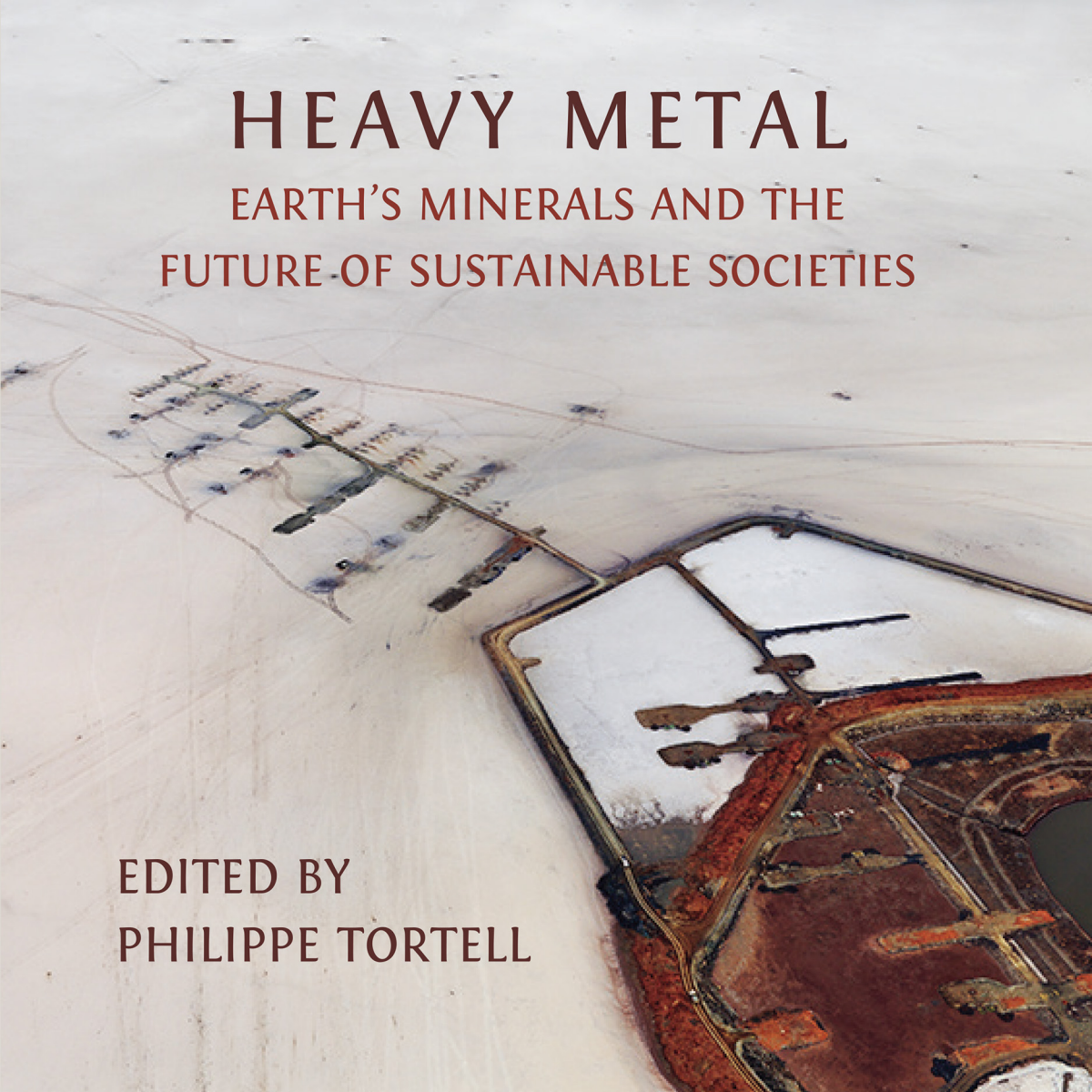
HEAVY METAL

EARTH'S MINERALS AND THE FUTURE OF SUSTAINABLE SOCIETIES



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A Matter of Trust

Allison Macfarlane

Picture a large, windowless room in a modern community center, with rows of folding chairs facing four Indigenous drums and a speaker podium. Picnic tables are set up at the back of the room, laden with breakfast foods and coffee fixings. The chairs are occupied by members of the local First Nation who are hosting the event, as well as representatives from the Nuclear Waste Management Organization (NWMO) and the Canadian Nuclear Safety Commission. A few members of other Indigenous communities are also present, along with a sprinkling of academics, and a few non-Indigenous people from nearby towns. The morning ceremony has ended with the burning of sage, and a sweet aroma lingers in the air.

