SPRINGS

THE RACHEL CARSON CENTER REVIEW

Issue #8 | 2025

November

(DIS)EMPOWERED COMMUNITIES: A CONVERSATION WITH DAVIDE ORSINI

Davide Orsini and Uwe Lübken

Springs

The Rachel Carson Center Review

8 • 2025

Davide Orsini and Uwe Lübken

Anthropologist and historian Davide Orsini and his research partners are conducting a five-year comparative study that explores the hidden costs and environmental implications of decommissioning nuclear power plants and facilities. Nuclear experts define decommissioning as the process of safely disposing of obsolete nuclear installations at the end of their productive life, with the objective of returning sites to public use or other purposes, if possible. Launched in March 2025, Davide's Volkswagen Foundation Change! project seeks to foster research collaborations between academic and nonacademic partners to promote social change. It sheds light on the uncertainties surrounding decommissioning projects and aims to involve affected communities in the management of decommissioning strategies. (Dis)Empowered Communities promises to challenge consolidated, and often misleading, ideas about the fate of obsolete nuclear facilities, as Davide explains in an interview with historian Uwe Lübken.

Demolition of the cooling towers at the Grafenrheinfeld Nuclear Power Plant, Germany, 16 August 2024. Photo by Michael Bemmerl. Wikimedia Commons. CC BY 3.0 DE.

UWE LÜBKEN: Davide, your new project involves a lot of traveling. Have you been to a nuclear power plant lately?

DAVIDE ORSINI: Oh yes, the last one I visited was the Latina Nuclear Power Plant in Italy, almost a year and a half ago, during a guided tour organized by the Italian decommissioning agency, Sogin (figure 1). This nuclear plant has quite an interesting story, because at the end of the 1950s, when it was designed, it was one of the biggest, if not the biggest, in western Europe. It's a graphite-moderated reactor cooled with CO_2—a British design that the Italian Hydrocarbon Board (Eni S.p.A.) chose to jumpstart its nuclear program. Previously I visited the Trino Vercellese Nuclear

DOI: 10.5282/rcc-springs-17462

Power Plant in Piedmont; the Mühleberg Power Plant, around 25 kilometers from Bern; and the Isar nuclear sites in Niederaichbach, pretty close to Munich, but the latter only from outside.

Fig. 1: Latina Nuclear Power Plant. Photos by Davide Orsini. CC BY-NC-ND 4.0.

UL: All of these sites are currently being decommissioned!

DO: Yes, but each site has a different history, different reactor designs, operational lives, and environmental characteristics, including the socioeconomic background of the surrounding communities. These are very important elements that influence decommissioning choices, strategies, and length. Despite their differences, all nuclear sites present some common characteristics and decommissioning problems. For example, all of them need water for reactor cooling, decontamination operations, and programmed effluents discharge.[1]

They all require the presence of certain infrastructures, such as dams and ponds, roads for transportation, space for temporary storage of contaminated material, and electric lines. To understand decommissioning processes and their implications, it is necessary to reconstruct the biography of nuclear sites, as I like to say, and to consider their socioecological entanglements. This is one of the main objectives of the project: regaining a holistic view of nuclear-power production, including some aspects of its back end that are still fairly unknown to the public and that need to be analyzed and discussed more openly, also outside expert conferences.

> *To understand decommissioning processes and their implications, it is necessary to reconstruct the biography of nuclear sites and to consider their socioecological entanglements.*

DOI: 10.5282/rcc-springs-17462

UL: How and why did you get interested in the history of decommissioning in the first place?

DO: When I was doing research for my first book about the presence of US nuclear submarines in Italy, I started thinking about what happens when these vessels become obsolete and need to retire. So, when I finished that project, I remained interested in this question but wanted to understand how nuclear power plants and other nuclear facilities could be dismantled, what the destiny of all contaminated material is, and what future those sites could have after being decommissioned. I then decided for this to be the topic of my next book. I started to read a lot of technical documents and the very few works in the humanities and social sciences devoted to these questions.[2]

I was and remain fascinated by the fact that decommissioning seems to have received growing attention only recently in our fields.[3] The question of what to do with obsolete nuclear facilities emerged in public debates in the mid-1970s and is destined to become the biggest business in the nuclear sector because the number of sites that need to be shut down and disposed of is large and will be inevitably bigger in the future (figure 2). The International Atomic Energy Agency (IAEA) estimates that by 2050 more than four hundred nuclear facilities will be shut down around the world.[4] Not only power plants but also fuel-fabrication plants, reprocessing plants, uranium mines, uranium-extraction and -enrichment plants, spent fuel, and contaminated equipment must be taken care of. The variety of nuclear sites involves different decommissioning approaches, given the operating history, technical characteristics, types, and extent of contamination of each site.

