease of mind, even if it couldn’t go up in a mushroom cloud. Some of them had read John Hersey’s book on Hiroshima, and whether it was morbid of them or not, they couldn’t stop dwelling on his images of the leveled city and the mutilated souls ‘lucky’ enough to have escaped instantaneous vaporization in the

⁸ Or perhaps it did exist—not in Detroit but in the desert of Nevada?

fireball. These Detroiters knew it was irrational, that we had tamed the atom and all that. Still... (Curtis and Hogan 1969: 8).

All they knew was the building would house enough nuclear material to flatten dozens of Hiroshimas. Throughout this passage, Hogan and Curtis rely on the fear that the FCDA tried desperately to control in the decades of the Cold War. The power plant stands as not only a reminder of nuclear war, but of disaster at home. The destruction of the plant would not mean another Hiroshima, it would mean *dozens*. “Even if it couldn’t go up in a mushroom cloud,” the fear still couldn’t help but feel rational. There is the subject, the nuclear subject that now *questions*. If you ask most people in this country, especially those that lived through these bomb drills in their childhoods, they will naturally doubt the safety of anything radioactive.

Still, John and PG&E set up a largely successful tour. Though it was much more casual than what I expected, it made for a memorable and comfortable experience. If the intention was to soothe fear and anxiety about the inner workings of nuclear power plant staff, it was well crafted. However, there is weight to arguments such as Curtis and Hogan’s. There is a deeply interconnected ecological system that none of us can grasp the entirety of. All we know are the moments in which it starts to sicken and call out. Radioactivity is invisible. It affects environments in long lasting, largely difficult to detect ways. Oddly, in the way that the plant was discussed, it itself was made up to almost be its own complicated ecological system. The sounds from the PA, ringing through the valley, the structures that I still have no idea about, the self-sustaining nature of it all. If it was cut off from everything around it, it could still act on its own. There is a desalination plant, waste storage, a shooting range, and countless other moments of seeming self-sufficiency. Each part was essential to how the plant currently runs, and, like in more traditionally “natural” environments, if one piece was not working as intended, it would need attention.

Like Kahn, we weigh every day the choices we make against the risks we take. If we walk the plank, eyes open, we comfort ourselves in knowing we are, at the least, making a decision. The process of nuclear fission is, theoretically, a carbon-free power source. To pro-nuclear activists, that is enough to mark it as producing “clean energy.” In reality, the industry has a way to go before this is strictly true. The plants cannot start up on their own—they need external energy to power on. They need trucks driving across the country to transport uranium. (Kohso 2020). In empowering nuclear energy as a clean energy source, what is gained? What is lost?

How does fear still exist today and how is it addressed by pro-nuclear organizations? How is controlled in the newly environmentalist branches of the movement? What does what we fear mean for what we feel we must urgently act on?

Organizations like the FCDA have historically relied on mitigating emotional distress in an effort to mold the citizen into one that rationally accepts the danger of nuclear war. It would not be an overstatement to say that Diablo Canyon also attempts, at every corner, to mitigate fear in local and national subjects. The question then becomes what these differences in intentions mean for the effects of this mitigation and how nuclear power both relies on and detests its linked past.

In returning to Trouillot, what do spaces firmly in the nuclear imaginary invite us to think about when we think of the past? What histories are being made today, and what silences can we turn to, keep an eye on, before they too are absorbed into an organization of forgetting?

After the simulation room, we left Diablo Canyon. As we drove away from the twin reactors, I noticed a flash of fear. Brief, but electrifying. A moment, a realization that behind the feet and feet of concrete were two pressurized-water nuclear reactors, capable of destroying my

body beyond what I could ever imagine. Yet, the flash was a flash, and was gone by the time I watched the waves gather in clear pools beneath the green cliffs.



The entirety of Diablo Canyon's facility from the air. (Figueroa 2005).

2 . . . Nuclear Motherhood

Reframing and Redressing with Women in the Nuclear Movement

“The future with abundant, clean energy is so sexy to me.”

A water wheel turns and a blue, holographic bar records the water level. An inchworm crawls on a mossy rock while a pump system displays its capacity; an “84” contextualized by no unit. A cow sits in a rolling green plain in the shade of hexagonal solar panels. This is the world envisioned in the 2021 animation “Dear Alice.” (The Line 2021). The short film, as it first appears to be, depicts a woman and her grandmother in a beautifully drawn style reminiscent of the maximalist, clean, stunning detail of Hayao Miyazaki’s worlds.⁹ She reads out a letter to her daughter, Alice, promising her their family’s farm. Their wooden home is full of verdant, bright life; hanging plants, dried herbs, flowers in vases and fruit in bowls. Sunlight bathes the seemingly converted home in warm, rich color. Her counter, again, detailed with blue holographic circles, rests a hovering red kettle for her tea.

The tone of the video shifts, however, when a clue at its purpose “sneaks” into the frame. The woman, clad in yellow overalls, a denim shirt, and a red bandana, brings her tea to her deck, and there, ten seconds into the video, we see a Chobani yogurt container resting in the sun on the porch. Interesting. The video, an advertisement for Chobani, depicts a possibility of a renewable future. Wind turbines floating in the sky power the family’s small garden and we see, in the distance, a green and white city glistening. The video makes no attempt to say this *will* be the future—it is enough to associate Chobani with an intention for this type of world. The ad’s production company, The Line, describes the depiction as “not a perfect utopia, but a version of a

⁹ “Dear Alice”’s soundtrack is even composed by Joe Hisaishi, a composer for various Ghibli films.

future we can all reach if we just decide to put in the work.” (The Line 2021). This idea - putting in the work - is one alive in many worlds of current climate activism. What we see here is a decision from a company like Chobani to align themselves with this burgeoning “solarpunk” movement of climate activism—one focused on positivity, hope, beauty, light, simplicity, love, and progress.



Still from the end of “Dear Alice.” (The Line 2021).

It is a dream for Paris, an interlocutor of mine and the global director of international pro-nuclear group, Stand Up for Nuclear, to have “powered by nuclear” on her bread. She told me that she had recently picked up her organic oat milk and saw “powered by renewables” labeled on the carton. For Paris Ortiz-Wines, it is essential that nuclear power becomes less taboo. “I want it to be so normalized, like everyone knows we have a plant, it’s clean power 24/7, and it’s cool.” She seems excited when she talks about the future but guarded in her animation, looking off to the side of the Zoom screen. She’s aware of how far we are from that. But that doesn’t mean she is disheartened in the slightest. “I want my vertical farm. The future with

abundant clean energy is so sexy to me. So many of our problems come down to energy. We need more energy. Put a vertical farm in your neighborhood and make sure there's a nuclear plant nearby. You can literally say it's powered 24/7. You can't say that with renewables. And that's greenwashing."

This idea of the "sexiness" of a green future is everywhere, but something that differentiates Mothers for Nuclear, Stand Up for Nuclear, and Generation Atom from their counterparts in other forms of environmental activism is that this "sexiness" is often not "sexy." Meaning, the image of the movement often focuses its rebranding efforts on child-friendly, family-friendly messaging and uncomplicated positivity. "All you need is love and clean energy" states a shirt with a nuclear chimney spouting pink clouds. "I'm a nuclear girl" says a shirt in cursive against a baby-pink heart. Often, these online merch stores have robust children's sections, a move that works to normalize nuclear energy as much as it works to paint it as overwhelmingly safe. It was not uncommon at all for the atomic bomb, in the 50s and 60s, to enter into a similar fetishized social role, however, mainly as an object of illicit, adult fun. Songs like the Five Stars' "Atom Bomb Baby" compared their girlfriends to atom bombs— "Atom bomb baby, loaded with power, radioactive as a TV tower, a nuclear fission in her soul, loves with electronic control" —and bars sold Atomic cocktails, complete with smoke pouring down the sides of the coupe glass. (Rafferty 1982).

Here, however, in the rebranding efforts of groups like Stand Up, the separation between the bomb and the plant is further exaggerated through diluting the power of nuclear energy by associating it with children. By association, nuclear power is now squeaky clean and family friendly, all part of a larger attempt to limit, at all costs, any conversation about the integrity or safety of these sites. Seeing my interlocutors work so diligently (and effectively) at limiting these

questions and conversations makes me want to explore how the Mothers and their sister organizations do this. What is a rebranding effort for? Who are its allies? Who are its enemies? What is the role slowly taking shape for women in this nuclear renaissance?

Validated Fear.

If Stand Up for Nuclear were to fund “Dear Alice,” it would replace the solar panels with portable nuclear reactors, place twin reactors at the coast, and suddenly, it would create the future Paris described. Studying environmental science at UC Santa Cruz gave Paris a look into what she refers to as indoctrination in classic environmentalism—“small is beautiful, we must harmonize, return back to nature. I went vegan for two years, it was really an awakening for me. ‘There’s so much going on, I would love to help’ and after university you have this power, this feeling that you’re going to change the world with your freaking degree.” She laughs as she holds her hand up as if clutching a diploma. “But that’s not how it goes.”

The world that Paris fights for is one that is positive. That is hopeful. That is not focused on the “doom and gloom.” This, again, is a core tenant of the contemporary pronuclear movement. A world of positivity, of harmony, of color and life. “Dear Alice”’s YouTube description asks, “What if we created a future for ourselves that was full of optimism and positivity?” (The Line 2021).

Paris is open in our conversation about her tactics of rebranding and honest in her use of turning the question back on the asker; a move that is especially useful when it comes to the questions pro-nuclear advocates are consistently asked. Like the one about the waste. “It’s the number one. ‘What about the waste?’ It’s so valid, but I want to rip my eyes out because I’ve been working on this for four years. The message hasn’t gotten out there, we need to find better

ways.” Paris’ frustration is the frustration of anyone who knows a lot about a subject and is asked the same question, over and over, even if, as she admits, it is “valid.” Among my interlocutors there was a tendency to validate nuclear fear in an almost resentful tone, like both her and I know it must be said but the conversation the advocates are involved in is advanced along what “the public” is prepared for. Again, using this contemporary idiom of “validation,” Paris appeals to those ingrained with nuclear fear yet, despite her and my various interlocutors’ claims of the masses that are too misinformed to trust nuclear power, in asking her about the community response locally in California, she immediately turned casual. Apparently, many young people they reached out to didn’t know about California’s nuclear industry, but were willing to listen.

The Californian environmentalist movement in the later decades of the 20th century effectively eliminated the conversation on nuclear power— “Sierra club won.” (Tuhus-Dubrow 2021). In the years since, that win has morphed into a reality for a younger generation that neither cares nor knows enough to immediately oppose nuclear power in the same way previous generations may have. Even with her planned rhetoric in reaction to this ambiguous ball of a terrified public, in reality, local outreach was warm, pleasant, and hopeful. “Younger people are like ‘that’s great.’ You only get a couple that are like, nah. But they’re usually older people that have been tainted by weapons and the Cold War, and for them it’s like, I see you, you’re valid, but for us, this is what we want in our future.” Paris’ *tone*, again, is one that understands fear perhaps out of public necessity and Paris’ *language* reveals a move toward placing contamination on those that worry about radiation, not the radiation itself.

Often, Paris refers to older generations as being “tainted.” Nuclear fear becomes a corrosive, contaminating, and contagious force, as it was in propaganda and public announcements of the Cold War. “Younger people are like, ‘what, we have a nuclear plant? Oh,

nuclear energy?’ The level of knowledge is just non-existent which is a great starting point because they haven’t been tainted.” The paradox in the environmentalist “success” against Diablo Canyon in decades past resulted in a generation unaware of the risks, inherently distanced from a conversation theoretically won by opponents to Stand Up and the Mothers. Paris celebrates the “starting point” of youth as a blank slate, because “they haven’t been tainted.” Rebranding efforts are a lot easier when you don’t have to accommodate the needs of a largely terrified public.

