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Exclusive public—an analysis of public participation in the site selection procedure for a repository for nuclear waste

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The aim of this article is to highlight and conceptualize key aspects of social closures that impact the German nuclear waste management case. According to the German legislator, the public must be involved in the search for a final repository for high-level radioactive waste. *De facto*, however, almost the entire population of Germany is excluded. In this article, processes of social closure are identified which lead to this and more extensive problematic situations with regard to procedural gaps. The participatory claim of the procedure already contains indeterminacies, participation conditions and concrete exclusions that make broad participation impossible. Based on the analysis of social closures to the outside and to the inside, it is shown that this participation only includes extremely few, generally better-off citizens and does not meet the claim to represent the public. Above all, closure mechanisms have an external effect, due to the characteristics of a supposed separation between people and their natural environment, the nation-statehood, and a limitation to symptom control. Internal closures function due to ignorance of unequal social positions, nuclear-historical amnesia, and the decoupling of safety and justice. This article ends with the conceptual creation of an exclusive public, which describes a process of state instrumentalization of public participation.

KEYWORDS

participation, exclusive public, site identification, repository, high-level radioactive waste, Germany, Max Weber, Ulrich Beck

1 Introduction

Considerably less than 1 % of the population living in Germany has so far taken part in the opportunities for citizens to participate in the finding¹ of a final repository. Of the only

1 In contrast to the legal term “site selection,” the term “site search” is used predominantly by those involved in the process. This is already reflected by the name of the current participation format “Forum on the search for a final repository,” but also consistently at the interface between the Federal Office and citizens, such as the “Info-Mobile on the search for a final repository” or the Federal introductory events “Co-creators wanted – basics on the search for a final repository.” Even in nuclear waste management research, the term “site search” is widely used, for example 14 times in the project description of the TRANSENS project (Transens, 2019). In this text, the concept of site-finding is introduced as a more

0.0005 percent in the beginning, only 0.00003 percent are left in the procedure until 2022.² In this article, a kind of participation is considered which is described by the term public, but which is neither representative nor ideal-typical for the public in the Federal Republic of Germany. So how does the difference between the claim of public participation and this opposite practice come about? And what exclusion mechanisms operate beyond this national framework? In order to answer these questions, the concept of social closure according to Weber (1922) and Beck's (1986) risk-society theory will be applied here. These two theoretical approaches provide an insightful framework for analyzing the public participation that has taken place so far.

Weber developed the concept of social closure in his Weber (1922). A social closure includes exclusions, limitations, but it also occurs when participation is merely conditional. Thus, it is not exclusively about forms of non-participation. There is also a distinction as to whether social closure is directed outward or inward. The former deals with rational interests of exclusion, such as maximizing opportunities or monopolizing resources. The latter describes, within an already closed group, its own hierarchical structure with restrictive functioning (cf. Mackert, 2020, p. 156). For example, the characteristic of class membership can structure a group both internally and externally. Access for members of a given class may be completely impossible, while other class members are part of the group. Within the group of citizens involved there is a hierarchy based on structural categories such as class. This paper applies this approach to elaborate the structural features for the context of public participation in the siting of a repository.

The analysis of this field of research is particularly compatible with the work of Ulrich Beck. First and foremost, he dealt with the topic of nuclear energy in his popular diagnosis of a risk society (Beck, 1986). In 1986, he already examined the consequences of this way of producing energy and the role of science in this context. With regard to the public participation procedure examined here, there are topical links to Beck's work. This legally anchored procedure is itself a direct consequence of the use of nuclear energy and is also massively influenced by science. Beck used a sociological perspective to point out the pitfalls of the production cycle of nuclear energy in terms of content (the industrialized society is endangering itself as 'progress' produces threatening risks) and societal structure (ecological risks are becoming increasingly invisible due to increasing individualization). His work provided an essential conceptual framework that, under the

term risk society, has become part of the international vocabulary (Schäfers, 2016).