The audience is focused on a PowerPoint presentation describing the potential impacts of a mined geological repository for high-level nuclear waste that is being proposed near their land. They are just a year or so away from deciding as a community whether to agree to host the repository. This courtship, if you could call it that, between the NWMO and the First Nation has gone on for years. For some in the potentially affected areas, it has gone on far too long. For others, who are just beginning to learn about the proposed project, there is a need for more information—and perhaps a more direct role in the decision-making process. This meeting, a Sharing and Learning Gathering, is one of hundreds of meetings, webinars and open houses used for public

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engagement on the siting of a nuclear waste disposal facility. But such events alone do not guarantee that a community will accept a mined waste repository. There are many other factors at play, and perhaps the most important is the establishment of trust.

As the energy transition proceeds and nations around the world begin moving away from fossil fuels towards renewable energy, the need for critical minerals and mining is expected to increase. New mining projects will be disproportionately located on rural and Indigenous lands, including areas not previously impacted by this extractive activity. These new projects will certainly face a range of technical challenges, but it may be that the largest challenge lies in obtaining informed community support. With growing demands to engage impacted communities in consent-based siting and collaborative decision-making—especially in light of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)—there is an urgent need to approach the siting of new mines in an intelligent, effective and respectful way.

Nuclear waste repository siting has some important lessons to share with the mining community about public engagement and the siting of a 'difficult' facility. Several countries, including the United States, Canada, Sweden, Finland, France, Switzerland, Japan and Belgium, have actively been siting nuclear waste repositories for years. These geological repositories are similar to mines in that deep underground tunnels must be excavated to make room for large waste canisters. Eventually, the tunnels are closed and the site, in theory, is monitored for hundreds of years. Because countries with nuclear power plants have been searching for mined waste repositories for decades, history is replete with lessons about how to be successful and, of course, cautionary tales.

The US provides a particularly notable case study of how things can go wrong. The country started the process of nuclear repository siting in the 1970s, and today, fifty years later, is no closer to operating a repository. In 1982, the US passed the Nuclear Waste Policy Act, outlining a fair and reasonable process to find a site for a national nuclear waste repository. Five years later, however, the US Congress amended the law, effectively giving itself sole decision-making power in the siting decision. They selected

the Yucca Mountain site in the Mojave and Great Basin Deserts, near the Nevada Test Site, where 928 nuclear bombs were detonated from 1951 to 1992. The selection of the Yucca Mountain site met with fierce opposition from the State of Nevada, as well as from local communities, including the Western Shoshone and the Southern Paiute, and powerful politicians, such as Nevada Senator Harry Reid. The fate of the site remains at a political impasse. Since 2010, the US Congress has refused to appropriate funds for any further work on the repository.

The story of Yucca Mountain provides a clear example of the 'decide-announce-defend' method of site selection. It is exactly the opposite of a consent-based process, and the resulting debacle speaks for itself. Of course, no country has ever been able to find quick and easy solutions to the complex process of nuclear repository siting. Rather, the process has been an iterative one, where successive policies are tried, lessons are learned from failure, and new approaches developed.