In every interview I conducted, the women argued that the biggest obstacle in the way of nuclear power was leftover fear stoked in the invisible flames of the Cold War. Despite this, Paris, specifically, made it clear she understood the reasons why people might be scared. Paris’ intent to validate and, again, accommodate the fear demonstrates that female advocates are often not awarded the ability to be outraged. There’s always something behind the eyes and the words of my interlocutors, something that came out only occasionally in our conversations. Paris only allowed for it, herself, by the end of my work with her, opening up to the ways that the questions she was asked, the way she’s been treated, and people’s unwillingness to understand her arguments really pissed her off. The need to consistently validate other ways of thinking seemed to weigh on my interlocutors, and, in the case of Heather Hoff, was stated as the tendency most actively holding the pro-nuclear movement back.

“Glorified Death”

Heather Hoff is one of two co-founders of Mothers for Nuclear, a San Luis Obispo-based pro-nuclear advocacy group that has fought, since Earth Day 2016, for the continued maintenance of Diablo Canyon. When I speak with her for the first time, it’s over text. She sends

atom emojis as we try to pick a good time to talk that week. She recommends other people to speak to, a man working in a similar group. I ask if she works with him and she says, “We know each other. Most nuclear advocates know all the other ones. We’re a fairly small group still.

👋💪🧪.” When we talk for the first time, she texts to ask if I can call *right now*. I answer the phone and our impromptu conversation turns into an impromptu interview. I can hear her enter her well-worn toolbox and pull out each answer to each of my questions, yet, she’s still extremely convincing. Her casual, friendly demeanor works well with her quick and efficient attitude. She wears her job, both in advocacy and in the nuclear industry, well. We talk briefly about nuclear waste and she off-handedly reiterates, “fossil fuel kills people, nuclear does not kill people.” She laughs, frustratedly, as if already in an argument with someone in the opposition. This is the first conversation I have with a nuclear advocate. The claim that “nuclear does not kill people” will be made by all of my interlocutors.

The nuclear industry has not always been so quick to advocate that it is a safe industry to work in. In scholar Shannon Cram’s “Living in Dose: Nuclear Work and the Politics of Permissible Exposure,” she details the history of regulating dose in the industry, a difficult task as

the human body cannot sense ionizing radiation. It has no sound, smell, or taste; it imparts no pressure to the skin; the naked eye cannot see it. Furthermore, radiogenic injury often takes decades or even generations to manifest. This latency period removes the element of immediate causality, introducing doubt about the source of cancer, mutation, and birth defects. (Cram 2016).

This latency means that the ways to test for exposure are much more complicated than accidents with clear beginnings and ends. The goal of the Mothers and other advocates is twofold here. Firstly, it is essential to distance latency from nuclear energy. This is done in a myriad ways, primarily by bringing into the conversation the urgency of climate change. Secondly, nuclear

advocacy aims to, in deflecting nuclear latency, attach that long-term, harmful delay to fossil fuel emissions, shining the spotlight of energy production's consequences away from the nation's nuclear plants. I saw countless times online—on YouTube videos, Reddit forums, Tumblr posts—many claim, without cited evidence, that anti-nuclear sentiment is a plot from fossil fuel companies to scare audiences into submission. My interlocutors also introduced the role of fossil fuel companies in encouraging anti-nuclear sentiment, often brought up as a thought, without a period, but a question mark. If you plant in the head of your audience the link between fossil fuel companies and anti-nuclear sentiment, you can leave your comment open. You can leave your thought without an end. You can just ask the question. In that move, they have already done a fair amount of the work to get that idea moving, to introduce fossil fuel influence to the conversation.

This redistribution of blame onto oil and gas is a move that assists in my interlocutors' own iterations of radical maintenance—a term I want to introduce to help better understand the process of advocating for something, positioning yourself as opposed to a larger, powerful majority, yet still (subconsciously or covertly) advocating for the values and agendas of state or corporate hegemony. I aim to think through this more as we pat the idea into shape.

Paris already said that she finds it useful to utilize reversal in her arguments—shifting that blame onto easily despicable energy sources, especially when already debating with and speaking to people who are thinking actively about the climate, gives the pro-nuclear movement an easily accessible bad guy. For good reason. However, part of that shift is the way that nuclear accidents are addressed and assimilated (or not) into the arguments of pronuclear advocates.

Like at Diablo Canyon, the nuclear industry of today (and its supporters) acknowledges the “mistakes of the past ” with a heavy heart, and addresses, tirelessly addresses the ways that it

has changed. Part of all of this is that staying on the story of “the nuclear accident” is not helpful nor interesting to pro-nuclear advocates. For Paris, climate despair

immobilizes you. We need something to look forward to. So tired of the doom and gloom. It was not fun to be at parties or family functions and try to push people to be vegan and think the way that I did and be scared for the future when that is not a sustainable way of living your life. If we’re going to build an awesome future, there’s no time to think about that. Reframe it. We glorify the deaths of nuclear accidents, you’re taking away the value of these other lives that have been taken. Shame on you. You say all that, and then [your opponent] is like ‘what?’ And then you don’t have to answer.

And then you don’t have to answer. The idea that we glorify the deaths of nuclear accidents is a fascinating one. Death marks the event of the nuclear disaster as such—an event, an instance, a tragedy. Her use of “glorify” points to her discomfort and apparent frustration with making martyrs of people killed in nuclear meltdowns. Paris’ statement reminds me, despite my unease, that there is a long history of making martyrs of victims of nuclear energy and weapons—death holds a complicated place in nuclear worlds. (see other people who have looked into this...) People become evidence, deaths become numbers. It is one of, if not the most, indicative modes we use to indicate “real” harm. Death seems to have a clear *cause*, something useful if you’re trying to claim that the *cause* is leaking radiation. Like cancer, like tumors, death acts as a way for the invisible harm of radiation to make itself manifest to a local, national, and international public.

Additionally, Paris’ argument that the harms of fossil fuels are not as noticed or attention-grabbing as nuclear radiation weaves back into her claims here about glorifying death. To an extent, we *do* know the harm that fossil fuels are doing to our world. We see oil spills, chimneys of smoke out of refineries, clouds of choking black out the back of cars—we see these images everyday. What Paris speaks to, here, is perhaps the interest we have in an invisible source of harm. I think of the terror and almost morbid curiosity that comes with looking into

images of long-term nuclear waste planning—the invisibility of radiation made manifest in shape and size. There is something captivating about invisible harm that makes us manage it differently, that makes us imagine it vastly differently.

What makes Paris' statement so fascinating to me is that, again, there is a certain extent to which we *do* “glorify” the deaths of nuclear accidents, but death itself does not always clearly point a finger at a specific harm. Conversely, non-death does not always clearly point a finger *away* from a specific harm. In the years since Fukushima's nuclear disaster, the lack of a high number of classified deaths due to the meltdown is almost always compared with the dozens of deaths that were caused by the evacuation proceedings. Comparing those numbers begs the public to ask: so what was the *real* harm then? The answer seems to display itself, again, again, and again. The “*real*” harm is overreaction, over preparedness, overanxiety, overstressing. Paris is imploring us (and deliberately confusing us) to see that when we talk about the nuclear accident, we are making a moral decision to grieve *those* deaths rather than those that have been cruelly forgotten by us accepting the risk of fossil fuel toxicity in daily life across the planet. This process is inherently one of scale-making.

Anthropologist Gabrielle Hecht writes in her fantastic piece, “Interscalar Vehicles for an African Anthropocene: On Waste, Temporality, and Violence,” that thinking and working with scale is never *just* about size. Often, thinking at a certain scale offers more than thinking purely quantitatively. We are reminded of graphs, something increasing, unfettered, over time. For Hecht, scale finds itself in the ways that people analyze and, in performance, share quantitative data. How are comparisons set up? What rules have been introduced? What possibilities are there in the *scale* that someone is utilizing? Setting up the situations you are comparing informs the possibilities for the comparisons you are able to make, and what you are saying implicitly about

each subject you are comparing. It is essential to note that Hecht does not introduce this topic to make moral claims about scale-making as a tool, despite arguing that it is inherently performative. Hecht expands that

scales, then, are emergent rather than eternal. But their situatedness and historicity do not detract from their reality. They do work in the world. They are performative. Scale is messy because it is both a category of analysis *and* a category of practice (...) Scaling is inescapable, but that does not force us into the trap of reification. Scaling is neither inherently evil nor intrinsically virtuous. (Hecht 2018).

Hecht argues against scale-making as a totalizing tool, one that is used without self-acknowledgement and awareness. It's difficult to bring many worlds together in the comparisons that pro-nuclear advocates introduce. This is partly what makes it so effective as a rhetorical device—now, the conversation has changed. Suddenly, when you've asked a question about instances (still occurring, still dangerous instances) of nuclear catastrophe, you are now answering a question about an altogether different subject. Did you notice?

Arguing the value of the deaths of nuclear accidents in relation to the value of those that died in the process of evacuation is not the conversation I am having. I am interested in working through what Paris brought to me—the question of what possibilities the pro-nuclear movement allows for thinking at multiple scales. Here, I return to Paris' comment that, “[fearing the future] is not a sustainable way of living your life. If we're going to build an awesome future, there's no time for that.” What does the pro-nuclear movement assume we *do* have time for? Where does that difficulty to think with interscalar ability come from in a movement that is inherently tied to so many forms of time-making? In the world that it makes, that these groups work *to* make, how does time proceed?

Dressing up and dressing down.

The women at Mothers for Nuclear work to portray themselves as home-grown, down-to-earth, environmental activists. Indeed, Hoff and her co-founder Kristin Zaitz both grew up with the values of sustainability ingrained in their everyday. Zaitz grew up at the base of the Sierra Nevada in a family that spent more time outside than in. Hoff was raised in a trailer in rural Arizona with a composting toilet. Their website’s homepage does not instantly register as the first face for one of the most influential groups in the pro-nuclear movement.

A quilted collage of smiling women with their children, rising above the message that “We were initially skeptical of nuclear, but learned through asking a lot of questions. We started Mothers for Nuclear as a way to share our stories and begin a dialogue with others who want to protect nature for future generations.” Below this declaration, a date for this digital plaque - “Earth Day, April 22, 2016.” Both Hoff and Zaitz, in our conversations, mentioned officially launching the group on Earth Day—a move that has come to frame the focus, aesthetic, and tactics of Mothers for Nuclear. I can’t help but feel, when I visit the website for the first time, that there is something religious about the message. The impulse to be so forward with initial skepticism read more like a pamphlet for a religious organization than a group supporting a form of energy. It feels like a lifestyle—it feels bigger than the shockingly small space we usually give to thinking about where our energy comes from. A vast majority of the images are of white mothers with their children—a few are women holding their infants in their arms in front of the twin reactors. In one, a woman smiles with her baby, a tiny hand firmly in its own mouth, against the mint green of the mint green computers of Diablo Canyon’s control room.

Danish scholars Rens van Munster and Capser Sylvest explore the history of the environmental pro-nuclear movement in their 2015 piece, “Pro-Nuclear Environmentalism:

Should We Learn to Stop Worrying and Love Nuclear Energy?” They argue, through outlining the methods of supportive documentaries and rebranding efforts, that the contemporary nuclear movement (named the “nuclear renaissance” by some), uses radicalism as a veneer to purport indeed “highly conformist” ways of thinking. When I talked with Paris, I felt myself settle into the interview as a conversation - a theoretical discussion between friendly acquaintances. Her candor was quick, self-referential, sarcastic yet emotional. By the time I was thirteen minutes into the interview, I was asking about advocacy, and commenting that focusing on the emotion was something that felt “beautifully feminine.” Listening to these recordings gives me insight into how effective my interlocutors were at persuading me. It was as if it was never a question if I supported the movement - they talked to me as if I already did. They described their work as radical and game-changing, a move that, listening back to my interviews, I was surprised to see work so effectively with me.