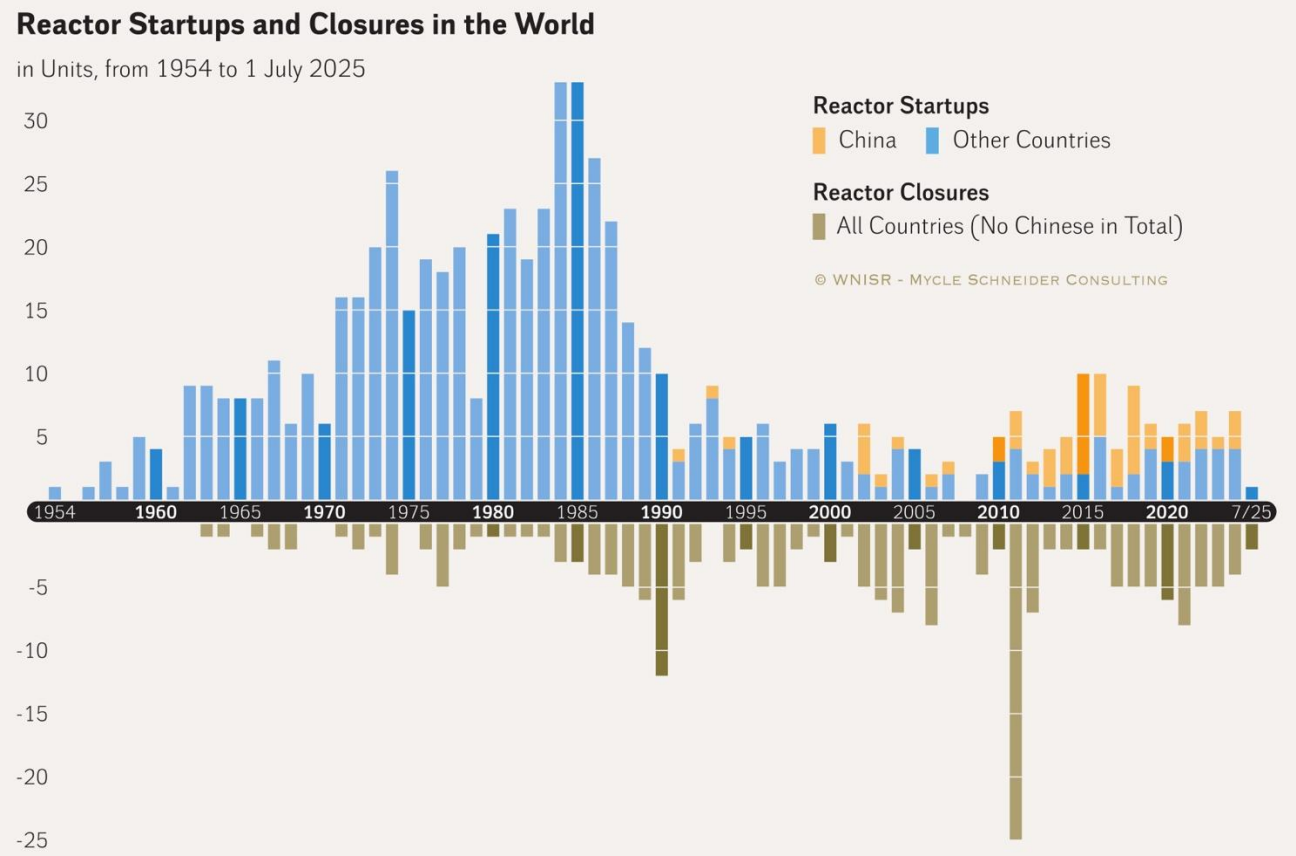

Fig. 2. World nuclear-industry status. Published in Andreas Molin, Mycle Schneider, Antony Froggatt, Oezguer Guerbuez, Paul Jobin, Phil Johnstone, Timothy Judson, et al., *The World Nuclear Industry: Status Report 2025* (Mycle Schneider Consulting, 2025), 49, https://www.worldnuclearreport.org/IMG/pdf/wnisr2025-v1.pdf. © Mycle Schneider Consulting. All rights reserved.

UL: This sounds like a lot to look into—a project that cannot be done alone. In fact, your team consists not only of other researchers but also a film crew! What is the idea behind this?

DOI: 10.5282/rcc-springs-17462

DO: One of the main objectives of (Dis)Empowered Communities is to solicit public awareness of the socioecological and economic dimensions of nuclear decommissioning in new and engaging ways. This is why I contacted Tobias Büchner, of Büchner Filmproduktion, and documentary director Sabine Herpich, whom I had met during a conference on nuclear-waste disposal in Belgium, and decided to produce a documentary about decommissioning that will hopefully reach a wide audience. Concretely, this means that we will go to different sites in Italy, Germany, Belgium, and in the US and try to look at decommissioning operations from multiple perspectives: nuclear workers, engineers, community members, and policymakers.

