

Indigenous Futures Amidst Settler Disposal in Yawn Mosir¹

ann-elise lewallen, University of Victoria

Nuclear Timescales: Settlers, Ainu, and Radionuclides

Settler | “In 50 years, or even 30 years, none of us will be here. And so, we know the nuclear waste facility won’t affect us. This process to assess our town’s history, and the geology of Suttsu, will not pose any risk to us. Most of us will be gone in the next 30 years, and so this thing [nuclear waste] has nothing to do with us.” (Wajin settler in Suttsu, 2023).

Ainu | “In the past this vast Hokkaido was our ancestor’s world of freedom. Living with ease and pleasure in the manner of innocent babes in the embrace of vast, beautiful nature, they were truly the beloved children of nature. Oh, what happy people they must have been.” Chiri left this world at the young age of 19, but her words, enshrined in the Foreword to *Ainu Songs of Gods*, the epic volume she compiled and translated, remind us of our relations with *kamuy*. For us living in Ainu Mosir (present-day Hokkaido), we humbly receive nature’s bounty and live in this land’s abundance in this land. But today, this discussion of ‘nuclear waste’ is a very serious problem. Even if I live a long life, I have perhaps another 30 years. However, my daughter, nieces, nephews, and then, their children. The cries of a newborn infant and the futures awaiting yet unborn children. Many children’s future lives are yet unknown, and possibilities await them. (Ainu artist reaching out to fellow Ainu, October 2021)

Radionuclides | Uranium-235 has a half-life of over seven hundred million years; the half-life of Uranium-238 is 4.5 billion years; and plutonium-239 has half-life of 24,100 years. Among these, plutonium is by far the most hazardous for living organisms.² Nuclear waste stored in vitrified glass vials (one of the favored technologies for management of High-Level Nuclear Waste (HLNW), is potentially lethal to humans after only 20 second of exposure. Detoxification of that waste requires 100,000 years.³ In the interim, competent management of this high-level nuclear waste is an urgent task to protect the health and security of not only humans, but all living creatures in the world. Moreover, “nuclear competence” requires that this waste be managed and stored securely for more than 100,000 years (Jacobs 2022, 214-217). As an indicator of this risk, radionuclides deposited from Cold War nuclear

¹ “Yawn Mosir” is the geographical designation and Ainu term for their homeland in settler-occupied Hokkaido prefecture, in Japan. Many Ainu refer to their ancestral homeland as “Ainu Mosir” (Land of Humans) in contrast to “Repun Mosir” (Land of Ocean). Here I use Yawn Mosir to signal Hokkaido’s position vis-à-vis its regional neighbors in Russia, China, and Japan.

² Lifetime exposure limits for plutonium are 0.5 micrograms, according to the US Centers for Disease Control guidelines.

³ To be clear, plutonium requires 100,000 years for reduced radioactivity but uranium remains dangerous for more than a million years. Plutonium is far more toxic for living organisms than uranium, however.

testing in the Antarctic and Arctic regions have recently begun to migrate as global warming hastens the melting of glaciers, thus triggering a second wave of environmental contamination from the original tests (Clason et al, 2019 cited in Jacobs 2022). What kind of unanticipated redistribution pathways might be imagined for nuclear waste contained within Deep Geological Repositories, some 10,000 or even 50,000 years from now, after they have been sealed and forgotten?

it is difficult to conceptualize how we might meaningfully grapple with waste which remains extremely toxic for nearly 5 billion years

Learning “Deep-Time Reckoning”

Thinking through nuclear temporality compels us to stretch our imaginative capacities to envision how these human timescales, settler and AINU futurity, intersect with nuclear timescales. Given the atrophied attention spans and overall distractedness of post-industrial 21st century humanity, it is difficult to conceptualize how we might meaningfully grapple with waste which remains extremely toxic for nearly 5 billion years. The myopia of the first group – who say that they are not concerned about what happens underneath their hometown after their deaths – speak to what anthropologist Vincent Ialenti refers to as “short-termism” (Ialenti 2020, 1). Human activity in producing and consuming fossil fuels has now exerted a substantial geological impact on the planet, resulting in a new epoch which scientists have defined as the Anthropocene.⁴ As we rush headlong toward false climate solutions such as nuclear power transition to prevent future climatic damage, we are now stumbling toward new crises of disposal futures generated therein. Thus these “climate solutions” require us to expand our imaginative boundaries – and capacity to manage the repercussions of these choices – well into the hundreds of thousands of years in the future. Anthropologist Ialenti, who conducted ethnographic fieldwork with Finnish scientists involved in the planning of Okiluto (Finland’s nuclear waste facility), argues that we should situate *temporality* as a cultural practice, to understand how myriad cultural communities engage with “time-reckoning,” by considering scale, duration, and intervals of time management (cf. Evans-Pritchard 1939 cited in Ialenti 2020: 3). In order to engage with the wicked problem of nuclear waste, Ialenti suggests we begin to adopt a “*deep-time reckoning*” model that