The symbol of the atom has struggled to stand for the “right” kind of progress. In the early push for nuclear energy, the atom failed “to gain full acceptance from an increasingly anxious public continuously reminded of the dangers of nuclear weapons through an alternative iconography of mushroom clouds, sudden flashes, and excruciating blast effects also documented on celluloid.” (Munster and Sylvest 2015: 792). When the image of the atom is always drawn, always obvious in its existence as a mediated, conjured image, it wrestles with the tangible and terrifying *real* images of the bomb. Anti-nuclear environmental movements of the time found it easy to rely on the omnipresent, ubiquitous imaginary of the mushroom cloud - people could overlay it over any horizon in a way that made the atom itself difficult to grasp. (Munster and Sylvest 2015). With these images so vivid in the public mind, “environmentalist voices—many of them questioning the risks accompanying a seemingly ever-expanding technological

civilization—served to break down the distinction between military and civilian applications of nuclear energy: fallout, radiation, and nuclear waste were framed as the interlinked symbols of a world gone awry.” (Munster and Sylvest 2015: 793). The nuclear bomb as a symbol for surpassing the “inherent limits of nature” was an immediately powerful message. The authors quote Denis Hayes in an interview for the 2009 film, *Earth Days*— “When I was born Strontium-90 did not exist. By the time I was a teenager, every living creature on the planet had Strontium-90 in its bones or its shells.” (Munster and Sylvest 2015: 795). It speaks to the power of the Mothers’ work of nuclear reframing that they have been so able to center the planet in their argumentation. They inaugurated the group on Earth Day—Hayes himself, who makes the above observation, was the national coordinator for the first Earth Day.

Van Munster and Sylvest’s argument that the pro-nuclear movement hinges on “highly conformist” ideology is not immediately apparent. Many Americans *are* still scared of nuclear energy, weapons, and waste. Many Americans *are* opposed to women in roles that require them to be “rational messengers.” In establishing the ways people disagreed with them, my interlocutors were adept at utilizing their self-radicalizing language. When they fight for a society that is powered by nuclear energy, they define that society as one that is deeply opposed to their core tenants. However, their core tenants are, interestingly, aligned with much of current practice and hegemony. Filmmaker and creator of pro-nuclear documentary, *Pandora’s Promise*, Rob Stone describes this phenomenon perfectly when arguing that “one of the great ironies about our relationship with nuclear energy is how so much of that 1950’s imagery and the arguments surrounding it actually turns out to contain a surprising amount of truth. As a generation we’ve made fun of all that stuff mercilessly, assuming that because the government said it all then the exact opposite must be true.” (Munster and Sylvest 2015: 805). The alignment of the self with an

established nuclear history requires walking the fine line between accepting past propaganda as current, mobilizing fact and denouncing it as attempts to lie en masse to American citizens and beyond. Walking that thin line requires a change in tactic, one that accounts for a greater, changing demography. One that moves past relying solely on “impersonal statistics and scientific investigations [to] drive the argument.” (Munster and Sylvest 802). What has changed in the almost decade since Sylvest and van Munster’s piece is the movement’s manifestation as one that is increasingly women-led.

In 2015, when the two were writing, Mothers for Nuclear was still “Save Diablo Canyon,” a local group started, again, by Hoff and Zaits for the express purpose of saving the life of the power plant after it was given a “premature” decommission date. Their transition and rebranding into Mothers for Nuclear came alongside work with Michael Schellenberger, a Bay Area-based pro-nuclear advocate seen in interviews on Jordan Peterson and Joe Rogan’s podcasts.

What gives the Mothers such a particular power as, really, the face of women in nuclear is their ability to “dress-down” and “dress-up” depending on what circumstance necessitates. Both are, of course, mothers, but they are also professionals in the nuclear industry. Hoff, herself, is a reactor operator and Zaitz a civil engineer and project manager. They have both found a place for themselves in the nuclear renaissance that allows them to live comfortably in a multiplicity of identities. At once, they are mothers, scientists, workers, technicians, women, advocates. They collapse these various roles onto each other. Through originally fighting for their jobs and the existence of their workplace, their current activist identities as mothers was itself initially founded on their role as workers. Before finding their place in the larger movement, Hoff and Zaitz’s introduction to nuclear advocacy was as employees of the industry.

That identity gives the two a credibility that the veneer of grassroots, homegrown activism may lack. In an interview with Chris Cuomo, Heather expressed how amazing it is for the movement to have so many advocates in so many different worlds—a growing list of demographics that are being tapped and read for their own interest. (The Chris Cuomo Project 2023).

To be clear, “dressing up” does not imply lying. It is acting, but acting as something you already are. Acting, as in acting—doing action *as* a part of yourself. In these moments, you interpolate yourself as a specific kind of citizen. It is taking the lab coat off and putting on the “Mothers for Nuclear” shirt. It is changing the coat for a baby carrier. It is enacting and activating the identity needed in that particular moment. Women are expected to inhabit and synthesize various identities for the benefit of others, and, in a post-feminist context, that multiplicity of identities has never been so multiplied. Why and how are they able to be all of these things at the same time? How are they able to embody plural identities in a way that celebrates that move as both an achievement as well as a necessity?

Their ability to address points of transition is remarkable. They wipe the mud out of plurality, shining it for a clear, bright purpose. Hoff mentioned getting weird looks wearing her “Nuclear Mom” shirt around San Luis Obispo when she first started the group. For my interlocutors, they point out the inability of others, especially other mothers, to recognize their own multiplicity. Concealed in that multiplicity, however, is a re-inscription of women’s necessity to fit the many roles expected of them. Aya Hirata Kimura writes on the mentality of the post-feminist world we live in now. In this “postfeminist gender settlement,” the expectation of our current patriarchal society is that after the first and second-wave feminist movements, when women began to enter previously male-dominated institutions, the need for feminism ceased to exist structurally. In this mentality, sexism and violence against women exists in

individual interactions, instances, and accidents. (Kimura 2016: 11). Essentially, what this does to women's lives everyday, and to an extent others in society, is that they are expected to exist and thrive as not only mothers, but lovers, workers, activists, care-givers, etc. This is, needless to say, extremely tiring for many people. Expecting excellence in every circle is, at the least, overwhelming. What is so powerful about the Mothers is that ability to bring together each of these identities into one cause. Perhaps this is why their website initially came off as a call to a new *lifestyle*, not simply a call to support an energy source. When they are questioned for being mothers who support nuclear power, they respond by saying that not only *can* they be both, but it is imperative that *everyone* be both. Besides, nuclear power is safe, anyway. They absorb the plurality by tying the threads of each identity together, weaving a tapestry that narrativizes a mother's need to work, fight, and parent.

Ain't Nowhere We Can Run: Women and the "Nuclear Mentality".

Women's skepticism of nuclear power is and has been well documented and acknowledged. Mothers, specifically, are expectedly conscientious of the toxins, contaminants, and possibilities of both nuclear disaster and nuclear leakage. A few months ago, I was in a used bookstore when my friend spotted a book - *A Handbook for Women on the Nuclear Mentality* - a thin, beat-up copy stuffed with correspondence between the author and a fellow advocate. The book, a handbook made specifically for women *against* nuclear power sometime in the late 70s or early 80s, details the toxins and radioactive materials that leave women especially vulnerable. The diagram of a nude woman's body, lines pointing to each part, inside and outside. Lines point to bone, the spleen, the kidneys, the muscle, the liver, the skin, and more but the category with the longest list of potential harmful contaminants is the ovaries. On the page across, the

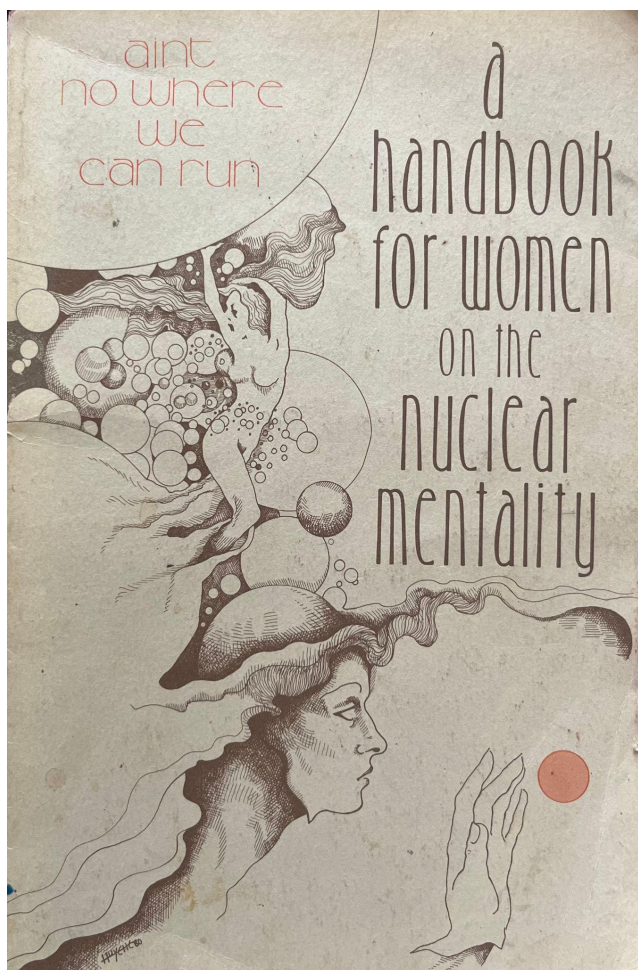
handbook suggests to women who “[work] in the nuclear industry under the regulations of the Nuclear Regulatory Commission and are contemplating having a child [that] the NRC recommends that you take the following precautions: (1) leave your job, (2) ask to be reassigned

to a less dangerous job, (3) delay having children, or (4) take the increased risk.” (Koen and Swaim 1980).

This suggestion is one that is completely contradictory to the way the Mothers, Hoff and Zaitz, envision their own lives, of course, but it also reveals a rhetorical instability in the argument of anti-nuclear advocacy. The push that women must choose between their kaleidoscopic multitude of identities is one that you would *never* hear pro-nuclear activists suggest. It is their imperative to suggest that things *can* stay the same. You don’t need to do anything but trust in nuclear.

Of course, this is in part because of the context of the book itself. Situated firmly in the second wave

feminist movement, *A Handbook* manages and discusses sexism and patriarchy as a structural issue that is emphasized by questions with no right answer, exemplified in part by the demands of the NRC above. What makes the synthesis of identity so powerful is that, in choosing a plurality, (as is perhaps more available to female activists of the 21st century), the Mothers also encourage their current and would-be followers that they, too, don’t have to give up on parts of their life to support nuclear power. It was important to Paris that she be someone women can



relate to when they hear about nuclear energy. Their worries, their concerns - all of it were things she felt too. Again, the language of validation - of course you would be scared, the “mother” takes on the responsibility of the future, one that is, ideally, free of toxins, contaminants, and danger for her children.

For mothers who give birth to their own children, their own bodies are on the line as idealized and policed standards for the world they want to reproduce. Any threat to the baby’s health before, during, and after pregnancy is blamed expressly on the mother. Meaning, there is a heavy weight on mothers to learn from the mistakes of the world around them to learn to “raise this generation right.” Parenting books have given way to parenting TikToks—mothers informing other mothers how to practice “intuitive eating” with their children to avoid the pitfalls of mother-informed disordered eating in their children. (Arnold 2023). The message of mothers being held responsible for disrupting generational cycles of abuse, loneliness, etc. meets neatly, here, with the climate narrative of inheriting a broken world and deciding *we* are the ones to fix it. To argue that you can work in the nuclear industry, live near a power plant, drink the water, swim in the ocean, do anything you would *normally* do, is to move in the direction of radical maintenance. In a way, this is perhaps freeing, liberating for mothers inquiring into nuclear energy. There’s already pressure to make the life of your child as safe and healthy as can be, and now, living in a moment emphasizing, almost demanding self care from everyone, mothers are expected to find ease for their own lives, even amongst the, again, multiplied multitude of identities one must carry at once.