Our research team features a third partner, the Nuclear Decommissioning Collaborative (NDC), a nonprofit organization that for 10 years now has developed analytical and consulting activities around decommissioning and post-decommissioning community resilience and redevelopment plans in the US. Not only will NDC provide data about decommissioning sites in the US but will also help the team organize two open workshops, one in the US and one in Germany, with representatives of decommissioning stakeholders and academic experts, and assist with drafting reports on how to change decommissioning policies and practices based on those open discussions.

Next year, two PhD students will join our team at LMU. One of them will conduct research on decommissioning sites in Germany and the other one in Belgium, while I will focus on the Italian case.

> *The International Atomic Energy Agency (IAEA) estimates that by 2050 more than four hundred nuclear facilities will be shut down around the world.*

UL: What does decommissioning mean exactly with regard to its temporal dimension? Nuclear reactors and other facilities cannot be shut down at the flick of a switch.

DO: Well, the duration of decommissioning projects is one of the most interesting aspects. There are no "standard" decommissioning strategies for all nuclear facilities, and, as a consequence, decommissioning times vary. It can take a few years, usually decades, and sometimes even centuries.

For example, if properly managed, a facility used for the assemblage of nuclear-fuel elements usually causes contamination of buildings and equipment that can be removed both chemically and mechanically from the surfaces. In these cases, decontamination work can be done in relatively short time and quite effectively. Decommissioning large commercial nuclear reactors instead requires more complex and lengthy projects. In this case, there are a few operations that need to be done before dismantling, like the extraction, cooling, isolation, and transportation of the fuel elements off site, if possible. The reactor structures, including the core, remain radioactive for centuries due to the effects of the neutronic bombardment resulting in the penetration and absorption of radioactivity in steel and concrete portions of the plant. This often involves the use of remote cutting and removal techniques—for example, tools such as plasma torches and even robots—in addition to specific dismantling and decontamination technologies to avoid workers' excessive exposure.