Beck operates with the concepts of community and society. In sociology, community emphasizes shared social norms within a group, while a society can be made up of different communities whose social norms are not broadly shared. Communities are constituted consecutively through closure processes. Beck described the risk community. This research analyzes those closures that are constitutive of the participation community in the German site selection procedure. In this article, his findings are applied to the specific object of research, the German participation procedure, and, subjected to a theory-based analysis. While Weber's concept of social closure serves as a heuristic for this article, Beck's assumptions provide an argumentative framework for analogies.

Analyzing the German site selection procedure for high-level radioactive waste, this article addresses a central and current topic of climate and environmental policy. A comprehensive analysis of processes of social closure has not yet been published when it comes to the field of a repository for nuclear waste or in the context of public participation in Germany. There is research on individual aspects, for example, such as gender distribution in specific formats (Schwarz et al., 2021b, p. 14) or on civil society organizations that fundamentally reject the procedure (Schwarz et al., 2021a, p. 2; Schwarz et al., 2021b, p. 17). What these studies have in common, however, is that they are not placed in the context of structural exclusions and ultimately remain at the level of individual-deterministic explanatory approaches ("people do not participate due to a lack of interest"). In addition, in this article a new concept will be developed under the title *exclusive public*. This concept describes a contradiction between the claim to address society as a whole as the goal of public participation and comprehensive closure processes that lead to a situation in which only an exclusive group of citizens are involved. Hence, the literature on participation research in general (for example Nanz and Fritsche, 2012; von Unger, 2014; Nanz and Leggewie, 2018), as well as with regard to the German case (for example Schwarz et al., 2021a,b; Themann et al., 2021a,b, 2023; Sieveking et al., 2022; Brunnengräber et al., 2024), is thus expanded by an analysis and conceptualization of social closures. Neither of the two exist yet. The existing literature has not used the notion of social closures, neither in the Weberian terms nor in a in a systemizing and comprehensive manner, to analyze these phenomena. This research contributes to a comprehensive understanding of closure processes that can be transferred, beyond the context of nuclear waste management, to public participation processes in the context of democratic systems.

The article is structured as follows. In the following section the research object, the methodological approach and the documents are described. This is followed by the results section, which first examines the claim of the participatory site-finding procedure as defined in the Site Selection Act (StandAG, 2022). Who is involved as the public and how, is the focus of the following two subsections of the results section. In these two sections, the field of participation is analyzed in terms of different social closures. The focus is on social closures externally and internally. At the end of this article, the contents are discussed and finally concluded with the contradictory rhetorical figure of an *exclusive public*.

adequate description than site-search. The German procedure does not allow for any alternative to the selection of a site (or possibly some sites). However, the concept of search includes the possibility that nothing might be found. According to the StandAG, this option does not exist, so that the term suggests a scope for action that is not available. This primarily assigns the public a legitimizing role for a fundamental decision that has already been made.

² The registration numbers in the group of citizens at the *Fachkonferenz Teilgebiete* in 2021 decreased gradually from about 400 to about 300 to about 200 people. Finally, only 25 people from the self-identified group of citizens were involved in the *Forum Endlagersuche* in 2022. Another event took place in November 2023, without this number being announced. See for an analysis of the last event in 2023: Brunnengräber et al. (2024).

2 The site selection procedure

The research object of this study is the German public participation procedure in the so-called final repository site search for high-level radioactive waste. The participation considered here is legally anchored in the StandAG and has been practiced since 2020. The “search” is divided into three phases. In the first phase, the geologically feasible regions are currently being determined on the basis of existing data. The feasible area for a repository has so far been narrowed down to 54% of the German territory. In the two subsequent phases, surface and underground explorations will be undertaken. In the course of the first phase, three consultation meetings lasting several days and a kick-off meeting of the *Fachkonferenz Teilgebiete* (FKTG) took place in 2020 and 2021 to involve citizens. At the request of the stakeholders,³ a successor format was arranged in 2022 – the *Forum Endlagersuche* (FES). Both consecutive formats consist of citizen dialogs which were initially implemented purely online, due to Covid-19, and are now hybrid. These are intended to provide a platform for exchange in the form of lectures, discussions and working groups, above all between interested citizens and governmental institutionalized experts.