For women, Paris at Stand Up, the Mothers, and others working on the burgeoning nuclear “front-lines,” they assimilate the conversation on empathy and on emotion into their own rhetoric. They exist and live in a state of “post,” implying that women “stuck” in the past,

fearing nuclear power, are still to reach enlightenment. My interlocutors validate, suppress their outrage, accommodate opposing viewpoints because, still, as women they must stand as bastions of empathy. Catherine Eschle, in writing about the women's movement campaigning against the atom bomb, argues that in those spaces,

gender was interpolated in a more abstract way, in terms of a repeated emphasis on the impact and cost of nuclear weapons on human bodies, relationships, and the natural world. The abstractions of nuclear rationality, as pursued by a technocratic, Western, masculine subject, were thus confronted by the concrete, embodied mode of reasoning historically associated with feminine (and also non-white, non-Western) subjectivity, but here assumed to be more widely shared. In this way, the discourse constructed a feminized but potentially inclusive figure of the antinuclear activist we could call the 'Empath.' (Eschle 2013: 717).

In Eschle's description of the anti-nuclear activist as the "empath," we see in the new women-led front of pro-nuclear advocacy the same role, the same expectation. Empathy for those who have *not* reached enlightenment, who have not realized the true solution to a world that feels terrifying to welcome children into. Still, despite everything, they are, above all, expected to be empathetic.

Kristin Zaitz, like Heather, wears her job well. When I met her, I thought she would be more reserved, straight-to-the-facts than Heather, but she wasn't. She was honest with me—honest in admitting her frustrations, honest in admitting her doubts, and it made her candidness about how much she loved nuclear energy that much more impactful. She told me that she felt her and Heather were in "this position, this really weird position, where we have access to all this technical data but we also have this caring side of us. We care about our children, our environment, and we've been able to mesh those two sides together. It's our responsibility to say something." Heather said something similar—that it was *their* job. When I asked about their specific framing as mothers, she shared that her and Heather had actually

struggled with that for a while. We were encouraged not to be mothers for nuclear. Well, people like mothers—we're looking at the future, we're caring, etc. But [other nuclear organizations] didn't want us to be for nuclear. They wanted it to be 'for climate action.' We tried a few names, and then, we just thought, that nuclear energy is accused of so many things that it doesn't actually do, I don't want to be accused of hiding what I'm advocating for.

Seemingly, men like Schellenberger and his colleagues at other nuclear organizations were intimidated by Heather Hoff and Kristin Zaitz's willingness to be open in their advocacy for nuclear energy. The initial demands, as Kristin says above, were to disguise their true positions behind fighting vaguely "for climate action." Kristin and Heather were right—their ability to be consistently open is part of what makes them so immediately trustworthy. However, despite aiming toward a female audience, Kristin told me that, when she was looking at the demographics of their social media followers, she was wondering "who was following us, and we were like...men? We're trying to reach women!" She laughed with an emotion I can't exactly place, and continued. "There's a lot of men out there who saw the situation and were trying to communicate with people but no one's listening, and then they see that women, mothers, are doing it and they were just thrilled to have someone else with a different voice out there in the advocacy community." Kristin, here, admits that many of the followers and those interested outwardly in the work the Mothers are doing are, in fact, men. The Mothers' introduction into the historically deeply masculine movement of nuclear energy should in theory give women more available avenues in which to advocate in the way they want to advocate, and the Mothers, in theory, do just that. Despite their excitement for what they bring to the pro-nuclear movement, I couldn't help but feel that Kristin and Heather were much more interested in talking about nuclear policy than they were at all talking about their role as mothers. How is empathy here

being used and by whom, I wonder? What opportunities is this giving women to speak their own minds? Where is the men's excitement coming from?

Here, the role of the Mothers in the ecomodernist pro-nuclear movement begins to reveal itself. It is important, first, to situate their role in a greater context. 2015's "An Ecomodernist Manifesto" was signed by a dozen or so authors, and is deeply intertwined with the beliefs of both the Mothers and Paris in her work with Stand Up for Nuclear. Michael Schellenberger who, again, was instrumental in the organization's foundation, signed the manifesto.¹⁰ They firmly find power in the potential of the Anthropocene, believing in the possibility of a "good anthropocene [that] demands that humans use their growing social, economic, and technological powers to make life better for people, stabilize the climate, and protect the natural world." (Schellenberger 2015). The movement's association with technology and its general domination by mainly white men leaves it masculine in make-up and ideology. I remind us of Stewart Brand's motto for his Whole Earth Catalog—"we are as gods and we might as well act like it." For ecomodernists, "humankind"¹¹ already has the ability to mitigate climate change, it is not only our responsibility but in our power to act as such.

Think of the world of "Dear Alice," the idea that the only thing in the way of a "solarpunk" future is simply "putting the work in " is a simplified implication made by the ecomodernist manifesto. Ecomodernism, at its core, believes that "by understanding and promoting these emergent processes, humans have the opportunity to re-wild and re-green the Earth—even as developing countries achieve modern living standards, and material poverty ends." (Schellenberger 2015). The beliefs that act as the scaffolding for the ecomodernist movement are ingrained in the construction of the civilizational ladder—early anthropologist

¹⁰ One of only eighteen.

¹¹ A term they use quite often.

Henry Lewis Morgan's idea that there is one direction that culture and technology move in. As an American, Morgan believed himself and his colleagues in Europe to be in front of and at an inherently higher level than what the ecomodernist manifesto refers to as developing countries. This manifesto's consistent references to modern living standards offer a perfect example of the ways in which we still feel beholden to social evolutionist hierarchies.¹² What does this movement ask us to change? What does it ask us to think differently about? What assumptions of ours does it make uncomfortable? This is not to say that poverty and energy inequality in comparing the Global North to the Global South are not immaterial—this manifesto refers to conditions that are generally accepted to be vastly inequitable.

Nevertheless, ecomodernism and the previously uber-masculine nuclear movement still missed something. I argue that what is afforded, what is offered by the recent surge of women as spokespeople for the nuclear movement, is a way to *perfect* ecomodernist rhetoric. When I hear Zaitz admit that, according to the Mothers' social media analytics, most of their supporters online are men, I hear that there was something in the women's presence that finally filled a hole that the movement needed filling.

A similar sentiment was shared by both Zaitz and Hoff in our conversations—they were clear in how welcomed they've been in the pro-nuclear movement so far, and relay how excited the mostly male-led organizations were to have people who emphasized care so clearly in their message. Again, Zaitz and Hoff were brief to talk about what ability being women and mothers gave them in their advocacy work, citing their ability to be seen as empathetic, to care, to be trusted by other mothers. Perhaps, they too fall into a "natural" position that men aren't able to access in the same way. In the decades-long conversation post anthropologist Sherry Ortner's

¹² This also applies to a greater nuclear imaginary—nuclear power is often seen as profoundly technologically advanced, and this is taken advantage of by the movement. However, in that identity of technological advancement, there is also an overwhelming need to

iconic essay, “Is Female to Male as Nature is to Culture?” it has been a mode of feminist critique to speak to women’s perceived intrinsic connection to some vaguely defined “nature.” This is a classically *ecofeminist* argument, a movement that has, to say the least, a very different picture drawn of it.

Ecofeminism’s reputation of being too radical, too liberal, too full of “bunny-huggers,” and the potential relationship women who are “more in the center,” as Kristin put it, like the Mothers, is expressed, again, by Kimura’s analysis of post-feminism. Kimura writes about the importance of rationality in masculinist organizations, and what type of subject is created in that world—she argues that

under the effects of postfeminism and neoliberalism, in what Angela McRobbie calls the postfeminist gender settlement, women are increasingly considered to be economically mobile players in society but are still required to conform to hegemonic femininity and behave in ways that are nonthreatening to men. This new sexual contract also lets women have power as long as they do not question the main assumption of postfeminism—that structural inequality is no longer a problem. In this gender dynamic, women are allowed to become politically vocal only to a limited degree, while radical activism is policed as incongruent for these aspirational and feminine citizen-subjects. (Kimura 2016: 11).

There is so much here, and Kimura points to something that is unmarked, yet woven throughout the way women exist in pro-nuclear advocacy. As previously argued, the “dressing down” into the identity of the mother gives an interesting credibility to the greater movement. The Mothers act as a compromise between the women-led, moral power of ecofeminism and the masculine, technology-focused, progress-defined world of ecomodernism. Kimura speaks to this in her argument about what is compromised in order to be enfolded into ecomodernist understandings. Motherhood can now act as an alibi, a cover for these particular women working and advocating in the field. Having the framework of a larger set of principles and contacts has been invaluable to the Mothers (as their consistent work with and gratitude for Schellenberger exemplifies), and,

in turn, the mainly masculine nuclear movement is given a wider audience, and a newly minted credibility of care.

Another aspect of this neoliberal, “nonthreatening femininity” that Kimura speaks to is the ability to take risks. Somewhat paradoxically, it is extremely important to not threaten the risks others are taking in masculine movements, especially regarding toxicity. Think of the relationship to contamination that is exemplified in my interlocutors’ comments about the safety of nuclear. Paris, herself, would get frustrated in our conversations about the way that safety was so important to those in the opposition. Heather, in talking about the Mothers’ “rival,” the anti-nuclear Mothers for Peace, would off-handedly, implicitly refer to them as irrational, driven by a dated, emotional relationship with nuclear weaponry. What is kept of women’s supposed “emotional strength” in their inclusion in mainly male organizations? What possibilities are there for women in the pro-nuclear imaginary?

The roles that are made and embodied by the Mothers are not the only opportunities for women in this movement. We’ve seen this in the last two years with the advent of a new kind of platform for nuclear advocacy—the internet’s first pro-nuclear influencer.

Radioactive Skin Routines.

Isotope makes TikToks about nuclear power and refers to herself as a nuclear influencer. A project/character/persona of Isabelle Boemeke, she is a Brazilian model and major supporter of the pro-nuclear movement. She makes shorts about her “radioactive skin routine,” while stating numbers and data about the radiation already existing in the world—an attempt to placate the fear by declaring that we are *already* living in a radioactive world. She says, in a stylish monotone, that

we also receive radiation from things like eating potato chips, or flying. Actually, you'd receive as much radiation flying from the United States to Ukraine as you would touring the Chernobyl exclusion zone. Hot springs are radioactive. Bananas are radioactive. Even *you* are radioactive. And let's be real. Even a little toxic sometimes.¹³ (Isotope 2022).

This is consistent with past tactics of the movement. In the documentary, *Pandora's Promise*, (a film almost all of my interlocutors mentioned changed the way they thought about nuclear energy), they dress up the world as one drenched in radiation, and a nuclear-fearing public as misinformed and propagandized—

Nuclear energy, in short, constitutes an acceptable risk given the catastrophic dangers of climate change. Stone and Lynas¹⁴ do much to naturalize radiation by measuring background radiation (using technological devices) around and above the globe; at one point the film even alludes to its beneficial health effects by filming a man buried in sand at a Brazilian beach possessing naturally high levels of radiation. (Munster and Sylvest 2015: 802).



Stills from Isotope's "Radioactive Skin Routines." (Isotope 2022).

¹³ I feel it's important to note that, here, Boemeke includes a clip of Britney Spears from her "Toxic" music video, as well as the song's main riff.

¹⁴ Filmmakers of *Pandora's Promise*.