DOI: 10.5282/rcc-springs-17462

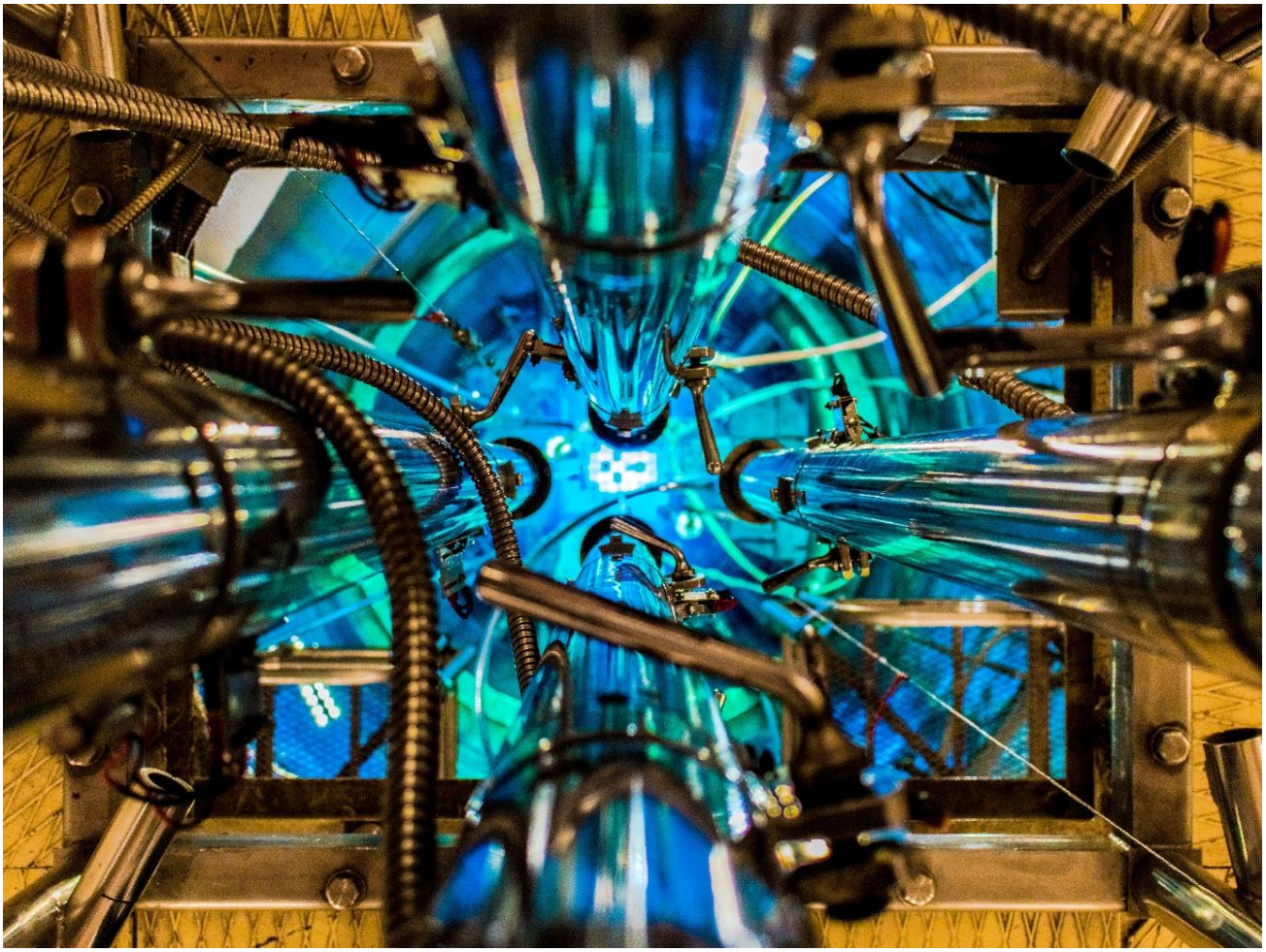

Fig. 3. Core of the RA-3 nuclear reactor, National Atomic Energy Commission (CNEA), Argentina. Wikimedia Commons. CC BY-SA 4.0.

UL: Does it make a difference whether a site is being decommissioned according to plan or after an accident?

DO: Yes. Decommissioning a nuclear plant at the end of its programmed life, let's say after 30 or 40 years of operation, is usually possible after carefully planning all aspects of the dismantling activities. But postaccident decommissioning, like in the case of Fukushima, is obviously much messier, dangerous, and uncertain. One of the most important activities before decommissioning operations start is the so-called characterization of the site. This means mapping out the levels and the types of radioactive contamination existing in different parts and components of the facility and on the site. As you can imagine, this information is extremely relevant to those who have to perform decommissioning because they want to know what they can do and where, as well as the relative levels of exposure involved in the different operations. In the case of postaccident decommissioning, this work is much more complicated and sometimes even impossible.

DOI: 10.5282/rcc-springs-17462

Fig. 4. IAEA nuclear-protection experts visiting control room of units 1 and 2 at Fukushima Daiichi Nuclear Power Station as part of a mission to review Japan's plans to decommission the facility. Photo by Greg Web, 2013. Courtesy of IAEA. Flickr. CC BY-SA 2.0.

UL: What about the costs of decommissioning?

DO: A US Nuclear Regulatory Commission Staff report in 2019 showed that decommissioning trust funds oscillate between around four hundred million and one billion dollars.[5] Time variation is also reflected in the cost estimates for decommissioning projects, a specific branch of the nuclear-decommissioning industry that emerged in the mid-1970s and that currently is one of the most requested services of this sector (figure 2).

Since the uncertainty of decommissioning costs is quite high due to several contingences—think of the economic instability we are experiencing right now—estimating how much money nuclear-facility owners and operators need 40 to 60 years after construction is quite complex. After decades of public disputes and regulatory efforts, several countries now require nuclear-plant owners and operators to put aside a certain amount of money, through escrow and investment funds, for eventual decommissioning costs. If you think about it, this is a matter of intergenerational justice: Polluters and electricity users should pay for the costs of decommissioning without leaving this responsibility to future generations. The question is whether this is even possible in the nuclear case, given the unresolved issue of nuclear-waste disposal. But this is a topic for several interviews.