This type of a participation procedure is not new, as it is part of existing formal participation formats at federal level in Germany that go beyond elections. Since 2011, for example, there has been an Enquete-participation program in which “interested citizens accompany the work of the 17 experts officially appointed by the Bundestag to the Enquete Commission as the 18th expert”⁴ (Nanz and Fritsche, 2012, p. 22). Another popular example is the Citizens’ Assembly on Nutrition. Between 2023 and 2024, 160 people, representing Germany’s citizens, drew up nine political recommendations with the involvement of experts on the topic of “Nutrition in transition: between a private matter and state responsibilities.” However, the scale of the procedure analyzed here is unique, as the entire population is invited to participate directly. This is not just about those who have a vested interest, but potentially about everyone.

The legally anchored participation procedure is a state response to the decades-long conflict between anti-nuclear movements and actors at federal and state levels, which have accumulated in the protests over the Gorleben repository site since the 1970s (Schreurs, 2012; Brunnengräber, 2019). From 2014 to 2016, a state-mandated commission (Commission for the Disposal of High-Level Waste) developed proposals for the amendment of this law, also using participation formats such as citizen conferences, workshops or online discussion forums (Krick, 2021, p. 283). While the StandAG now calls on the entire population, the previous participation procedures were only aimed at stakeholders. The commission’s findings were finally handed over to the Bundestag, which adopted large parts of it. Despite the lack of comparability due to different target groups, the preceding

stakeholder participation procedure provides initial indications that women, for example, were strongly underrepresented and that the most popular German anti-nuclear NGO *ausgestrahlt* rejected the process (Krick, 2021, p. 291). Following on from these initial indications, there is a need for research to analyze the continuity and extend of social closures in current processes.

3 Materials and methods

This research topic is examined by applying the method of theory-based document analysis (Mayring and Fenzl, 2014; Mayring, 2023). A qualitative evaluation of scientific literature and the legal normative basis (StandAG) for German public participation in the context of a final repository was carried out. In doing so, the results are deductively mapped to Weber’s theory of social closure introduced above. The documents were searched via the databases Primo of Freie Universität Berlin, Google Scholar and ScienceDirect, so that a reciprocal verification was created. A temporal restriction of the data corpus was applied in that the public participation process started in 2020 and scientific analyses of the process were published only afterwards. The end of data collection was set for the end of 2022, so that the total publication period covers three years. Access to the documents was possible without exception via the institutional access rights of Freie Universität Berlin. Using the German terms “Endlager” (engl. Final repository) and “Bürgerbeteiligung” (engl. Public participation), 77 articles were found (see Annex 1). For example, interviews, conference abstracts and lectures listed as academic sources were excluded from the hit list. Duplications, such as individual contributions from an anthology already listed, have been deleted. Since only 15 articles provided information on processes of social closure, gray literature was also exploratorily consulted, first and foremost from state-institutionalized actors as well as from civil society. In addition, older articles from the research field were used to form hypotheses.

The evaluation was categorized along processes of social closure internally and externally. A partially open approach was chosen, since the focus on social closure in the form of exclusions or internal hierarchies was determined in advance on the basis of theory. The two deductive codes⁵ “inside” and “outside” are based on Weber’s theory. They represent a level of meaning. Below this is a further level of meaning, which was formed with inductive codes, as there was no comprehensive analysis of social closures for the subject of the case. Which concrete categories came about this way, remained open at the beginning of the evaluation and was worked out from the material by proceeding from the general to the specific. Looking inwards, the inductive codes include “unequal social positions,” “nuclear-historical amnesia,” and “decoupling of safety and justice.” Looking outward, the inductive codes also include “human-nature dichotomy,” “nation-statehood,” and “combating symptoms.” Hence, the evaluation led to the formation of two main categories and three subcategories in each main category, which are presented below in the results section.