Burying a man in radioactive sand and calling a skin routine “rad,”¹⁵ are in the greater rebranding effort that brings radiation into our lives. Specifically, in a way that transforms *threat* into interesting, exciting, shocking *pleasure*. This marks a difference in her tactic from that of the Mothers—she diverts the question of danger, instead focusing on the place we are already in, the risk we already take for granted. This process of domesticating and naturalizing radiation in our world holds its power in a confusing place. Radiation, then, becomes safe, but not safe alone. Radiation *alone* isn’t even part of the conversation. It is safe because it is everywhere—a common pro-nuclear talking point made by Isodope is that that banana you ate this morning was, in fact, radioactive. We are told that we encounter radiation everyday. That “we” here is not only the global “we” —the human race, humanity, the global population etc. —but it is also the “we” of the Isodope’s audience. “We” who are sitting, watching her video, digesting our banana from that morning, have encountered radiation already. Scholar Heather Davis writes about the domestication of plastic as it individualizes the relationship between us and the material, arguing that, for example, “3D printing represents the duality of individual desire and infinite reproducibility. It is oil made digital, made personal.” (Davis 2017). Isodope attempts to make us not only okay with radiation, but she wants to make us love it. There’s something exciting about her monotone, infallible delivery. She’s glowing, radiant in her shorts, with perfectly styled hair and outfits. The pro-nuclear movement, in a moment of confusing irony, consistently finds its domesticating symbols in food.

Another is that of the gummy bear—talked about by Isodope and held up by Michael Schellenberger at a TED talk—as it’s the amount of uranium needed to get an equivalent amount of energy out of a ton of coal. (TED 2016). Paris also mentioned the gummy bears, saying that,

¹⁵ As Boemeke writes many times in her website, and says many times in her videos. The word has become somewhat of a popular occurrence in newsletters I receive from Stand Up for Nuclear and another group, Generation Atom.

in her work at Stand Up, they had a green gummy mascot at their booth at the annual climate convention, COP26 in 2021. Even though Isodope and Paris in her work at Stand Up for Nuclear parallel the Mothers in values, they bring an edge that seems to be interesting to many in the movement. However, Isodope is not without her own journey to get where she is now.

The narrative of conversion is pervasive in pro-nuclear rhetoric. The Mothers pass their support through the claim that “once, we were like you!” - a move that allows these women to come across as relatable and, in turn, trustworthy. Women, as subjects that are often thought to have a natural suspicion of the nuclear industry, are appealed to in specific and directed ways, ways that rely heavily on other women to be the “messengers of the truth.” The Mothers themselves are open in their discussion of the power relatability gives them. They stated clearly in conversation that they felt they would be the most effective framing their own activism and participation in nuclear industry through their motherhood. If a mother hears another mother accepts something for her child, she is, in theory, more likely to accept it too. The implicit understanding here is that mothers, ideal mothers, have the interests and safety of their children at heart. The moments in which a mother’s fear for her child is questioned, however, are particularly revealing in what we consider the line between appropriately loving and over-protective to be. What is so essential about groups like Mothers for Nuclear is that their most basic goal is to state clearly where that line is, at least regarding nuclear power. To the Mothers, the fear of nuclear power is firmly, as firm as can be, on the other side of rationality. It jumps, both feet first, into the pool of irrational, overprotective, hysteria.

Further, with conversion comes a moment of enlightenment. In these narratives, people become prophets. Boemeke, herself, in her TED talk, “Nuclear Power is Our Best Hope to Ditch Fossil Fuels,” and in other interviews, begins with her conversion moment—“my life completely

changed with one tweet.” (TED 2022). The tweet, written by planetary scientist Carolyn Porco, “Let’s dump oil and go nuclear. Dispersant used to clean Deepwater Horizon spill more toxic to corals than the #oil,” was so impactful to Boemeke because of Porco’s credibility. As Boemeke says, “Wait... I thought nuclear energy was bad? Yet, here’s this scientist, and a TED speaker, making it sound good.” (TED 2022). The idea that one moment can be your “wake up call” extends throughout pronuclear rhetoric and ideology. This lends itself to being a state of mind that one “reaches” with almost religious weight. Boemeke continues, in this talk, to state that she talked to many scientists in the years after her initial broken suspicion, and, according to her, their answers were all shockingly similar on the role of nuclear energy. With each point she raises a finger - “It’s good. We need it. People hate it.” These moments of Boemeke learning what she observed to be the scientific reality of nuclear power aligned with her “waking up” to the already present presence of climate change.

When the turn to trusting nuclear power is narrativized as a moment of conversion, it implicates the rest of society to be at odds with its goals and ideologies, with a certain spiritual/religious weight. Pro-nuclear activists, in turn, are framed as counter-cultural, radical thinkers who oppose the irrational, hysterical, and frightened doctrine of nuclear fear. When they question, they speak firstly of those that disagree with them, sometimes even before they say their own argument. Essential to the ideology of the Mothers is that they are able to exist as caring ideals of motherhood at the same time as their support of nuclear power, yes, but also directly *as a result of* their support of nuclear power. They believe in *science*, in the empirical truth. The push and fetish of science is central to pro-nuclear rhetoric and, additionally, at the core of the conversion story. *Pandora’s Promise’s* “converts are all filmed in atmospheres and sites of contemplative reflection like in private studies or open fields. The message is clear:

supporting nuclear energy is rational and reasonable, while opposition is cast as unfounded, emotional, irrational, and immature.” (Munster and Sylvest 2015: 802).

Again, on the merchandise sites for many organizations, companies, and groups working to advocate for nuclear power they sell shirts, stickers, water bottles, etc. that mainly rely on images of the atom or a smiling nuclear plant chimney spewing blue sky, white clouds, and rainbows over the fabric. This is part of a larger story of commerce—“cutesifying” the invisible made visible transforms scientific theory into a merchandisable object. We see atoms on shirts, mugs, onesies, hats, and water bottles. The image of the perfect, symmetrical, atom is a convenient mascot. It stands for all, for truth, for beauty. Though we drew it, depicted it, translated it and sold it, its image is powerful—it naturalizes its own perfection, indicating its inevitability as a symbol.

There is an appeal to the idea of being “pro-science” that has, in the years since Trump’s presidency, risen to align itself with climate-forward, liberal politics. Nuclear advocacy has the ability to slot itself into that thinking, fitting itself in between renewable giants as the “obvious solution,” a representation of a radical reversal from the ubiquitous image of the mushroom cloud masking any serious conversation about an American society brought into the future by nuclear energy. There is something undoubtedly remarkable in nuclear power. A magic solution. Part of the pro-nuclear movement’s “sell” is its *ease*.

Therein is why the aspect of fear is necessary to emphasize among pro-nuclear groups of the environmentalist persuasion (not all groups label themselves first and foremost as “green.”) Fear brings with it urgency, and if the pro-nuclear group is able to redirect that perceived fear toward climate change, it has not only reframed apocalyptic temporality but gained a supporter. If they can convince someone that combating climate change is more urgent than managing

radioactive material, they have properly managed a frankly easy counter-argument. Though it may sound counterintuitive, a group that defines itself against the fear of nuclear power does have a noted and vested interest in keeping that fear alive (for now).

That fear is interesting—it's exciting, even if clearly and baldly terrifying. The Mothers say this themselves—establishing how safe the plants are is, to them, *not* the way to get more widespread support. The way that Isotope and now the Mothers are annoyed by “fear,” yet also frustrated by a reliance on constant reiteration of “safety,” reveals that there is a complicated balance being struck here, one unseen on the surface. The reliance on safety, for my interlocutors, scared people into thinking there was, in fact, something to fear. I believe, however, that there is also something that is implicitly *exciting* and captivating about fear that the pro-nuclear movement is beginning to harness. Movements that are focused so completely in childhood, innocence, purity, and a beautiful, lush, clean future are seen by hegemonic ideals as safe to follow, but are rarely exciting objects. Part of the work that Boemeke's Isotope is doing right now is to inject even more “sexiness” into the lifeblood of pro-nuclear advocacy. Her website, and general look, are situated precisely in their time. An aesthetic of a cyberpunk, revived 2000s, vaporwave webscape asks visitors to join her “nuclear school” (her mailing list), and to scroll through press, videos with electronic musician, Grimes, and ultimately, a call to “join the movement” (donate). This is all within the mission of radical maintenance—to dress up a hegemonic movement with radical clothes and radical claims. At the end of the day, the work that Boemeke is doing is to domesticate radiation into the everyday.

In addition, the Mothers' structure and framing as an organization assists Diablo Canyon in a greater process of not only domesticating but *localizing* nuclear energy. Meaning, the way that that space is made specific to California—to its ocean, its rocks, its mountains—brings

nuclear energy to a scale that people can connect to and understand. Likewise, bringing that scale to a relatable, intimate level was integral to my interlocutors' theory and work.

Near the end of my conversation with Paris, she was getting frustrated. She said, eyes closed, talking through her hands,

stop fucking saying nuclear is safe. I'm so tired of hearing it because people weren't even thinking it and you just brought it up. I would like to see the movement focus less on going deep into the numbers on safety, accidents, and waste. (...) We need to go on the offense rather than the defense. People would like a vision. People want hope.

What does the object of fear look like in this new pro-nuclear imaginary? What is it being converted into? Attraction? Excitement? What is offered by this new medium of advocacy? What spaces do we have, if not in this environmentalist, activist world, to reckon with, live with, and die with toxicity?



Mannequin mother with children, pre-bomb. (FCDA 1953).

3 . . . The Waste of It All

Concluding with Gender, Toxicity, Permeation, and Fetishism

So...what about the waste?

Heather mentioned something in our interview—that sometimes things can be scary, but that doesn't really mean that they're dangerous. Paris said something similar.

Humans and risk perception...it's not very effective sometimes. It's very common for people to be scared of flying, and then, it's safer than driving a car. Just because it's scary doesn't mean it's more dangerous (...) It's important to talk about it, and reframe it, and use the science angle. 'Believe science.' That's a huge phrase among the left! The National Energy Agency—they all say nuclear energy is needed. A European report said it's the safest source of energy, with the smallest land footprint (...) The first step is a conversation.

Determining the scale that risk is measured against is imperative to pro-nuclear activism, and a core part of determining that risk is in determining what waste looks like, where it goes, and who it hurts. These conversations with my interlocutors brought into view questions about what we are willing to live with in our lives, and what levels of concern we are willing to have for our own bodies, our own selves, and the vastly interconnected entanglements of all our messmates.¹⁶

Paris was more than willing to talk about her strategies regarding waste, knowing that I was interested in the topic. For her, “the act of surprise” and purposefully confusing her ideological opponents was critical to both winning the debate and carefully side-stepping the question. “I would like to see the movement focus less on going deep into the numbers on safety, accidents, and waste. Bring it to a high level—say nuclear waste *is the best kind of waste*, kind of confuse them. It's the act of surprise, and then you can go in if they want more numbers.” So,

¹⁶ I have utter love and respect for this term borrowed from Donna Haraway's *When Species Meet*, referring to the many human and non-human companions we have, messy and muddy, in our worlds.

what would it mean for nuclear waste to be “the best kind of waste?” Is it possible to even *have* a “best kind?”

Waste undoubtedly allows us to see patterns, lives, pain, and hurt that is bubbling, churning on and below the surface. Gabrielle Hecht acknowledges that the study of waste “has come a long way since Mary Douglas first identified dirt as ‘matter out of place.’” (Hecht 2018: 111-112). Indeed, the shifts in understanding the deeply embedded stories of waste have evolved to question hegemonic power, oppression, and pollution. However, as Hecht argues, “scholars have [also] sought to disentangle waste from abjection by focusing on how waste and its management can produce new social relations, cultural forms, and political demands.” (Hecht 2018: 112). This is exemplified in Marisa Solomon’s work in which she outlines how gentrification in Brooklyn and Virginia fundamentally affects what waste is, or how she brilliantly puts it, what matter *matters*. (Solomon 2019: 84). Part of what makes Solomon’s argument so impactful is that she acknowledges both the interconnected communities brought together and finding power in what we refer to as “waste,” while still acknowledging the material reality of what being expected to live *in* waste does to a group of people.