DOI: 10.5282/rcc-springs-17462

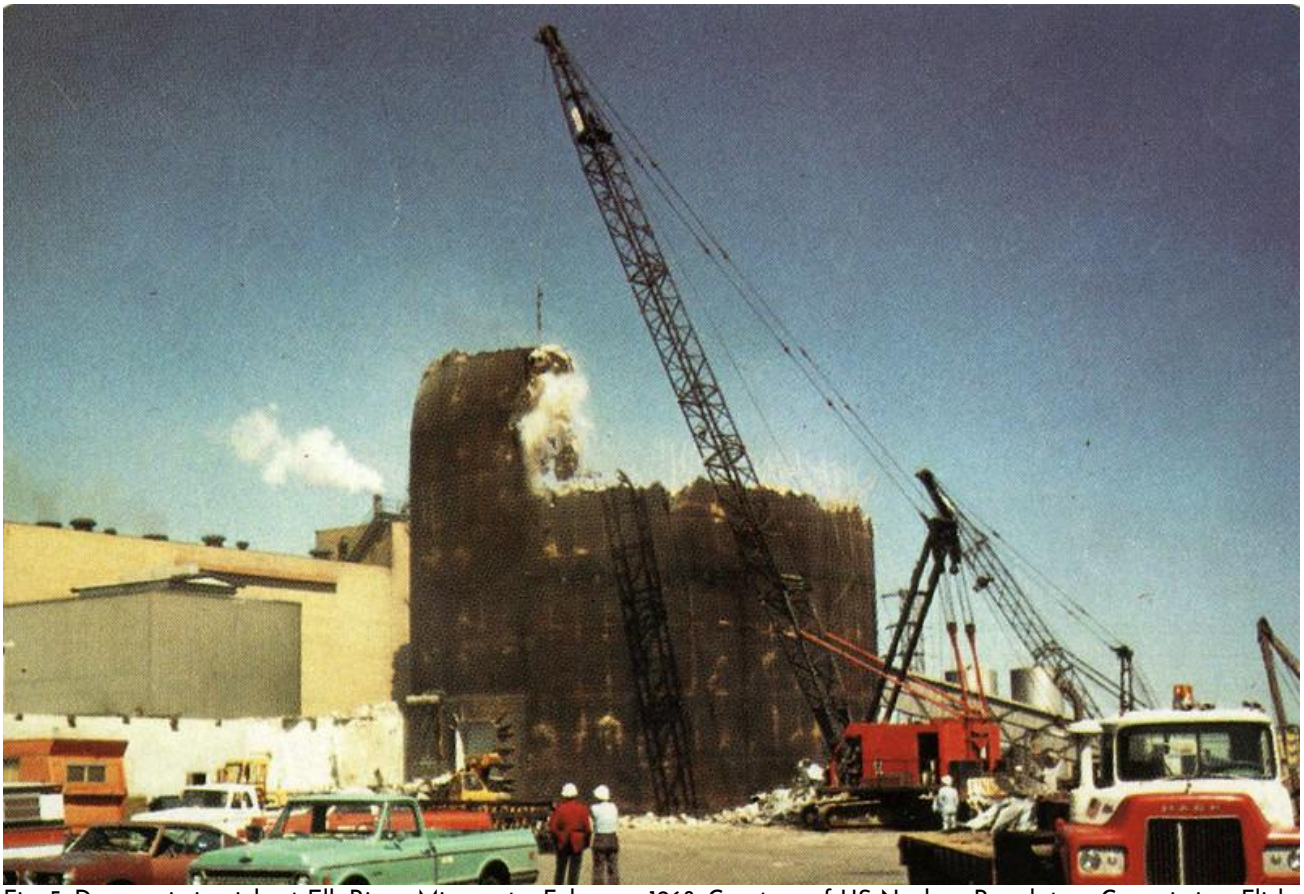

Fig. 5. Decommission job at Elk River, Minnesota, February 1968. Courtesy of US Nuclear Regulatory Commission. Flickr. CC BY-NC-ND 2.0.

UL: Nuclear reactors are not simply technological devices but also part of the cultural, political, and social landscape. People who have lived close to a reactor for a long time might even experience the destruction of cooling towers as a loss. How does your project deal with these dimensions?

DO: Local attitudes toward nuclear facilities differ from place to place and change over time. While some scholars have used the concept of "peripheralization" to describe the power imbalance between local communities and powerful state and corporate actors,[6] recent studies conducted in the UK, the US, and Canada have highlighted that this power/resistance interpretative scheme risks glossing over local communities' nuclear attachments and sometimes even desire to host nuclear plants and waste repositories.[7]

In this research project, we look at decommissioning as a transition process that gives us the opportunity to analyze what happens when nuclear sites shut down and become something to dispose of—or "material out of place," to use the words of anthropologist Mary Douglas.[8] We are interested in understanding how the siting and emplacement of nuclear facilities shape the cultural and physical landscapes that local communities build, perceive, and inhabit. We are also interested in documenting what happens during decommissioning phases and afterwards, when tax revenues, jobs, and incomes disappear.

UL: How does this play out on the spot? Could you give us an example or two?

DOI: 10.5282/rcc-springs-17462

Fig. 6. The village of Gundremmingen, Germany, with Gundremmingen Nuclear Power Plant in the background, on 25 October 2025, just before the cooling towers were blown up. Photos by Davide Orsini. CC BY-NC-ND 4.0.