³ This was based on the final report of *Fachkonferenz Teilgebiete*, which was written by the preparation working group (*Arbeitsgruppe Vorbereitung*). The working group consisted of 26 people from local authorities, the interested public, academia and organized civil society, some of whom joined and left the group over the seven-month process.

⁴ The original German texts in this article were translated by the author.

⁵ Coding scheme in Annex 2; Example of a coded document section in Annex 3.

4 Results

In this section, the legally defined claim of public participation is first subjected to an examination, so that the current state is presented before the closure processes. Only by determining the current state of affairs, the processes described below can be aligned and classified. This is followed by the results on social closures along the two main categories of outward and inward. In each of these, three aspects are highlighted as dominant patterns underlying the current process.

4.1 The participatory claim in the German site selection procedure

The sovereign of a democratic state is its citizens. By means of elections, they transfer their political decision-making shares to representatives who are charged with acting in the interest of the voters. With site selection, this shift of power in the sense of communicative capabilities (Arendt, 1970) is at least partially reversed. The participation of citizens in political decision-making can be interpreted as a process of social opening. As will be shown in this paper, this opening process takes place under a variety of social closures. Moreover, this opening is only made possible by the fact that a closure has already preceded it by delegating decisions to political representatives.

By the participatory orientation in StandAG the legislator pursues the goal of achieving a *broad social consensus* as well as *tolerance* on the part of those affected [StandAG §2, 5(1)]. Both of these objectives are *to be reached*⁶ by the participation of citizens and lead to complementing the decisions of representative democracy (Smeddinck, 2021, p. 494). It is thus a matter of reassurance to the population and, beyond that, of increasing the legitimacy of the decisions made by the state. The citizens are supposed to have a say and ultimately agree, but “the fundamental decisions [...] are made by the Bundestag” (Smeddinck, 2021). This is preceded by a review by the supervisory authority, the Federal Office for the Safety of Nuclear Waste Management (BASE). The basic issue has already been decided: A deep geological repository for high-level radioactive waste of German provenance is to be constructed within Germany. The citizens are to provide the decision with a higher degree of legitimacy that is acceptable to society as a whole. This is due to the stipulated process objective, because even in case of doubt, contradiction or dispute, any form of participation ultimately leads to the final repository. Whether the participants agree or not, they will not stop a repository. Thus, even doubting participants will attach a confirming effect to the process. The state actors are thus looking for citizens who legitimize the process on the basis of the participatory claim.

However, it is disputed which form of participation is exactly aimed at. On the one hand, a “lack of concretization resp. differentiation [of the participatory aspect defined in the law]” (Isidoro Losada, 2021, p. 152) leads to uncertainties in implementation. How many people should participate and agree on a repository in

order to reach a *broad consensus* has not been specified in the StandAG. On the other hand, a procedure “with as much public participation as possible” (Bauchmüller, 2021, p. 7) is demanded. Whether it is a matter of as many participants as possible or merely those who can make themselves heard in the process thus remains unanswered. Also concerning the procedural practice, it remains undefined who is specifically meant by the term public. There is a mishmash of terms, such as general public, interested public, expert public, civil society actors or citizens. The latter term in particular points to overlapping roles, since the employees of state authorities or the scientifically institutionalized stakeholders are no less citizens. Finally, contradictory formulations such as that of a “highly specialized expert public” (Weißpflug et al., 2022, p. 5) can also be found. Highly specialized expertise acts as an access barrier for a broad public participation due to, for example, specialist vocabulary or general comprehensibility. Hence, the wording used here of highly specialized expertise includes a distinguishing feature from the general public.