The understanding that waste is contingent on its context is well understood in anthropological thinking, and it can perhaps lead to a certain making of waste products as metaphysical, metaphorical objects. Hecht argues against this, stating that she stops

short of framing the biophysical properties of waste as lively or vibrant. Metaphors matter. And those particular metaphors enchant: they make materials appear mystical and mysterious. Their joyful connotation can all too easily erase the brutal histories and ontologies that produce new biophysical phenomena, instead indulging in what Zsuzsa Gille calls ‘waste fetishism.’ (Hecht 2018: 112).

I admit, when I read that line I felt—simply put—called out. My fascination with nuclear waste initially began in high school, sitting with my friends at lunch looking at the Human Interference

Task Force's many plans and mock-ups for a long future. Then, reading Robert Macfarlane's fantastic book, *Underland*, I fell deeper into an obsession with the aesthetics of bureaucratic, science-fantastical, nuclear futurism. Then, three years later, I spoke with a number of nuclear engineers and advocates for a project about gendered nuclear futurism.

I mention all this to say that Hecht's point is a poignant one. To paint over the real processes of waste maintenance with a ready-made, aestheticized brush, is to ignore "the biophysical properties of waste." (Hecht 2018). In looking at the myriad, "mystical" ways that radioactive waste from nuclear plants and weapons will potentially be stored in the future, we often don't think about the actual waste product in question. This is a power of technological utopianism—a sleight of hand. A conversation about a material that will never go away becomes a conversation about linguistics, or universal symbology. This is all part of a process of domesticating radiation into our lives, pasts, and futures. The waste repositories that are already being built in Europe stand as fascinating, paradoxical monuments to both domesticating radioactive material and fervently disavowing it. It is dangerous, and everywhere.

Paris, herself, spoke about her experience visiting COVRA, the only nuclear processing and storage facility in the Netherlands.

When you go there, they've used the buildings to make it an art-visual in itself. Every ten years, they reduce the color to show radioactive decay and put low and intermediate waste right next to the artwork. When you go there, you're like—this is totally cool. There are actually permanent substances that will remain toxic forever, we don't talk about that in our daily lives, and they need to be stored in a facility. They offer tours to elementary school kids, build relationships with the area. We just need to demystify. Some people still think it's a liquid that's going to contaminate groundwater (...). Radioactive materials are used in daily life, that waste comes from hospitals or factories. People just don't know. That's the reframing—places like [COVRA] are like 'we've got this.' We have a lot of problems, I just don't think nuclear waste is that big of one. I would say [waste storage] is one of our biggest opportunities for nuclear.

Here, again, Paris demonstrates her ability to confuse in order to make a point. This is a common tactic in rhetoric, in argumentation, but what makes it so effective when discussing nuclear power is that nuclear material, already, is *so* mythologized, so heavy with mindful construction, that she is able to have a multitude of threads to pull on. Waste storage, now, becomes “one of the biggest opportunities for nuclear” when it is so commonly, and easily, stated as the energy’s biggest downfall. Paris’ comment here is fascinating in a number of ways. We see, again, that paradox of a monument that stands to remind people, as Paris says, that “there are actually permanent substances that will remain toxic forever,” stand directly next to the idea that “this is totally cool.” This is indicative of nuclear energy’s place at the core of ecomodernism—that technology, and our theoretical ability to consistently and constantly contain the waste of our products will end climate change and bring about a new, energized vision of the future. What do places like COVRA do for the way that nuclear waste is “fetishized” in the pro-nuclear movement? Using paint to indicate radioactive decay, and processing the ecological weight of nuclear waste as an opportunity for visual engagement functions as a tactic to make the invisible visible—to do the work of letting us see both the waste and its solution. We meet both at the same time, shake both hands, understand the problem alongside the solution, instead of sitting with the material of the waste at all.



COVRA’s exterior. (COVRA).



Inside COVRA’s facility. Note the tapestries on the walls—this is on a section of the site’s website titled “The Art of Preservation.” (COVRA).

Author and scholar Robert Macfarlane, in the last chapter of *Underland*, visits Finland’s Onkalo Spent Nuclear Fuel Repository, a facility similar to COVRA.¹⁷ Onkalo, meaning “hiding place” or “cave” in Finnish, when filled to capacity, will hold 6,500 tons of spent nuclear waste, securely, for at least 100,000 years. (Macfarlane 2019: 402).

Macfarlane makes clear that the most feasible solution the nuclear industry and collaborating powers have come to is “burial.” (Macfarlane 2019: 402). COVRA’s website concurs— “according to the current state of science and technology, storage of this long-lived waste in stable geological layers in the deep underground is the only solution to ensure the waste will still remain out of the human living environment after thousands of years.” COVRA, unlike Onkalo, is not intended to be a place of final, permanent burial. Instead, it will operate for a century before the waste stored there is transported to another, more secure location deep in the

¹⁷ For more information on Onkalo, see *Into Eternity*, a Danish documentary on the facility that outlines the construction of the site and how they planned to store waste. (Madsen 2011).

ground. The exhibits in Onkalo mirror those at COVRA and even Diablo Canyon and the PG&E Education Center. Macfarlane is struck by the soundscape of the space, reinforcing Paris' point that these buildings, these visitors centers, become “art-visuals” in themselves. They inscribe worlds with their making. When he's in the bathroom, Macfarlane notices that, “there is no piped music but there is piped birdsong. People piss to the calls of nuthatches, or perhaps they are tree-creepers.” (Macfarlane 2019: 402). High-definition photographs of forest vistas cover the walls, and Macfarlane's interlocutor and tour guide at Onkalo, Pasi, points him toward a special exhibit—“a life-size model of Albert Einstein sitting behind a desk, pen in hand. “‘See who's here!’ says Pasi, leading me to Einstein.” (Macfarlane 2019: 404). He's told by Pasi to push a button, and “Einstein's upper body lurches towards [him] and stops with a jerk that dislodges the right-hand half of his grey moustache, which droops slowly over his upper lip. A recorded voice that I do not take to be Einstein's begins to speak to us in Finnish.” (Macfarlane 2019: 404).



Host giving first ever tour to the UK's Sky News in one of Onkalo's tunnels. (Nuclear Waste Services 2022).

The Best Kind of Waste.

Macfarlane and others writing about nuclear waste repositories fall into the same trap that I did, initially excited about such a project. The conversation to be had about the time scales that nuclear waste fundamentally requires us to think with is just too interesting to not focus our energy on. Though not exactly celebrating nor fearing nuclear energy, Macfarlane’s language speaks to Hecht’s critiques of the ways and routes that conversations about waste can take—”The most dangerous waste (....) - the toxic and radioactive spent fuel rods from reactors - requires even more secure burial: a special funeral and a special tomb. We have only ever attempted to construct a few such high-level waste repositories.” (Macfarlane 2019: 401). Nuclear waste belongs underground, far from what we perceive as life, and in the act of burying it, Macfarlane relates the material to a body necessitating a funeral, a tomb. When he reaches the lowest level of Onkalo’s many floors of ready-to-go waste repositories, Macfarlane writes that “an arched side tunnel sides off the terminal chamber. The tunnel’s floor is flat and screeded.¹⁸ Sunk into that floor are two cored-out cylindrical spaces. These are burial holes awaiting their bodies.” (Macfarlane 2019: 415). Here, I believe, is where we can start to really understand what Paris means when she says that nuclear waste is “the best kind of waste.”

The mystical elements of nuclear waste—the questions it forces us to ask about time, space, and ourselves—allow its elevation above its material state, a move that its near-invisibility easily allows. Hecht’s indictment of “waste fetishism” is an indictment of taking away burden from waste, of piecing apart an entangled mass, looking for the projectable, mysterious, exciting, and “best” metaphysical components. I saw this reflected in how my interlocutors spoke about the material of radioactive waste. For Paris, it did not need to be a burden.

¹⁸ This word refers to a floor that is made level with a straight edge moving back and forth.

We don't have a national repository. Yucca Mountain was a failed project to begin with - it was going to fail. Before we can get to a repository, people need to know what the waste is. It's a very scary thing, of course, you hear from the Navajo nation about uranium mining for the weapons program. It was just a mismanagement back in the 60s. We don't want to burden people, but it doesn't need to be a burden. I would want that more than a gas plant or even a freeway, to live near.

The idea that waste does not need to be a burden clicks in perfectly with the puzzle of climate change no longer needing to be a burden for the general public to worry about. In a podcast episode, "Beyond Fear: How to Talk About Nuclear Waste," guest and nuclear advocate Tay Stevenson says that many people are just trying "to do whatever they want to do without feeling like the sky is falling on them." (Deep Isolation 2022). Nuclear power, in offering a world with abundant energy, requires prospective followers to imagine a future where they expend *no* energy worrying about climate change. In setting up these varied scales at which to think with—at once both immediate and infinite—the contemporary nuclear movement also seeks to tightly control our scales of concern and care for the world around us.

The construction of an immediate, close-knit, consolidated family unit grew alongside and within the nuclear age. "Nuclear" referred to the "nucleus" —the idea implying that immediate family was to be the center of one's life and of one's concern, however, the "nuclear family" also played a crucial role in the atomic panic of the 50s and 60s. The idea of attempting to control fear and chaos, devised by atomic leadership and government protocol, was instrumental in creating the scale at which one should be expected to care. If something happened, you were to know exactly where your parents were, your children were, your siblings were—no one else. Resistance against panic necessitated the structure of the nuclear family. My work with the Mothers and advocates from other groups brings me to the question of what scales

of concern are framed as possible by the contemporary nuclear lobby. What nuclear families are in the making today?

Nuclear Families.

In the decades that have passed since the height of the Cold War and atomic fear, we've seen climate change rise as a prevalent cultural fear, yet arguably with less mobilizing power. My interlocutors and many eco-modernists are of the belief that climate despair is radically immobilizing, and nuclear advocates argue that people are much more willing to take action if they support nuclear power for economic reasons and not environmental ones. (Deep Isolation 2022). Thinking about the world through waste alerts us to the interconnectedness of lives. It asks us to care for those we cannot see, and never can. Political theorist Sabu Kohso in his fantastic book, *Radiation and Revolution*, reaches to define the worlds that are created by this interconnected, irradiated world, arguing that, in spite of a tight-knit, “nuclear” family, radioactive waste gives rise to, “a *radioactive crowd*.” (Kohso 2020: 2). Kohso uses this phrase to bring attention to the effect of waste, production, and warfare—radioactivity—as well as turn the family into a *crowd*. This shift puts into practice another theory of Kohso's—that to live means constant remaking, reordering, destroying, and renewing. That to live, is to live *life-as-struggle*. This idea implies a radical break from nuclear interpretations of the family, in that, as Kohso refers to the nuclear industry and its allies as the “nuclear regime,” arguing that

friends who are developing ways to protect themselves from radionuclides and confronting the power over that which seeks to control their distribution (...) are telling themselves: ‘Stop thinking of yourself as an ego in order to live a flow, a set of flows in relation to other flows, outside of oneself and within oneself...The soul as the life of flows is the will to live, struggle, and combat.’ (Kohso 2020: 15).

Kohso argues, here, that to confront these systems of control and irradiation, people are seeking ways to reframe the way they see themselves—to live, struggle, and combat, as only one in a greater world of others who are, likewise, living, struggling, and combatting.

LeGuin writes something similar in her essay, that “persevering in one’s existence is the particular quality of the organism; it is not a progress towards achievement, followed by stasis, which is the machine’s mode, but an interactive, rhythmic, and unstable process, which constitutes an end in itself.” (LeGuin 1982: 12). Toxicity *also* shifts and permeates; rhythmically, interactively, and with instability. In this way, there is an odd sense of similarity between the permeation of toxicity and the permeation of relationships, of community, and of life. It puts into question the utopian ideal of a future free from worry.