DO: We look at decommissioning nuclear sites as places of memory—shared, contested, silenced—nostalgia, planning, and longing for possible, alternative futures. For example, interestingly enough, cooling towers next to reactor buildings often become iconic features that external observers take as symbols of nuclear power. When these structures are demolished, some members of the local community feel like they are losing part of their identity, a point of visual reference that for years had been integral to their landscape.

On the other hand, those who had been opposed to the nuclear plant or just look forward to the end of decommissioning take the disappearance of the cooling tower as a sign of progress and feel relieved. You can easily imagine how different generations and different groups experience and perceive decommissioning differently. When I interviewed nuclear employees and workers and asked them to describe how they felt transitioning from the operational to the decommissioning phases, some of them had emotional reactions thinking that such an important part of their lives will be torn down. Antinuclear and environmental activists certainly do not feel that way. These are just examples of how decommissioning sites can be motives of conflicts between different interest groups who fight over symbolic and very tangible safety, economic, and environmental issues.

DOI: 10.5282/rcc-springs-17462

Fig. 7. Demolition of Gundremmingen Nuclear Power Plant cooling towers on 25 October 2025. Video by Davide Orsini. CC BY-NC-ND 4.0.

UL: So, decommissioning is not just about getting rid of a hazardous past but also about possible futures. The process opens up a variety of potential solutions, or does it? In what ways does the nuclear legacy of such a site enable or preclude such solutions?

DO: Nuclear-industry representatives, generally speaking, talk about site repurposing and redevelopment as post-decommissioning scenarios. Over the past years decommissioning experts—not exclusively in the nuclear sector—have used the terms "greenfield" and "brownfield" to describe the final result of clean-up operations, alluding to the idea that it's possible to reuse nuclear sites for other purposes—with or without restrictions, depending on the level of residual contamination left on site. These terms are not just technical descriptions, they suggest that the nuclear industry is capable of cleaning up after itself, demonstrating that nuclear-energy production is socially and environmentally sustainable, especially now with the emergence of climate change as one of the biggest existential challenges for humanity in public discourse.

But apart from public-relations strategies, thinking about post-decommissioning futures means answering really important questions that bare upon the livelihoods of entire communities and the sustainability of the nuclear industry itself. [9] First of all, we need to think of decommissioning as one crucial process in the larger context of the nuclear life cycle, which includes uranium extraction, nuclear-fuel management, and waste isolation. For example, most countries—with the exception of Finland and soon Sweden—currently do not have final geological repositories.[10] This means that spent fuel and high-level waste resulting from decommissioning operations need to be collected and isolated in interim or temporary

Fig. 8. Dry casks for spent fuel, November 2007. Courtesy of US Nuclear Regulatory Commission. Flickr. CC BY-NC-ND 2.0.

DOI: 10.5282/rcc-springs-17462

storage sites. Very often, contaminated materials resulting from decommissioning remain on-site inside dry casks waiting for alternative destinations (figure 8). It is clear that for safety and security reasons those spaces need constant surveillance and are not available to communities for other purposes.

UL: I assume there are also sites that have to be "sacrificed," given up, due to the high level of contamination?

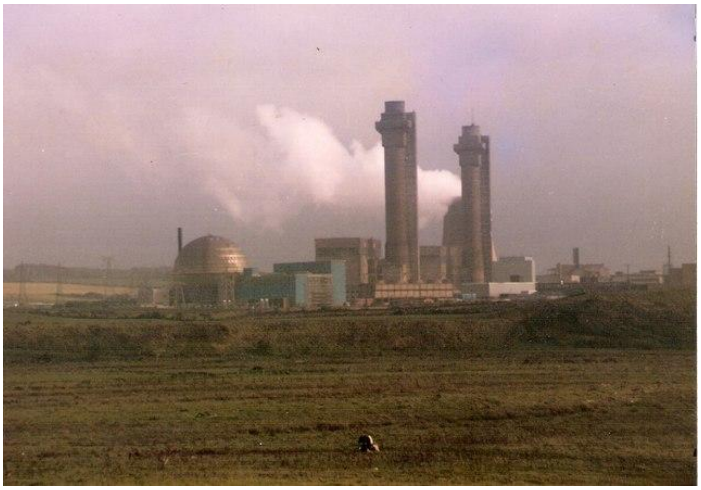

Fig. 9. Storm clouds over Sellafield, Cumbria, UK. Sellafield is the site where the UK nuclear program has developed since the 1940s. It hosts the first UK nuclear-power production plant, a plutonium-production facility, a fuel-reprocessing plant that serves the entire UK nuclear fleet, and numerous storage areas (silos and ponds) for radioactive material resulting from all those activities. Photo by Chris Eaton, 1985. geograph.org.uk. CC BY-SA 2.0.