⁴ The concept of the “Anthropocene” has been met with significant pushback from communities in the Global South and low-carbon emitters who assert that their small carbon footprints have contributed minimally to humanity’s impact on the earth’s geology. Indeed, it is important to differentiate between “Humanity” and the many fragmented “humanities” who struggle with these burdens. My attempts to consider different groups of settlers and Indigenous AINU perspectives in this essay push us to decouple the idea of universal and collective human responsibility from a shared burden toward a more complex and differentiated set of Land relations, which reflects our specific and situated knowledge (cf. Haraway) of place, ancestors, care for the land, and more. Anthropocene theorizing has predominantly focused on the challenge of climate crisis, nuclear waste poses a similar type of geology-altering threat since much of it will be entombed 300 to 350-meters below the earth’s surface in Deep Geological Repositories across nuclear nations.

confronts these unfathomable time scales as actual, actionable, real-world challenges. Further, if time-reckoning is understood as a cultural practice, then “deep time reckoning” can be learned. And thus, adopting a perspective of “deep time reckoning,” requires that humans “begin to *think in geological timescales*” (Ialenti 2020: 2) The physical reality of radionuclides is that once they have been released, they cannot be disposed of or diminished, they can merely be relocated from one location to another, until they slowly shed radioactivity over time (Jacobs 2022; Ramana 2012). Humans can attempt to contain radionuclides within high-tech glass vials encased in bentonite, or dry cask storage, or in sealed underground tunnels, and/or embed them in the ocean floor. However, given the instability of the oceans (sea level rise, glacial melt, ocean acidification and warming), and the instability of Japan’s geology (no stable bedrock suitable for burying nuclear waste in the archipelago), human capacity to control nuclear waste’s future mobility is limited. We cannot argue with radionuclides and convince them to stay put in a sealed location. Once moisture breaches the inside of any one of these storage facilities, there is a possibility these nuclides will be released into the surrounding ecosystem (cf. Ono 2021, cf. Zabarte 2016).

Settler Temporality and Energy Futures |

In August 2020 the shrinking Hokkaido town of Suttsu volunteered to host northern Japan’s most radioactive nuclear waste in a subterranean facility, for perpetuity. Suttsu (寿都町 population: 2,771) was not alone. A second tiny village, Kamoenai (神恵内村 population: 904), had also offered to conduct the first stage of the feasibility study.⁵ Residents in Suttsu were shocked to wake up to the news that their mayor, Mayor Kataoka, had volunteered his town to host a nuclear waste storage facility, or more accurately, for phase 1 of the site feasibility study. Suttsu is well known in the region for its embrace of renewable energy, and Mayor Kataoka had demonstrated leadership in the region by constructing a fleet of wind power turbines (Ono 2021). Given his longstanding support for renewables, Suttsu and Hokkaido residents could not understand this sudden shift.

In the months that followed, Suttsu residents learned that the proposed facility was known as a Deep Geological Repository, it would be tunneled 300-meters below the town, and this underground facility would serve as the final resting site for roughly half of the nation’s most radioactive nuclear waste, with the technical designation High-Level Nuclear Waste (HLNW). Together with spent fuel from Japan’s nuclear reactors, the proposed facility would also house high-level nuclear waste from the hobbled Fukushima nuclear reactors. Reportedly, the type of waste that would be hauled to the facility would continue to emit harmful radiation for at least 100,000 years (Hokkaido

⁵ A third contender emerged to host nuclear waste in August 2023, the town of Tsushima in Nagasaki Prefecture, also known as Dokdo or Daemado in Korean, which has long been disputed between Japan and Korea. Tsushima Town’s interest in generating revenue through the waste feasibility study, has raised concerns among S. Korean anti-nuclear campaigners. In September 2023, Tsushima’s mayor, Hitakatsu Naoki, chose to opt out of the feasibility study (Japan Times, Sept. 27, 2023)

Shimbun 2022a). According to observers, Kataoka was frustrated that his proposals to host some of Japan's most innovative offshore wind power plants, had been ignored by the central government (Yamada 2023). Local activists narrated how he had attempted to cause a stir among government ministries by abruptly recruiting the nuclear waste project. In the same region, Hokkaido's only nuclear plant, the Tomari nuclear station (3 reactors, 2 on MOX fuel) had been in cold shutdown since 2011, in part due to geologists' discovery of several new fault lines (Ono 2021). Citizens and scientists have since questioned the suitability of Hokkaido's geology for hosting nuclear infrastructures (Ono 2021). One citizen group also published an empirically-grounded pamphlet, entitled "Did you know? Eight Reasons why we cannot build a Nuclear Waste Geological Repository now" (Kōdō suru Shimin Kagakusha no Kai 2021). To be clear, most geologists agree that nowhere in Japan is sufficiently stable to store nuclear waste in subterranean regions, given the seismicity of the archipelago (Ono 2021, Jacobs 2022).