Waste scholar Heather Davis writes on the future of reproduction in an increasingly plasticized world in her essay, “Toxic Progeny.” Plastic, like nuclear waste, will “outlive us.” It, too, is becoming increasingly invisible, infiltrating our bodies and fundamentally putting into question what the bounds of our bodies really do look like. This also extends to expanding circles of care and the model of the nuclear family—Davis argues that these ways of thinking are inherently queer—to care “not just about the individual, the family, or one’s descendents, but about the Other species and persons to whom one has no immediate relations.” (Davis 2015: 232). Davis writes on this confusing dynamic—

As plastic enters directly into our water stream, there is an inadvertent allegiance between certain forms of queerness and the petrochemical industry. Plastics contribute to queerness, causing mutations and inhibiting sexual reproduction. Some of the effects of reproductive toxicity that arise due to the prevalence of plastic in the environment enact a queering of the body. As Max Liboiron asks: ‘Is feminization of male fetuses abnormal, or even pathological? Is it a form of harm? The lesbian, gay, bisexual, transgender and queer community has argued that it is not. So, too, has the chemical industry.’ Here, the strange allegiance between queer forms of life and the life form of plastic comes into stark relief. (Davis 2015: 237).

There is something odd and blatantly uncomfortable in the idea that toxicity and harm are “queering” bodies. The argument that queer bodies, specifically trans bodies, are “contaminating forces” is pervasive and harmful enough. However, what Davis is pointing to is that living with permeating, weaving toxicity— something that fundamentally rearranges the objects we determine to be the most important (like reproduction) —is asking us to, likewise, rearrange our own lives. Uncomfortably. This is a reaction to living in an increasingly contaminated world—one in which “the debts that we accumulate always demand to be repaid, with interest, and in this case the payment will be of the flesh.” (Davis 2015: 234). Nuclear advocates and nuclear industry ask us to sit back and accept irradiation. After all, we can’t really fight it, can we?

We see this in Isodope’s work, and we see this in Bassem Saad’s 2022 film, “Kink Retrograde,” in which a performer wears a hazard suit unzipped to reveal bondage gear, as he stretches out over a landfill. The question being—is not a form of kink, desiring to put yourself in harm’s way, to live and enjoy yourself in an irrefutably toxic world? Is this what we do, then? Accept our worlds as they are and try to enjoy ourselves while we still can? Again, this brings in Heather’s question—that in enjoying with toxicity there is a strange allegiance made between the intoxicated and the intoxicator. Looking into history, working against forms of organized forgetting, and plainly trying our best to *remember*, I believe are tools that are available to us to disrupt this complicated, uncomfortable dynamic.

Nuclear power, and its promise of containing climate change requires little of its followers. That is a massive part of its draw. Paris was open in this admission—she (and many eco modernists) argue that any solution that asks you to change your life in any marked way is asking too much.

There's these flex alerts [in California] like... 'reconnect with your dad and go outside!' Who the hell are you? Do my laundry at 9pm? I live in an apartment complex. Quiet hours are at 10. I can't do that. It's so out of touch. For the image we're trying to portray with California progressiveness...that ain't it, baby. That's just not it.

Paris' humor here is another example of what makes her so good at her job. Imagining a notification asking you to reconnect with your father instead of watch HBO on your computer, insinuating that California is trying too hard to wear it's green on it's sleeve—it all made me feel like part of a larger conversation, like I was being let in on criticism that I hadn't even thought to have. Paris' point is one that would make sense to almost anyone she's speaking to—"Why would [we] want to return to a time of using less when there is an option for more? That's what it is. I will conserve when there isn't an option, but there is, and we're not deploying it." *Why not more? Why not progress? Why not move forward?* This is further exemplified by the fact that the Mothers and others, in our conversations, failed to mention any process that took place *before* Diablo Canyon. Meaning, the complicated, contaminated stories of uranium mining were *never* mentioned.¹⁹ That conversation is one that, it seems, has not been adopted as one that needs addressing as of yet by pro-nuclear advocates. Again, the temporal, future weight of the waste overrides, overcoming any previous burden.

What struggle do we expect to live with? What burden do we want to carry? What does always looking toward the future give us to work with in the present? And what toxicity should we expect in our bodies? Is that not, too, a burden to carry?

Kohso shares a story. In the decade since Fukushima's nuclear disaster, he first saw his friend chant "a better world is possible!" when she would protest changing regulations on radionuclide levels acceptable in food. That mission, that message - a better world is possible -

¹⁹ The only mention during my interviews of uranium mining practices/controversies was during a conversation with Paris, and the quote in which she mentioned the issue is on page 89. And even then, it was deemed "mismanagement." That brief mention is the only time I've heard a pro-nuclear advocate mention uranium mining.

speaks to a hope that anti-nuclear and environmental advocates can hold hands in proclaiming. But it also can be co-opted, used by capitalist endeavors. Absorbed by a monster that will not stop eating. For Kohso and other scholars studying the place of contemporary nuclear energy, the future that is sought by current nuclear regimes is one that replaces a *carbon*-powered capitalist ideology with a *nuclear*-powered capitalist ideology. (Kohso 2020, 87; Munster and Sylvest 2015: 806). Naomi Klein’s fundamental work on disaster capitalism—the idea that capitalism will take advantage of the sheer destruction of large-scale disaster at any cost—is referenced time and time again in *Radiation and Revolution*. This process, in a nuclear context, shows exactly how the nuclear industry and its friends are learning to believe in a future too.

“Assuming that the situation must be a disastrous crisis for the economy, still we also know that capitalism is in principle a movement that ceaselessly creates new occasions for greater investment by actively involving disaster, contamination, immiseration, war, and everything that disrupts the previous cycle of its reproduction in order to articulate a new one.” (Kohso 2020: 88). The nuclear future would require changed minds, but that is no issue for an energy source powering a movement that demands no attempt to question or remember the events, non-events, and intoxication that has brought it to this place.

Kohso’s friend chants something different now, in seeing how even fighting for a better future has been absorbed by the monster that has never known when to stop. Now, when she demonstrates, she chants “stay with the trouble.”²⁰ Nuclear energy is sublime. It asks us to believe in infinite power with no cost. Or, more accurately, a cost that has already been accounted for, “taken care of.” Fuel the size of a gummy bear. Tombs for the bodies of waste we

²⁰ Kohso implicitly references, here, Donna Haraway’s 2016 book, *Staying with the Trouble: Making Kin in the Chthulucene*. That text showed up again and again in the thinking of the scholars I referenced in this project, and it made me feel like all the pieces, all the text I was reading, connected in this specific, powerful way. This is also the message of the late Trouillot’s work—searching for silences and doubly looking for places where we have already invited the past into our currents, is essential.

bury. There is no possibility of escape, but that does not mean that we must be immobilized. We should not be burdened with the truth of the permeation and material reality of the waste we create, but that does not mean we need to live in constant despair. Life-as-struggle advocates for turning toward the material of waste and understanding that the catastrophes that have been created *are* never-ending. The perfection of women-infused ecomodernism is a monumental ideology to push up against. It promises so much, accounts for so much, seems to fight for so much. What would it do to ask ourselves what a group is promising to change? What, base-line, would change in a nuclear-powered America? In a nuclear-powered Global North? In a nuclear-powered world? What is not met and what is prioritized? Where are the places that we, ourselves, can “stay with the trouble?”

The boundaries of our world are inherently put into question by radiation. Something that can move through your body, without you ever knowing, causing damage you will never acutely truly feel, is undoubtedly spectral. We only ever see or feel its shadow, its phantom presence. But we still, we always still, pay a price. The question, then, becomes—in what currency, and with whose lives, do we pay the price for living as we do?

Bibliography

- Arnold, Taylor. “Hi, i’m dr. arnold. I help parents make food fun so your kids eat more veggies and don’t obsess over sweets.” *Growing Intuitive Eaters*. Accessed April 30, 2023.
<https://growingintuitiveeaters.com/>
- Adams, Tracey. *Diablo Canyon Family Open House*. Photograph. 31 May, 2008. Flickr.
<https://www.flickr.com/photos/bikracer/2542010478/> accessed May 2, 2023.
- Aronoff, Kate. “The Climate Case for Rationing.” *The New Republic*, March 3, 2023.
https://newrepublic.com/article/170914/climate-case-rationing?utm_medium=social&utm_campaign=EB_TNR&utm_source=Twitter#Echobox=1677862345
- Baker, David R. “Diablo Canyon shutdown ends up costing PG&E customers after all.” *SFGate*, October 27, 2016.
<https://www.sfgate.com/business/article/Diablo-Canyon-shutdown-ends-up-costing-PG-E-10418153.php#photo-11653660>
- Beaver, William. “The Demise of Yucca Mountain.” *The Independent Review* 14, no. 4 (2010): 535–47. <http://www.jstor.org/stable/24562052>.
- Beckrich, Amanda. “The Green Room: The Pros and Cons of Nuclear Energy.” *The Science Teacher* 80, no. 3 (2013): 10–10. <http://www.jstor.org/stable/43557693>.
- Benford, Gregory. *Deep Time: How Humanity Communicates Across Millennia*. New York: Avon Books, 1999.
- Berliner, Uri. “Why even environmentalists are supporting nuclear power today.” *NPR*, August 30, 2022.
<https://www.npr.org/2022/08/30/1119904819/nuclear-power-environmentalists-california-germany-japan>
- Birkett, Tomoki. “Queered Ruptures: The Politics of Anti-irradiation Maternalism in the TEPCO Nuclear Disaster, Kokutai, and Hentai.” *Platypus: The CASTAC Blog*, February 10, 2022.
<https://blog.castac.org/2022/02/queered-ruptures-the-politics-of-anti-irradiation-maternalism-in-the-tepco-nuclear-disaster-kokutai-and-hentai/>
- Cavanagh, Ralph. “Op-Ed: We don’t need Diablo Canyon’s nuclear power to prevent summer blackouts.” *Los Angeles Times*, August 18, 2022.

<https://www.latimes.com/opinion/story/2022-08-18/diablo-canyon-nuclear-plant-extension-2025-newsom-mistake>

Chow, Jeremy and Sage Gerson. “Wasted: Wastewater, Hygiene Theatrics, and Contaminated Imaginaries.” *Lateral: Journal of the Cultural Studies Association* 11, no. 1 (2022).
<https://csalateral.org/issue/11-1/wasted-wastewater-hygiene-theatrics-contaminated-imaginaries-chow-gerson/>

Cram, Shannon. “Living in Dose: Nuclear Work and the Politics of Permissible Exposure.” *Public Culture* 28, no. 3 (2016): 519-539. <https://doi.org/10.1215/08992363-3511526>

The Chris Cuomo Project, “Is nuclear power green? | Nuclear Roundtable #2 - The Chris Cuomo Project.” YouTube Video, 57:05. February 28, 2023. https://youtu.be/gxrD_gWwPpY

Curtis, Richard and Elizabeth Hogan. *Perils of the Peaceful Atom: The Myth of Safe Nuclear Power Plants*. New York: Doubleday & Company Inc., 1969.

Davis, Heather. “The Domestication of Plastic.” in *The 3D Additivist Cookbook*, edited by Morehshin Allahyari and Daniel Rourke. 2017. <https://additivism.org/cookbook>

Davis, Heather. “Future imaginaries for when the world feels like heartbreak.” *TAKE ecology* 1, no. 3 (2017): 14-16.
https://heathermdavis.com/wp-content/uploads/2017/02/Take-January-2017_HD.pdf

Davis, Heather. “The Land and Water and Air That We Are: Some Thoughts on COP 21.” SFAQ, March 15, 2016.
<https://www.sfaq.us/2016/03/the-land-and-water-and-air-that-we-are-some-thoughts-on-cop-21/>

Davis, Heather. “Toxic Progeny: The Plastisphere and Other Queer Futures.” *philoSOPHIA* 5, no. 2 (2015): 231-250.
<https://www.sv.uio.no/sai/english/research/groups/anthrotox-anthropology-of-toxicity-/2020.03.18%20Toxic%20Politics/Davis.Toxic%20progeny.pdf>

Davis, Zachary Evan. “The Need for a New, Clear Option: An In-Depth Analysis of Nuclear Energy.” *Consilience*, no. 13 (2015): 217–45. <http://www.jstor.org/stable/26427280>.