Sweden tried three different approaches before finally finding one that worked. Like the US, they began with a decide-announce-defend type process, sending geologists out to the countryside to assess the suitability of various locales. Once the locals got wind of what the geologists were up to—looking for a site to mine a repository for nuclear waste—they sent them packing. Critically, Svensk Kärnbränslehantering Aktiebolag (SKB), the independent, industry-based waste siting organization, never contacted the local municipalities to let them know what was happening. As a next step, communities were asked to voluntarily host a repository site. Perhaps not surprisingly, this approach was also not successful. In the end, SKB approached municipalities that already hosted nuclear power reactors and waste facilities, and found two communities willing to host the new proposed waste storage site. After years of technical studies of both potential sites, the small coastal village of Forsmark, about one hundred and fifty kilometers north of Stockholm, was selected due to its more favourable geological environment. The village (with a population of less than one hundred inhabitants) has had long experience with nuclear power. It has hosted three separate reactors since the 1980s, and currently produces about 15% of the energy used in Sweden. The reactors are equipped with highly sensitive instruments that can detect low levels of

radioactivity. In 1987, these instruments provided the first evidence of the Chernobyl nuclear accident outside of the Soviet Union. With the blessing of the community, the long-term waste disposal site at Forsmark has now been approved by the nuclear regulator, and construction will begin soon.

Another path to certain failure is the assumption that a well-informed and educated public will happily accept the risks of a mining project if they understand the underlying science. This fallacy, known as the 'deficit model of public understanding', continues to be accepted today, often by those in industry. The underlying idea is that opposition to a particular technology or facility simply reflects a deficit in scientific knowledge among potentially impacted communities. Proponents of this idea argue that public opposition can be reduced if the knowledge deficit is addressed through communication by experts. But social scientists have shown that such deficit-filling exercises rarely, if ever, produce support for a technology. And this begs the question of where opposition to technologies actually originates.

The public perceives risks from technologies as part of a larger spectrum of risks in their lives, which are informed by social relationships, life experiences and educational backgrounds. The people who communicate the risk and the way in which it is communicated play an important role in determining how it is perceived by the public. In particular, the level of trust that exists between those who communicate the risk and those who are being asked to assume it significantly influences people's understanding of risk and their willingness to accept it. To be effective, those voices communicating risk must do so in an accessible and culturally appropriate manner. If the messenger is not trusted, or the message unclear, no amount of education will alleviate the public perception of risk. On the other hand, clear information, delivered by a trusted source can go a long way to informing communities about the risks they are being asked to assume in hosting a mining project on their land.

Recognizing the importance of trusted sources of information, most successful nuclear waste siting efforts have provided affected communities with funds to hire their own independent experts to perform technical and social analyses of impacts and risks. This arms-length appraisal can help avoid the existence, or even appearance,

of a conflict of interest for project proponents in governments or industry. To ensure robust public debate and informed discussion, some countries have even gone as far as funding public interest groups that oppose a project. This 'red-teaming' approach is used to critically examine any oversights around the safety case made for a site, helping to identify potential blind spots. In the end, risk is best understood and managed when a shared understanding emerges from a range of voices and perspectives.

Over the past half century, there have been some successes in nuclear waste repository siting, although no repository for high-level nuclear waste is yet in operation. Finland has a repository under construction; Sweden has licensed their repository site at Forsmark and will begin construction in the coming years; France and Switzerland have both selected sites and await licensing; Canada and Japan will select sites in 2024–26; Belgium has successfully sited a low-level waste repository using a consent-based process. All these countries share one ingredient in common; they have used some type of participatory process for selecting a repository site. Their success holds important lessons, not just for other nuclear waste repositories, but also for the development of new mining projects.

What can we learn from successful waste repository siting efforts? Perhaps most importantly, it is clear that a participatory or consent-based process is essential to success. And this requires three key ingredients: time, people and resources. Though there is urgency around mine siting, the participatory process cannot be rushed. The process should begin as early as possible, and it cannot be a race against the clock. It is also important that the same set of individuals remain engaged with potentially affected communities over the long term, developing robust relationships with community members and demonstrating their commitment to the project. This requires appropriate technical expertise, no doubt, but also compassion and empathy to understand a range of community perspectives. And all of this requires resources—of both time and money—as the partners work to meaningfully address community concerns and needs.