Ainu Mosir and Ainu Memory on Japan's Herring Coast |

This proposal to discard forever waste in a tunnel hollowed into the earth 300 meters underneath a shrinking village in a seismically active zone may appear desperate solution to an unresolvable problem. To grasp these relations, first we must consider resource pasts, or the histories of communities that have been proposed as refuse hosts. In 1857, Suttsu was ravaged by a smallpox epidemic and Tokugawa chronicler Matsuura Takeshiro, narrated the epidemic's impact on the town in his text *Kinsei Ezo Jinbutsu-shi* (近世蝦夷人物誌). Matsuura narrated his encounters with Suttsu's village head, Munitok. The smallpox epidemic that devastated Suttsu, was part of a larger smallpox scourge recorded as the Oshamanbe smallpox outbreak of 1857, listed in detail in Matsu'ura's *Hōsō Ikken* – [The Matter of Smallpox]. Oshamanbe is situated on the Pacific Ocean side; however, Suttsu is located on the Sea of Japan.

An Ainu village situated on the edge of the Shakotan peninsula, Suttsu was comprised of 19 households and 60 residents (and was thus considered large by the standards of the day). Tragically, smallpox took the lives of 41 people, leaving only 4 houses and 19 people. The smallpox epidemic was also a personal tragedy for Munitok, who lost his eldest daughter and his wife to the disease. But this pathogen did not arrive independently. *Payoka Kamuy* as Ainu called the smallpox kamuy, likely traveled to Hokkaido with the *wajin* fisheries managers who operated the contract fishery on the Sea of Japan. Suttsu's proximity to the nearby contract fishery – and the fact that most Suttsu residents worked at the fishery - aided its quick entry into the village. Suttsu was also located in Southern Ezo, the region bordering Wajinchi, which also served as a vector for the early transfer of the smallpox pathogen into Ezo. As Oshamambe was identified as the locus of the outbreak, Suttsu was not the only village severely impacted by the 1857 outbreak. Smallpox also spread up the Sea of Japan coast from Suttsu to Utasutsu and up to Furū. Prior to the outbreak Matsu'ura counted 27 Ainu houses in Utasutsu, 27 Ainu households in Isoya, and 26

Ainu houses (population 100) in Furū (present-day Kamoenai). While Suttsu was impacted with a catastrophic population loss due to smallpox, the other coastal towns also experienced significant population decline during this time, resulting from this epidemic. Further, in Furū, many Ainu families fled to the mountains to escape the contagion (Hirayama 2016).

It is important to understand that for the Ainu community, smallpox, viruses, and pathogens, like other human threatening entities, belonged to the pantheon of more-than-human relatives (i.e. *kamuy*). In the same manner as high-ranking *kamuy* like the Blakiston's fish-owl, the brown bear, and the fox, the smallpox *kamuy* held an important position and required proper respect and management. To limit Payoka Kamuy's capacity for ravaging Ainu communities and thus prevent catastrophic loss of life, the smallpox *kamuy* had to be placated and honored through small ceremonies which acknowledged its agency while attempting to manage its power.

As Brett Walker has argued (2001), smallpox helped push Ainu integration into 19th century global epidemiological relations. Wajin who immigrated to Hokkaido came from Japan's urban centers, and the majority had already developed immunity to dominant smallpox strains. Ainu, for their part, were being exposed to smallpox for the first time and having not yet developed natural immunity; the disease ravaged their communities. While extended families attempted to care for and treat one another if one person became ill, far too many people were abandoned when the entire village fled to the mountains if they learned of a local outbreak. According to Mogami Tokunai, a cartographer who surveyed Ezo in the late 18th century, the high death rate was in part due to the disease, and in part due to compounding factors due to the broader ecology of the disease and its impacts. Smallpox outbreaks triggered social disruption because families voluntarily isolated by separating themselves from infected villagers which did help to prevent further infection. This social disruption further impacted Ainu subsistence economies and their integration with seasonal cycles and care for the land. Those who were isolated with illness were unable to gather or prepare food for themselves. Specifically, even when those suffering from the disease were able to recover, they often lacked the capacity to hunt, fish, or gather the foods needed for survival. That is, most of the village had fled to the mountains to prevent the pathogen from reaching them. In this way, smallpox had genocidal consequences for large numbers of Ainu villagers where outbreaks are known to have occurred.