Deep Isolation. “Beyond Fear: How to Talk About Nuclear Waste.” YouTube Video, 38:14. October 27, 2022. <https://youtu.be/-AdH5AEybHQ>

- Derrida, Jacques, Catherine Porter, and Philip Lewis. “No Apocalypse, Not Now (Full Speed Ahead, Seven Missiles, Seven Missives).” *Diacritics* 14, no. 2 (1984): 20–31. <https://doi.org/10.2307/464756>.
- “An Ecomodernist Manifesto.” Ecomodernism.org. 2015. <http://www.ecomodernism.org/>
- Eschle, Catherine. “Gender and the Subject of (Anti)Nuclear Politics: Revisiting Women’s Campaigning against the Bomb.” *International Studies Quarterly* 57, no. 4 (2013): 713–24. <http://www.jstor.org/stable/24014644>.
- Figuroa, Marya. *The nuclear fueled Diablo Canyon Power Plant — in San Luis Obispo County, California*. Photograph. 26 April, 2005. Flickr. <https://www.flickr.com/photos/35237093637@N01/11040625>
- Follett, Andrew. “New Red Tape Makes New Nuclear Reactors ‘Impossible.’” *National Review*, January 29, 2023. <https://www.nationalreview.com/2023/01/new-red-tape-makes-new-nuclear-reactors-impossible/>
- Gellar, Jacob. “Fear of Depths.” YouTube Video, 30:14. April 10, 2020. <https://youtu.be/7MOKTU9tCbw>
- Hamblin, Jacob Darwin. “Fukushima and the Motifs of Nuclear History.” *Environmental History* 17, no. 2 (2012): 285–99. <http://www.jstor.org/stable/23212578>.
- Hannabach, C. *Blood and the Bomb: Atomic Cities, Nuclear Kinship, and Queer Vampires*. In: *Blood Cultures: Medicine, Media, and Militarisms*. Palgrave Macmillan, New York, 2015. https://doi.org/10.1007/978-1-137-57782-5_5
- Hayes, D. *Nuclear power: the fifth horseman*. United States: Worldwatch Institute, 1976. <https://inis.iaea.org/search/searchsinglerecord.aspx?recordsFor=SingleRecord&RN=8281730>
- Hodgson, Mike. “Open letter seeks support for Clean Tech Innovation Park at Diablo Canyon site.” *Santa Ynez Valley News*, May 6, 2022. https://syvnews.com/news/local/open-letter-seeks-support-for-clean-tech-innovation-park-at-diablo-canyon-site/article_dbd82254-511e-5c1f-9411-f06c7e5c6cb6.html
- Holgate, Laura S. H., and Michelle Dover. “Gender Champions in Nuclear Policy.” Nuclear Threat Initiative, 2020. <http://www.jstor.org/stable/resrep26350>.

- Hecht, Gabrielle. "Interscalar Vehicles for an African Anthropocene: On Waste, Temporality, and Violence." *Cultural Anthropology* 33, no. 1 (2018): 109–141.
<https://doi.org/10.14506/ca33.1.05>.
- ISODOPE, "Nuclear Skincare Routine | Radiation is Everywhere." YouTube Video, 1:18. October 21, 2022. <https://youtu.be/zHj2i0iXfNk>
- Kessides, Ioannis N. "Nuclear Power and Sustainable Energy Policy: Promises and Perils." *The World Bank Research Observer* 25, no. 2 (2010): 323–62.
<http://www.jstor.org/stable/40891378>.
- Kimura, Aya Hirata. *Radiation Brain Moms and Citizen Scientists: The Gender Politics of Food Contamination after Fukushima*. Duke University Press, 2016.
- Koen, Susan and Nina Swaim. *Ain't Nowhere We Can Run: a Handbook for Women on the Nuclear Mentality*. Vermont: WAND, 1980.
- LeGuin, Ursula K. "A Non-Euclidean View of California as a Cold Place to Be." in *Dancing at the Edge of the World*. New York: Grove Press, 1989.
https://bpb-us-e1.wpmucdn.com/sites.ucsc.edu/dist/9/20/files/2019/07/1989a_Le-Guin_non-Euclidean-view-California.pdf
- LeGuin, Ursula K. *The Lathe of Heaven*. New York: Scribner, 1971.
- LeGuin, Ursula K. *The Left Hand of Darkness*. New York: Ace Books, 1976.
- THE LINE, "Dear Alice." YouTube Video, 1:19. July 13, 2021.
https://www.youtube.com/watch?v=z-Ng5ZvrDm4&ab_channel=THELINE
- Macfarlane, Robert. *Underland: A Deep Time Journey*. New York: W.W. Norton & Company Inc., 2019.
- Madsen, Michael, director. *Into Eternity*. Films Transit International, 2011. 1:15:00.
<https://youtu.be/ayLxB9fV2y4>
- Maizland, Lindsay, and Avery Reyna. "The Fukushima Disaster Didn't Scare the World Off Nuclear Power." Council on Foreign Relations, 2021.
<http://www.jstor.org/stable/resrep31164>.

Masco, Joseph. *The Future of Fallout, and Other Episodes in Radioactive World-Making*. Durham: Duke University Press, 2021.

Masco, Joseph. *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico*. Princeton: Princeton University Press, 2006.

“Megatons to Megawatts.” Centrus Energy Corp, June 28, 2016.

<https://www.centrusenergy.com/who-we-are/history/megatons-to-megawatts/#:~:text=The%20Megatons%20to%20Megawatts%E2%84%A2,for%20American%20nuclear%20power%20plants.>

Morton, Timothy. *Hyperobjects: Philosophy and Ecology after the End of the World*. Minneapolis: University of Minnesota Press, 2013.

Munera, Ivan Lopez. “Lands of Contagion.” *e-flux*, November 2020.

<https://www.e-flux.com/architecture/sick-architecture/363717/lands-of-contagion/>

Munster, Rens van, and Casper Sylvest. “Pro-Nuclear Environmentalism: Should We Learn to Stop Worrying and Love Nuclear Energy?” *Technology and Culture* 56, no. 4 (2015): 789–811. <http://www.jstor.org/stable/44017053>.

Nordhaus, Ted, Alex Trembath, Thia Bonadies, and Sean Trambley. “A New, Safe Normal: Breakthrough Dialogue 2021.” *The Breakthrough Institute*. April 30, 2021. <https://thebreakthrough.org/articles/a-new-safe-normal>

Nova, Nicolas and Disnovation.org, eds. *A Bestiary of the Anthropocene*. Onomatopoe, 2021.

Nuclear Waste Services. “NWS hosts Sky News visit to world’s first GDF in Finland.” *GOV.UK*, October 18, 2022.

<https://www.gov.uk/government/news/nws-hosts-sky-news-visit-to-worlds-first-gdf-in-finland>

Palladium Editors. “The Future History of the Nuclear Renaissance with Isabelle Boemeke.” *Palladium: Governance Futurism*. September 21, 2022.

<https://www.palladiummag.com/2022/09/21/the-future-history-of-the-nuclear-renaissance-with-isabelle-boemeke/>

Rafferty, Kevin, Jayne Loader, and Pierce Rafferty, directors. *The Atomic Cafe*. 1982. 1:26:37.

<https://youtu.be/i9xQTJ-kbUk>

- Reay, Barry. "The Transsexual Phenomenon: A Counter-History." *Journal of Social History* 47, no. 4 (2014): 1042–70. <http://www.jstor.org/stable/43308827>.
- Roth, Sammy. "Biden gives PG&E \$1 billion to keep the Diablo Canyon nuclear plant open." *Los Angeles Times*, November 21, 2022. <https://www.latimes.com/business/story/2022-11-21/biden-gives-pge-1-billion-to-keep-diablo-canyon-nuclear-plant-open>
- Rott, Nathan. "California lawmakers extend the life of the state's last nuclear power plant." *NPR*, September 1, 2022. <https://www.npr.org/2022/09/01/1119778975/california-lawmakers-extend-the-life-of-the-states-last-nuclear-power-plant>
- Saad, Bassem, director. *Kink Retrograde*. 2022. 3:45. <http://www.bassemsaad.com/kink-retrograde>
- Saint-Amour, Paul K. "Queer Temporalities of the Nuclear Condition." in *The Silence of Fallout: Nuclear Criticism in a Post-Cold War World*, edited by Michael Blouin, Morgan Shipley, and Jack Taylor, 59-80. Cambridge: Cambridge Scholars Publishing, 2013.
- Schaffer, Guy. "Queering Waste Through Camp." *Discard Studies*, February 27, 2015. <https://discardstudies.com/2015/02/27/queering-waste-through-camp/>
- Shrader-Frechette, Kristin. "Answering 'Scientific' Attacks on Ethical Imperatives: Wind and Solar Versus Nuclear Solutions to Climate Change." *Ethics and the Environment* 18, no. 1 (2013): 1–17. <https://doi.org/10.2979/ethicsenviro.18.1.1>.
- The Solarpunk Community, "A Solarpunk Manifesto." *Regenerative Design*. <https://www.re-des.org/a-solarpunk-manifesto/>
- Solnit, Rebecca. *Savage Dreams: A Journey Into the Hidden Wars of the American West*. Oakland: University of California Press, 1994.
- Solomon, Marisa. "'The Ghetto Is a Gold Mine': The Racialized Temporality of Betterment." *International Labor and Working-Class History* 95 (2019): 76–94. doi:10.1017/S0147547919000024.
- Specht, Mark. "Countdown to Shutdown: California's Clean Energy Future after Diablo Canyon Closes." Union of Concerned Scientists, 2021. <http://www.jstor.org/stable/resrep29543>.

TED. “Nuclear Power is Our Best Hope to Ditch Fossil Fuels, Isabelle Boemeke, TED.” YouTube Video, 11:44. September 19, 2022. <https://youtu.be/ESAaz9v4mSU>

Tracinski, Robert. “Prometheus Unbound.” *Discourse: Where Ideas Meet*, March 2, 2023. <https://www.discoursemagazine.com/ideas/2023/03/02/prometheus-unbound/>

Trauth, K. M.; Hora, S. C. & Guzowski, R. V. “Expert judgment on markers to deter inadvertent human intrusion into the Waste Isolation Pilot Plant.” November 1, 1993; Albuquerque, New Mexico. (<https://digital.library.unt.edu/ark:/67531/metadc1279277/>: accessed May 2, 2023), University of North Texas Libraries, UNT Digital Library, <https://digital.library.unt.edu>; crediting UNT Libraries Government Documents Department.

Trembath, Alex. “On the Differences Between Ecomodernism and Effective Altruism.” *The Breakthrough Institute*, December 5, 2022. <https://thebreakthrough.org/issues/food-agriculture-environment/on-the-differences-between-ecomodernism-and-effective-altruism>

Tsing, Anna. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press, 2015.

Tuhus-Dubrow, Rebecca. “The Activists Who Embrace Nuclear Power.” *New Yorker*, February 19, 2021. <https://www.newyorker.com/tech/annals-of-technology/the-activists-who-embrace-nuclear-power>

Patel, Sonal. “Atoms and Influence.” *The Breakthrough Institute*, November 28, 2022. <https://thebreakthrough.org/journal/no-18-fall-2022/atoms-and-influence>

Yulish, Charles B., Thomas L. Neff, and Donald Kennedy. “Assessing the Megatons to Megawatts Program.” *Science* 295, no. 5564 (2002): 2368–70. <http://www.jstor.org/stable/3076138>.

Wills, John. *Conservation Fallout: Nuclear Protest at Diablo Canyon*. Reno: University of Nevada Press, 2006.