Contrary to the variety of terms, only a few people have been involved in this process so far. This is evidenced not only by the small number of citizens involved but also by the people who can be identified by name and who are supposed to represent society as a whole, such as the citizens or social representatives in the Repository Commission,⁷ the National Monitoring Committee⁸ and the Forum Repository Search planning team.⁹ Furthermore, there are overlaps in personnel here. Consequently, this public participation can be seen as a deeply self-referential process of cognition with considerable voids that resembles an echo chamber. What follows is a further elaboration of this phenomenon in terms of processes of social closure. This is done from the outside in. Following concentric circles, the different aspects are presented according to their qualitative degree of influence (comprehensive to specific) on the participation procedure. While the social closures to the inside appear to be specific to the German case, all aspects listed in this article are relevant for the German site selection procedure examined here.

4.2 Social closure to the outside

Social closure takes place with reference to certain group characteristics. In this process, a community of interests is formed that monopolizes certain opportunities through closure (Mackert, 2020, p. 157). In the following, three exclusion processes are highlighted based on their characteristics. In the context of public participation, various representatives of the public are involved from the community, constituted by closures. By means of the closures, the opportunities for co-determination (§ 5) about a repository are monopolized.

Firstly, closure regarding humans' natural environment is evident in the characteristic of a socially constructed human-nature

⁶ The German law § 5(1) StandAG states “Lösung finden.” It does not refer to reaching a consensus or fostering tolerance, so the idea of helping to find a solution has been explicitly written down here.

⁷ The analysis of first names is of limited value, but it can reveal trends based on, for example, gender identities, migration experiences, and social inequalities: Bernhard, Erhard, Georg, Gerd, Jörg, Klaus, Ralf and Edeltraud.

⁸ Armin, Arnjo, Günther, Josef, Klaus, Manfred, Markus, Rainer, Roland, Tobias, Werner as well as Anette, Jorina, Magdalena, Maria-Theresia, Marion, Miranda, Monika.

⁹ Andreas, Farras, Heiko, Johannes, Manfred, Oliver as well as Asta, Bettina, Eva, Miranda, Monika.

dichotomy. This closure affects public participation most extensively, as it is a phenomenon of literally universal scope. Here the human environment is not seen as a partial aspect of the social but as something else. It is a spatial externalization to the advantage of humans over their natural environment (problem shifting to others). This goes beyond a critique of anthropocentrism (Nolt, 2015), as the global social order of capitalism is essential for the exploitative ways of thinking and acting through nuclear energy. Aspects of energy use are inevitably intertwined with systemic political-economic issues.

In the field of final repository siting, the unwanted high-level radioactive waste is to be externalized to the hitherto non-capitalistically incorporated “spatially other,” at least 300 meters below the earth’s surface. Germany’s Environment Minister Steffi Lemke calls for a repository that “functions independently of human civilization” (BASE, 2022a, p. 9). By the closed focus in the procedure on deep geological rock layers, the participants are suggested to imagine spaces without humans or even living beings. In doing so, such a kind of outsourcing socially constructs a supposed otherness that humans attribute to their natural environment, as a result of which the natural environment is understood as a cheap product (Patel and Moore, 2017). However, humanity cannot be separated from her*his natural environment, but is much more immanent to it (Kirchhoff, 2020). Especially Beck’s time diagnosis underlines “the end of the opposition between nature and society [...]. The social theories of the 19th century essentially conceived of nature as given, assigned, to be subjugated; but thus, always as something opposite, alien, as non-society. The industrialization process itself has annulled these insinuations, historically falsified them, as it were” (Beck, 1986, p. 107). Thus, repository siting is based on the inherently contradictory assumption that “only through permanent isolation” (Kuppler and Bechthold, 2022, p. 33) can humans be protected from their own achievements. However, it is precisely through the development of deep geology that the initially unattainable is made attainable. What used to be the depths of the oceans,¹⁰ a remote gravel pit or a disused mine, is now the deep geological repository. In egocentric continuity, humanity places itself above its natural environment and incorporates it. With regard to the field of participation, here a public is supposed to participate in an incorporating kind of outsourcing without the natural environment being able to represent its rights in this process vis-à-vis human. Under the primacy of total human domination, the human environment is considered to be developable and exploitable. The connection between a capitalist way of life and the appropriation of natural environment becomes clear. “The higher the economic numbers, prosperity indicators, and prosperity ambitions rose in democratic-capitalist societies, the deeper the earth’s soil had to be dug and drilled around the world” (Lessenich, 2022, p. 85). The repository process can be seen as a blueprint, as other processes of appropriation of a supposedly “spatially other” by humans are being driven forward for disposal purposes. For example, climate protection minister Robert Habeck already announced deep geological CO₂ storage by means of so-called carbon capture and storage (Denk, 2024a). The final repository for nuclear waste sets an example of deep