From a critical Indigenous perspective, circulation of pathogens like smallpox and other highly contagious diseases, served as a form of biological warfare which enabled settler invaders to gain a critical toehold in Indigenous territory while simultaneously decimating the population. Scholars such as Alfred Crosby, have referred to this as "ecological imperialism" (Crosby 1986) In the case of Suttsu, the devastating consequences of the 1857 smallpox epidemic opened the rich fisheries of the Japan Sea coastal regions and enabled wajin to claim control of

newly emptied villages once the Ainu managers had been eliminated. This exposed the region to wajin ecological imperialism, through claims on marine fisheries including herring, salmon, and eventually to the land as well. In the case of Suttsu, after nearly 70% of its residents were claimed by smallpox and remaining inhabitants fled to neighboring villages, Suttsu became vulnerable to wajin attempts to seize its Ainu controlled regions. Shortly after the smallpox epidemic, a wajin fisheries manager attempted to seize control of a river which fed one of the fisheries. Likewise, tension concerning conflicting ideas of the boundary between Iwanai and Furū flared up in a border dispute between two regions just north of Suttsu.

Thus, even as the disease pathogens brought social upheaval, they also threatened to bring ecosystem shift as well. A mere 12 years after the smallpox crisis, Suttsu was annexed by Japan. Ezo was annexed as Japan's newest prefecture of Hokkaido in 1869 followed shortly by Okinawa in 1879. Unfortunately, Munitok's prediction that the fisheries' managers would be "gone tomorrow" was proven wrong, as Ainu across the island found themselves subjected to a brutal settler colonial regime of assimilation and eventually, imperialization.

Nuclear Relatives |

Nuclear materials and the genome-altering radiation emitted from them have long been central to multispecies relations and narrative worlds for Indigenous peoples. Despite the hazards they pose to humans, these materials are relatives. Being in relation does not mean all relatives are well-behaved or desirable neighbors (cf. Liboiron 2021). Uranium and its cousin, radiation, do not respect the boundaries of the human body and may cause harm to humans in the surrounding area. Uranium is often described as taboo and is thus an undesirable relation in many Indigenous cultures. Australia has a bountiful supply of uranium, but Aboriginal peoples tempered its risks through placing it within the pantheon of relatives who should be respected and avoided. For the Mirrar peoples of Australia, Traditional Owners (caretakers) of the Jabiluka Uranium Mine, uranium is a giant lizard that should not be disturbed. The Kungka people of South Australia inherited knowledge about uranium from their Elders, and they understand uranium stored in the *manta* (land) as poison. As one elder explained, "We know it's poison because the old people told us. Them old people used to look after it. Because we have the water underground, we gotta fight for the land," (Emily Munyungka Austin 2015, cited in ANFA 2017). While there are many diverse Indigenous communities across Aboriginal Australia, Indigenous and non-Indigenous activists have adopted a shared language around uranium mining: Irati Wanti ("the poison, leave it"). In this way, Australian civil society has sought to manage the risk of uranium and proposed nuclear waste sites by strongly opposing any disruption of the uranium, or of the earth itself.

For the Navajo Nation in the American Southwest uranium is known as Leetso, the yellow monster. Navajo have a

long memory of co-existing with uranium long before mineral prospectors arrived in their region. Specifically, to *weaken* a hazard, or barrier to life, one must give it a name, and this enables a community to *diminish* its power (Yazzie-Lewis 2006: 2). Uranium has been christened “Leetso” (literally “Yellow dirt”). In Dine language, this term seems to mimic the name of a menacing reptile. Meanwhile, nuclear power has been christened “*nayee*” (“Monster”), or literally “that which gets in the way of a successful life” (Yazzie-Lewis 2006: 2). The name assigned to nuclear power is rooted in Navajo teachings. Based on Indigenous understandings, within Leetso, the toxic capacity of uranium yellow cake in all its material forms were tied together, and once people understood the risks of sustained interaction with Leetso when released from the earth, they strove to keep it underground. However, Leetso is a shape shifter, and its capacity to be absorbed by water, earth, and air, meant that it continued to pollute and contaminate housing as well as favored livestock watering ponds and human water sources alike (cf. Brugge 2006, Pasternak 2010) The Navajo people contributed 13 million tons of uranium ore to the US’s nuclear weapons production during the Cold War. Many Navajo people worked in the uranium mines between 1945 and 1988, and today these communities live with the legacy of more than 1000 abandoned uranium mines which have not been rehabilitated. Indeed, even today many communities continue to suffer from airborne and earthborn particles of Leetso which travel throughout these communities. The human health implications of dwelling on land where Leetso had been disturbed and unearthed continued for many decades even after health and environmental researchers had established the multiple impacts of yellow cake and uranium contaminants in harming nearby communities.