DO: There are decommissioned sites that due to their residual level of contamination cannot be inhabited by human beings anymore and are "given back to nature" as natural reservations. This is the case in the Fernald Preserve in Ohio and in the Rocky Flats Wildlife Refuge in Colorado, to name just two.[11] Both sites hosted weapon-production facilities. Also, think of sites like Sellafield, in the UK, which is undergoing a decommissioning process that will take more than one century (figure 9).[12] In addition, there are decommissioning projects like those regarding gas-cooled, graphite-moderated reactors installed in France and in the UK, and exported to other countries, like Italy, in the 1960s, which present specific decommissioning challenges due to their reactor designs: The irradiated graphite and its byproducts inside the reactor cores remains radioactive for millennia (like carbon-14), and their removal is a technical problem for which different solutions have been tested for quite a long time without standard results. The picture is therefore much more complex than we might think.

UL: But what about the impact of decommissioning projects on the environment? One might think that when nuclear plants are shut down there are significant risks involved. Is that so?

DO: Non-experts who live far from nuclear sites may perceive the shutdown of nuclear facilities as innocuous, because they are not operational anymore. This assumption, as I learnt when I started studying this issue, is largely misleading. There is a lot of contaminated material sitting inside a nuclear power plant, even after the fuel has been removed from the reactor. Another common assumption, strategically instilled by nuclear-power promoters since the 1950s, is that nuclear sites are like sealed envelopes, isolated from the external environment; this is not true because both reactor operations and decommissioning activities produce radioactive effluents that need to be discharged into the environment in line with internationally and nationally agreed upon safety thresholds and regulations. In general, decommissioning requires the treatment and transportation of radioactive material off-site. So, nuclear decommissioning is a hazardous industrial activity that demands careful planning, execution, and constant monitoring; it's not the end of the story, but the beginning of another phase in the life cycle of nuclear facilities. This is what we want to highlight in our project.

> *Nuclear decommissioning is not the end of the story, but the beginning of another phase in the life cycle of nuclear facilities.*

UL: Is there a final thought you'd like to share?

DOI: 10.5282/rcc-springs-17462

DO: Well, the first thing I want to say is: stay tuned because the project website is almost ready and will be available soon. We will also build a digital archive with the interviews we are conducting. This will be an open source for communities, experts, and scholars who are interested in decommissioning. Last but not least, we will use the website to launch our documentary in 2030.

. . .

Acknowledgements

I'd like to thank the Rachel Carson Center, particularly Christof Mauch and Sonja Dümpelmann for believing in this project and for their support. I also need to say that without Lena Engel, the managing director of the RCC, this project would be much more complicated. She is unbelievably knowledgeable and supportive. I'm also grateful for the opportunity to talk about the project.

Notes

[1] Per Högselius, "Atomic Shocks of the Old: Putting Water at the Center of Nuclear Energy History," *Technology and Culture* 63, no. 1 (2022): 1–30, https://dx.doi.org/10.1353/tech.2022.0000.

[2] Martin Pasqualetti, *Nuclear Decommissioning and Society: Public Links to a New Technology* (Routledge, 1990); Michele Laraia, *Nuclear Decommissioning: Its History, Development and Current Status* (Springer, 2018).

[3] Rebekka Bärenbold, Muhammad Maladoh Bah, Rebecca Lordan-Perrt, Björn Steigerwald, Christian von Hirschhausen, Ben Wealer, Hannes Weigt et al., "Decommissioning of Commercial Nuclear Power Plants: Insights from a Multiple-Case Study," *Renewable and Sustainable Energy Reviews* 201 (2024): 114621, https://doi.org/10.1016/j.rser.2024.114621; Angelica Greco and Daisaku Yamamoto, "Geographical Political Economy of Nuclear Power Plant Closures," *Geoforum* 106 (2019): 234–43, https://doi.org/10.1016/j.geoforum.2019.08.017; Petra-Tjitske Kalshoven, "The Fish Is in the Water and the Water Is in the Fish: Symbiosis in a Nuclear Whale Fall," *Cultural Anthropology* 37, no. 2 (2022): 349–78, https://doi.org/10.14506/ca37.2.11; Mauro Elli, "The Missing Decision: Nuclear Decommissioning and the Issue of the Waste Repository in Late Twentieth-Century Italy," *Contemporanea* 27, no. 3 (2024): 429–56, https://doi.org/10.1409/114590; Melanie Mbah, Viktoria Noka, Alexandra Lampke, Ryan Kelly, and Sophie Kuppler, "What Is Nuclear Cultural Heritage? Developing an Analytical Framework," *Energy Research and Social Science* 124: 104050, https://doi.org/10.1016/j.erss.2025.104050.

[4] "Nuclear Decommissioning," ed. Estelle Marais and Emma Midgley, *IAEA Bulletin*, April 2023, https://www.iaea.org/sites/default/files/nucleardecomissioning.pdf.