Another key element to success is the ability of communities to veto or opt out of the siting process. These opt-in/out decisions should be made democratically, through a culturally appropriate process. In some communities, this could be achieved through a referendum; in others, elected or hereditary leaders or Elder's councils could be empowered to make decisions on behalf of the community. No matter what the actual process, it is important to determine which voices are heard, by clearly defining the boundaries of a potentially impacted area, and applying the same rules to all communities within that boundary. In its search for a low-level nuclear waste disposal site, Australia ran into trouble when different Aboriginal communities were given unequal access to the decision-making process. In one case, a municipality allowed traditional Aboriginal landowners near the affected community to participate in the vote. In contrast, a second community, Kimba in South Australia, did not include the Barngarla People, who had held their own separate ballot unanimously rejecting the proposed site. When the government eventually decided to situate the waste disposal site in Kimba, the Barngarla mounted a successful court challenge to block the planned site, arguing that they had not been appropriately consulted over a project that would negatively impact their traditional lands. In her court ruling, justice Natalie Charlesworth said that the government had displayed a 'dismissive attitude' to the Barngarla's concerns. Eventually, the government abandoned the Kimba site.

Appropriate compensation is also critically important for affected communities that agree to host challenging facilities. In some cases, this will be in monetary form, but compensation can also be in the form of useful infrastructure, such as community centers, medical facilities and new local businesses, such as banks, shops, restaurants and hotels. In Finland, for example, the nuclear waste management organization, Posiva Oy, built a new Elder's home that also housed a community gym and meeting rooms to maximize interactions between younger and older community members. Sweden used a unique structure for compensation for the two communities that were considered as waste site hosts. The majority of the compensation funds (75%) were to be allocated to the community that was not selected for the site, leaving the remaining 25% for the community that was ultimately selected. This approach kept

both communities in the game, as it was assumed that the selected community would enjoy increased business associated with a new repository facility.

In generating trust between communities and project proponents (a mining company or government, for example), both transparency and openness are required. Transparency means that the proponent shares its analysis, and is transparent about how it makes decisions. Currently, environmental impact assessments for mining projects are often based on proprietary data obtained by third-party contractors with limited connection to the affected communities. A better approach is to build capacity within communities to support their role in the collection and interpretation of key environmental data. In the case of Indigenous communities, this can involve the incorporation of traditional knowledge and Elder wisdom alongside technical data. In Canada, the Indigenous Guardians program supports First Nations community members involved in ecosystem protection and land stewardship. Through this program, community members gather environmental data and participate in monitoring activities in the context of Indigenous laws and teaching. The program is currently active in more than a quarter of First Nations in Canada, and could be further expanded to play a significant role in environmental monitoring and oversight of future mining projects on Indigenous lands.

Openness means that project proponents listen to residents' concerns and address them in a meaningful way, demonstrating a willingness to change plans accordingly. It also means a willingness to truly share responsibility—and benefits—with communities. Some communities have formed legal partnerships with implementing organizations, providing them with a formal voice in planning and implementation of the facility. In some cases, it can be important for the local community to retain some operational control over the facility. In Belgium, the local community formed a partnership with the waste agency on the design of a low-level nuclear waste facility. Among other things, the community partners requested that cameras be installed near the repository. The waste agency did not see the point of this additional expense, but eventually agreed to

install the cameras. In the end, the cameras proved useful in ensuring the safety of the repository, highlighting the benefits of the collaborative design process that was used.

In the development of future mineral resource projects, it will not be only companies that need to work closely with communities in the siting of new mines. Regulators and the mining industry at large will also have to adopt a participatory approach to mining. Regulators will need to develop their own relationships with affected communities, so that they can provide trusted analysis and decisions on particular facilities. The mining industry will have to move beyond its reputation as an extractive enterprise with a history of challenging relations between companies and the communities in which they operate. This can only happen through tangible examples of partnership and collaboration, where companies work with the local communities for the betterment of all parties involved. In the end, many different people will need to work together to build a more responsible mining sector. A key element in this will be ensuring that risks are properly communicated and mitigated, and that communities reap tangible benefits from resource extraction on their lands.