Indigenous communities experience long histories of interacting with the entire nuclear fuel chain, and in response, many have developed narratives for how to protect their communities from unnecessary exposure to radioisotopes

That is, Indigenous communities experience long histories of interacting with the entire nuclear fuel chain, and in response, many have developed narratives for how to protect their communities from unnecessary exposure to radioisotopes. For Indigenous Ainu in southern Hokkaido, there is no uranium to be mined, but there are three nuclear reactors and plans to transport and store high-level nuclear waste nearby these communities. Former Member of Parliament and Ainu language revivalist Kayano Shigeru explained how nuclear reactors are relatives in the Ainu pantheon that “cannot be controlled by human hands” (Kayano cited by Honda 2021, September 3). Kayano referred to these reactors as *Okokko Ape*, “monster fire.” The power of *Okokko Ape* cannot be reined-in by humans and thus, “we must not become dependent on them.” *Okokko Ape* resembles *Payoka Kamuy* (smallpox spirit-being) – both are powerful, high-ranking sentient beings that nevertheless, cannot be controlled. They must be managed with great caution lest they spiral out of control, and thus endanger even greater numbers of people.

Settler Dependencies |

In 2020, the mayors of Suttsu and Kamoenai offered to host the stage 1 feasibility study of the nuclear waste project, after decades of economic contraction. The area where Suttsu and Kamoenai are located, the Shiribeshi Peninsula on the Sea of Japan, has long struggled with rural depopulation, a crumbling economic and primary industry base, wherein its mining, forestry and fisheries had suffered, and its leaders desperately sought a solution. Given the urgency of revenue for the town's economic base, volunteering for a feasibility study to host a nuclear waste facility appeared a workable solution. It is possible that Mayor Kataoka volunteered for the first stage of the project, known as "document clearance," with the intention to use government subsidies to make up for municipal budget shortfalls, and then pull out of the project. However, once a rural municipality agrees to host a high-risk project like a nuclear reactor, or waste facility, it is very difficult to change course once feasibility studies have been set in motion (Hokkaido Shimbun 2021d). As scholars like Daniel Aldrich have noted, mega infrastructure projects like nuclear power and nuclear waste, incentivize local communities to host public works through subsidies. Once the subsidies begin to flow from the center to the periphery, these institute a chain of dependency. Peripheral dependency on these funds regularly flowing from the center, with few viable economic alternatives, in part due to the neoliberal commitments and realignment of central government priorities, make it nearly impossible for rural communities to extract themselves from such commitments. Moreover, as Aldrich (2008) has demonstrated, the central government has actively recruited support and nuclear hosts in communities where civil society has already collapsed. Japan's nuclear operators have a proven record of recruiting rural hosts in areas where the fisheries and agricultural cooperatives have contracted (Aldrich 2008).

Before any high-level nuclear waste facility may be constructed, a series of procedures must be followed to determine viability. These *site and feasibility studies* include a detailed review of historical documents as well as seismic activity and geological surveys. Government policies mandate Document Clearance (2 years) – during this stage the government conducts an extensive review of historical and other documents and eliminates proposed sites that do not meet the minimum criteria. The second phase is "comprehensive review" during which the government conducts borehole drilling and other geological surveys and data collection to verify site feasibility (4 years). Next, in phase 3, analysis shifts to a "precision survey" including constructing an underground facility to conduct targeted experiments. In the final phase (4), the site selection and facility construction phase, the proposed facility is constructed in the site deemed to be most suitable per the above testing. In August 2023, the Nuclear Waste Management Agency (NUMO) released its full report on phase 1 of Suttsu and Kamoenai's feasibility study. In both cases, NUMO recommended that these towns should advance to phase 2 of the study. Per municipal bylaws, both towns are mandated to conduct a citizen referendum wherein all local residents are

able to vote before any geological surveys are commenced.