[5] *Summary of Staff Review and Findings of the 2019 Decommissioning Funding Status Reports from Operating and Decommissioning Power Reactor Licensees* (United States Nuclear Regulatory Commission, 2019), https://www.nrc.gov/docs/ML1934/ML19346E375.html.

[6] Andrew Blowers, *The Legacy of Nuclear Power* (Routledge, 2017).

[7] Başak Saraç-Lesavre, "Desire for the 'Worst': Extending Nuclear Attachments in Southeastern New Mexico," *EPD Society and Space* 38, no. 4 (2020): 753–71, https://doi.org/10.1177/0263775819889969; Kalshoven, "The Fish Is in the Water and the Water Is in the Fish"; Marissa Bell, "'We Are a Nuclear Community': The Ethical, Political Economic, and Social Relations of Canadian Nuclear Waste Siting," *Antipode* 57, no. 4 (2025): 1299–319, https://doi.org/10.1111/anti.13034.

[8] Mary Douglas, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo* (Praeger, 1966).

[9] *Socioeconomic Impacts from Nuclear Power Plant Closure and Decommissioning: Host Community Experiences, Best Practices and Recommendations* (Nuclear Decommissioning Collaborative, 2020); Elisabeth Sinclair and Jim A. Hamilton, "New Life at Old Plants: Exploring Solar Power Development at Former Nuclear Power Plant Sites in the United States," *The Electricity Journal* 36, no. 6 (2023): 107301, https://doi.org/10.1016/j.tej.2023.107301.

[10] Allison Macfarlane and Edwing Rodney, eds., *Uncertainty Underground: Yucca Mountain and the Nations' High Level Nuclear Waste* (MIT Press, 2006); Maria Rosaria Di Nucci, "Breaking the Stalemate: The Challenge of Nuclear Waste Governance in Italy," in *Nuclear Waste Governance: An International Comparison*, ed. Achim Brunnengräber, Maria Rosaria Di Nucci, Ana María Isidoro Losada, Lutz Mez, and Miranda A. Schreurs (Springer, 2015); Rony Emmenegger, "Nuclear Strata: Enacting Clay for the Deep Geological Disposal of Nuclear Waste in Switzerland," *Environment and Planning E: Nature and Space* 8, no. 3 (2024): 978–1001,

DOI: 10.5282/rcc-springs-17462

https://doi.org/10.1177/25148486251324935; Vincent Ialenti, *Deep Time Reckoning: How Future Thinking Can Help Earth Now* (MIT Press, 2020).

[11] Casey Huegel, *Cleaning up the Bomb Factory: Grassroots Activism and Nuclear Waste in the Midwest* (University of Washington Press, 2024); Shiloh R. Krupar, *Hot Spotter's Report: Military Fables of Toxic Waste* (University of Minnesota Press, 2014).

[12] Kalshoven, "The Fish Is in the Water and the Water Is in the Fish."

DOI: 10.5282/rcc-springs-17462

Davide Orsini holds a PhD in anthropology and history and a certificate in science, technology, and society (STS) from the University of Michigan. His research has focused on the social, political, and ecological implications of nuclear-power applications after WWII. Davide is PI of the research project "(Dis)Empowered Communities: A Comparative Study of Decommissioning Nuclear Sites," based at the RCC. He previously was a Marie Skłodowska-Curie Fellow at the RCC, a Zurich-Munich Fellow, and assistant professor at Mississippi State University.

Uwe Lübken is lecturer and coordinator of the MA program Environment and Society at the RCC. He has held teaching and research positions at the universities of Cologne, Munich, and at the German Historical Institute in Washington, DC. His publications include a prize-winning book on the US perception of the National Socialist threat to Latin America and several edited volumes, special issues, and articles on (US) transnational and environmental history.

Cite this article

Orsini, Davide, and Uwe Lübken. "(Dis)Empowered Communities: A Conversation with Davide Orsini." *Springs: The Rachel Carson Center Review*, no. 8 (November 2025). http://doi.org/10.5282/rcc-springs-17462.

Springs: *The Rachel Carson Center Review* is an open-access online publication for peer-reviewed articles, creative nonfiction, and artistic contributions that showcase the work of the Rachel Carson Center for Environment and Society (RCC) and its community across the world. In the spirit of Rachel Carson, it publishes sharp writing with an impact. Surveying the interrelationship between environmental and social changes from a wealth of disciplines and perspectives, it is a place to share rigorous research, test out fresh ideas, question old ones, and to advance public and scholarly debates in the environmental humanities and beyond.

Springs is available online. To view, please visit
https://springs-rcc.org

ISSN 2751-9317

Rachel Carson Center