Meanwhile, the Ainu community has been unable to voice its concerns about the project to central government planners. That is, there are no active branches of the Ainu Association in either community, nor on the Sea of Japan coast, until one reaches Yoichi or Ishikari. Ecosystem destruction wrought by the herring fisheries and genocidal consequences of smallpox epidemics exerted an enduring impact. Ainu activists whom I spoke with in southern Hokkaido lamented the absence of *local* Ainu voices in determining Ainu and ancestral futures and choosing how to respond to the problem of waste. A group known as the [アイヌ政策検討市民会議 \(Citizens Alliance For The Examination Of Ainu Policy\)](#) issued a petition in October 2020 arguing that the proposed nuclear facility infringed on Ainu Indigenous rights to free prior and informed consent and it should be strongly opposed as an impediment to democracy. This group also does not predominantly represent Ainu-identified voices.

In November 2021, civil society members and Ainu from across Hokkaido and Japan gathered in Sapporo to express their opposition. This was the first time for many to speak openly about the project. Anxiety about the overly politicized nature of Ainu activism and fear of intra-Ainu backlash, loss of access to cultural project budgets, or other central government support, had coerced many Ainu into silence. But as one local leader active in supporting cultural revitalization efforts expressed: “If there is any type of accident or damage from this waste facility, all of the years we have poured into cultural revival and cultural heritage will amount to nothing more than a bubble of water.” Recognizing the hazards posed by this project, leader of the Shiraoi Ainu Assoc. Yamamaru, said, “I stand here before you as one Ainu voice and as a resident of Hokkaido. Today I am speaking from the firm belief that we cannot allow nuclear waste to be transported into this land” (Hokkaido Shimibun 2021d). His stance was echoed by a group of 15 Ainu from around Japan, including activist Akibe Hideo of Akan, who noted, “We are borrowing this bountiful earth from the next generation, we need to be able to pass it forward without *wounding* it.” If the proposed nuclear waste facility is built in subterranean Hokkaido, should any radiation release incidents should occur, the potential impacts would reach far beyond the borders of these two small villages. Akibe continued, “We are borrowing this bountiful earth from the next generation, we need to be able to pass it forward without *wounding* it.” One of the keynote speakers of this gathering was elder and cloth artist Ukaji Shizue. As Ukaji expressed, the crisis of the nuclear waste proposal highlighted a broader imbalance between a profit-hungry capitalist economy, and ancestral values inherited from her own traditional culture, as taught by her elders. From Ukaji’s perspective, Mayor Kataoka had consented to building a permanent home for a “poison that cannot be erased.” Ukaji explained, “These past 50 years, 100 years, humans have prioritized economic growth and have wrecked the land, leaving the earth in a terrible condition. Here in Hokkaido nuclear power plants have been constructed creating ‘nuclear waste,’ and now the surveys to locate a final resting place for this waste have begun.

Without any knowledge of how to erase this poison, these poisons were made, and now the bill for dealing with this will come to all of us people, I am filled with sadness. This is not our culture [as humans]" (Hokkaido Shimbun 2021d).

As Ainu leaders expressed, plans to hollow out the earth underneath either town of Kamoenai or Suttsu, assumes mastery over domains of knowledge that humans have still not yet mastered. As Ukaji explained it, humans have prioritized economic growth to the detriment of the earth. Inventing nuclear power without a waste management plan is one example of these worlds being out of balance. As discard studies scholar Liboiron (2021) argues, these poisons exceed the "assimilative capacity" of the earth. When land is imagined as a "sink" by industrial science, with the expectation that water bodies or landmasses can absorb a certain amount of toxins before they reach the tipping point, this calculation is already a form of ontological violence. Plans to bury hazardous waste deep in the earth for eternity commit the violence of positioning the earth as a waste dump for human convenience. They also assume that humans and the earth are already disconnected and/or severable.

Ainu and Indigenous Futures |

Returning to the question of nuclear timescales, I would like to close out this think-piece by reconsidering Ainu interactions with the non-human world through the lens of temporal reckoning. By invoking an Ainu temporality, I suggest that we should tilt our ears toward Ainu voices and center Ainu relationships with seasonal cycles and Ainu experiences of time. This means that we let go of constantly trying to force Ainu into a neoliberal or productivity-driven model of settler modernity. Under this model, Ainu are always positioned as "lacking" and incapable of achieving "modernity" (Winchester 2009), or to borrow from postcolonial theorist Dipesh Chakrabarty, Ainu are "consigned to the waiting room of history" (2000). In response, I draw upon literary scholar Mark Rifkin, who writes that we should be critical of arguments which simply position Indigenous communities within a long arc of settler modernity, dooming Indigenous peoples to settler time, implying total erasure if they do not achieve the arbitrary thresholds of progress determined under this model. Narratives of "settler-time" frequently position settlers as "advancing" and Indigenous peoples as "static," according to literary scholar Kevin Bruyneel. Further, models of sovereignty which center more fluid land relations may be seen as posing a "threat to contemporary political life and political space" [of the settler occupier] (Bruyneel in Rifkin, page 5). To be clear, contemporary narratives that Indigenous peoples can never be 'coevals' with settler modernity are rooted in what Rifkin describes as "refusal to accept the (geo)political implications of persistent Indigenous becoming, the ways that the presentness of Native peoples challenges settler claims to possession now and for the future" (Rifkin, page 5). Instead, Rifkin, pushes us to center Indigenous futurities and capacity for imagining and narrating futures centered in Indigenous realities, rather than determined by "settler time."

What, then, can be clawed back from a neoliberal-consumption driven ecosystem on the brink of collapse, by restoring Indigenous sovereignty over time? By centering Indigeneity in a new relationship with time, we open the capacity for temporal sovereignty. Sovereignty, in relation to time, in much the same way as territorial sovereignty, is not about *control*. Instead, this model of sovereignty is about a fluid relationship with how Indigenous communities understand the past/present/future – relationships which are not constrained to a linear model. Linear models that posit Indigenous progression from “barbarism” through agriculture, written text and eventually arriving at “advanced evolution” are grounded in pseudo-scientific theories of social Darwinism. They reduce Indigenous peoples to a caricature of settler modernity while denying their capacity for agency in asserting alternate models. Instead, we can understand Indigenous engagement with temporality through their deployment of traditional ecological knowledge (TEK), we can experience the patterns imposed by seasonal cycles, and observe the disruption caused by the climate emergency, and industrial crises that interrupt these seasonal patterns. Furthermore, we must engage with Indigenous temporality by honoring Indigenous relations with non-humans and with ancestors outside the context of settler-defined modernity. “Temporal sovereignty,” then, can be understood by empowering ancestors and ancestral knowledge as mediating these alternate “timescales” (Evans-Pritchard 1939). From this perspective on the future, the materiality of nuclear waste explodes any hubris about settler modernity’s control over time.

Nuclear waste anticipates a futurity that *settler time* has no capacity to imagine or resolve. Two numbers help us bring that into focus: 20 seconds and 100,000 years. The potency of radiation from vitrified or condensed glass vials, into which nuclear waste is concentrated, becomes deadly upon human exposure *after only 20 seconds*. *Detoxification of that waste requires 100,000 years*. I can read this paragraph in 20 seconds, but to situate 100,000 years, we would need to return to the Neanderthals. Government panels and thinktanks have devoted more than half a century figuring out what to do with nuclear waste and how to communicate it to future humans, and still have not identified what memes or symbols can effectively convey the toxic nature of nuclear waste to future living organisms (Joyce 2020). Management of nuclear waste requires a degree of spectacular competence that human society has yet to demonstrate with any existing nuclear reactors or nuclear infrastructures (Jacobs 2022).

Terra Activus |

Land is not a noun, they are a verb. Enfolded within land, are layers of inter-generational relationships, thick pockets of more-than-human memory, and multi-species futures enclosed within seed pods. None of these entities is mute, nor a passive agent. In each of these terrains of struggle, dirt, seeds, minerals, and roots intersect with

one another as they birth future generations. Drawing from Métis geographer Max Liboiron (2021) thinking about land as an active, shifting relative, I urge that we must cultivate the capacity to listen to land. Liboiron (2021) writes “Land is about relations between the material aspects some people might think of as landscapes—water, soil, air, plants, stars—and histories, spirits, events, kinships, accountabilities, and other people that aren’t human” (2021). This means that we must bring land into dialogue as an active agent that can refuse invasive projects which fail to realize their ethical obligations to the land. Once we begin to interact with land in this way, we have no choice but to recognize that land is a complex agentive entity which exercises the capacity for refusal and responses on their own terms. By keeping this set of relationships in focus, we can comprehend that Land is thus never reducible to *Terra Nullius* (empty land). Instead, Land should be understood as the inverse of “nullius,” and seen as “terra activus” (Active Land). From this perspective, we can begin to engage with them, and with communities who have tended them, with humility and obligations of care and reciprocity, recognizing our own fragility and vulnerability.

References

- Aldrich, Daniel P. 2008. *Site Fights Divisive Facilities and Civil Society in Japan and the West*. Ithaca: Cornell University Press.
- Australian Nuclear Free Alliance. 2018. *Twenty Years Of Radioactive Resistance: Australian Nuclear Free Alliance*. www.anfa.org.au.
- Brugge, Doug, P. Hynes. 2005. *Community research and environmental health: studies and science, advocacy and ethics*. Aldershot, England: Ashgate Publishing Ltd.
- Chakrabarty, Dipesh. 2000. *Provincializing Europe: Postcolonial Thought and Historical Difference*. Princeton: Princeton University Press.
- Crosby, Alfred W. 1986. *Ecological Imperialism : the Biological Expansion of Europe, 900-1900*. Cambridge [Cambridgeshire] : Cambridge University Press, 1986.
- Evans-Pritchard, E.E. 1939. Nuer time-reckoning. *Africa* 12.
- Ialenti, Vincent, 2020. *Deep-Time Reckoning: How future thinking can help earth now*. Cambridge: Massachusetts Institute of Technology.
- Inoue, Yukana. 2023 [Tsushima mayor turns down request for nuclear waste site survey](#). *Japan Times*, Sept. 27.
- Joyce, Rosemary. 2020. *The Future of Nuclear Waste: What Art and Archaeology Can Tell Us about Securing the World's Most Hazardous Material*. New York: Oxford UP.
- Liboiron, Max. 2021. *Pollution Is Colonialism*. Durham: Duke Univ. Press.
- Murphy, Michelle. 2017. Alterlife and decolonial chemical relations. *Cultural Anthropology* 32(4): 494–503.
- Pasternak, Judy. 2011. *Yellow Dirt: A Poisoned Land and the Betrayal of the Navajos*. New York: Free Press.
- Ramana, MV. 2012 *The Power of Promise: Examining Nuclear Energy in India*. New Delhi: Penguin Global.

Rifkin, Mark. 2017. *Beyond Settler Time: Temporal Sovereignty and Indigenous Self-Determination*. Durham: Duke University Press.

Walker, Brett. 2001. *The Conquest of Ainu Lands : Ecology and Culture in Japanese Expansion, 1590-1800*. Berkeley: University of California Press.

Yazzie-Lewis, Esther. 2006. *The Navajo People and Uranium Mining*. Santa Fe: University of New Mexico Press.

Zabarte, Ian. 2016. Interview with author. June 2016. Las Vegas, NV.

伊藤正子・吉井美知子共編. 2015. [『原発輸出の欺瞞—日本とベトナム、「友好」関係の舞台裏』](#) 明石書店.

宇梶、静江. 2011. *すべてを明日の糧として今こそ、アイヌの知恵と勇気を*. 東京: 清流出版.

宇梶、静江. 2008. *セミ神様のお告げ*. 東京: 福音館書店.

小野、有五. 2021 “寿都町、神恵内村で明らかになった「核のゴミ」地層処分の問題点.” 科学 91 (1): 90–104.

川崎、哲. 2011. “原発輸出と核の未来.” *インパクション* 182: 25–40.

行動する市民科学者の会・北海道（ハカセの会）. 2020. “知ってましたか？今地層処分してしてはいけない8つの理由.” <http://saikadososhinet.sakura.ne.jp/rn/archives/15102>.

更科源蔵、吉田、豊、（共訳）. 1981. *アイヌ人物誌*（松浦武四郎原著「近世人物誌」）. 人間選書47. 東京: 農山漁村文化協会.

鈴木.真奈美. 2011. “原発輸出の構造と脱原発の展望.” *インパクション* 182: 12–24.

戸塚、美波子. 『1973年6月14日』*アヌタリアイヌ：我ら人間*. 2：6（1973年）1頁。

平山、裕人.2016.『アイヌ地域市資料集』東京：明石書店。

北海道新聞 2021a.「<シリーズ評論 核ごみどこへ>33アイヌの大地を汚すな札幌大教授本田優子氏」2021年09月03日

北海道新聞 2021b. 「核ごみ処分場調査 問題が多すぎ賛成できぬ」2021年09月20日

北海道新聞 2021c.『寿都町選告示 文献調査 賛否問う 越前谷氏 即時撤回 分断解消 | 財政運営身の杖で 片岡氏「独断」判断に反論 | 交付金で地域復興』2021年10月22日

北海道新聞 2021d.「核ごみ反対、アイヌ民族も『先人が守った大地を汚すな』進む文献調査、募る危機感」2021年11月22日。

北海道新聞 2022a.『<社説>神恵内村長選 核ごみの進撃の議論を』2022年02月23日

北海道新聞 2022b.「核ごみ、文献調査『おおむね終了』神恵内で第6回対話の場」2022年03月29日

北海道新聞 2022c.「<社説>寿都議事録開示 独断専行の弊害あらわ」2022年04月30日

ルアレン、アンエリス, and 中村、歩. 2016. “宇梶静江—関東アイヌの呼びかけ.” In 人々の精神史第六巻、日本列島改造—1970年代. 東京: 岩波書店.