geological waste disposal, paving the way for other waste materials, so that fundamental issues can be more easily neglected in the future, as they have supposedly already been dealt with in this process. Final storage is an integral part of a profit-oriented industry whose waste is part of a capitalist exploitation process. Citizens are involved in a process in which their participation makes them complicit with industrial interests. Because the “appropriation [...] of living nature [is] an incorporation of value” (Lessenich, 2020, p. 120). However, the profits are already distributed among the actors of the nuclear industry.

Secondly, a closure takes place along the characteristic of nation-statehood. Public participation is based on a German legal foundation, is embedded in German institutions, and primarily addresses German citizens. The citizens who provide legitimacy are sought within a limited state container that currently encompasses some 83 million people and closes abruptly at supposedly precise borders, some of which run through the middle of towns and villages. Herein lies a process of social closure, as a public sphere is determined along state affiliations and particular-state conceptions of citizenship. According to StandAG §10 (2), people from neighboring countries will be involved at a later stage of the procedure. In the procedure so far, non-German citizens are to be located first and foremost from the context of the Swiss repository, so that again these are predominantly German-speaking people. The national closure becomes problematic because it is a transnational risk. High-level radioactive contamination does not stop at national borders (Beck, 1986; Blowers, 1999). In the same way, cancer sequelae, for example, cannot be reduced to the narrow boundaries of states, since they simply do not carry designations of origin. Even the downstream focus on riparian states seems inadequate if, for example, a catastrophic event results in more widespread¹¹ impacts or the high-level radioactive waste is elsewhere used willfully as a means of violence. The participation process negates people such as those on the Atlantic coast of Portugal, where German nuclear waste amounting to 480 casks has been dumped into the sea and has been leaking from rusting casks into the immediate environment since 1967 (Nuclear Free Future Foundation et al., 2022, p. 50). The potential impact of high-level radioactive waste, including of German provenance, is ultimately global. Beck describes such closure as methodological nationalism, which becomes evident as a result of a globalization of risks and capital. Research subjects such as the final repository for high-level radioactive waste can only be inadequately analyzed through a national lens, because the subject matter encompasses transnational communities of risk (Beck and Grande, 2010, p. 194). Moreover, this narrow focus is subject to a logical flaw in thinking, as it implies that every country using nuclear industry is provided with deep geological repository options. However, this is anything but certain with regard to island states or, for example, the deep geological conditions in the Netherlands. Not every individual state using nuclear power can construct its own final repository, so that a moral problem remains with regard to global solidarity.

10 For example, Germany has dumped nuclear waste into the Atlantic. In addition, Germany is directly affected by the storage of high-level radioactive waste of Soviet provenance in the Baltic Sea.

11 There are no empirical values for the catastrophic case of a repository. But there are values for the migration of radioactivity: “Radioactive dust from Australia has been found [for example in] Antarctica, a good 7,000km away” (Nuclear Free Future Foundation et al., 2022, p. 36).

While the public addressed by the participation procedure is narrowly defined by the nation-state, more spatially heterogeneous origins can already be identified in the causation of the problem of nuclear waste. Today, a final repository is being sought for waste products that initially came from two different states whose borders and state communities no longer exist in their original form. This results in problematic situations, for example with regard to legal systems and resulting actions. An example of this is the curiosity that after German reunification “the legacy of SDAG¹² Wismut [was] disposed of on site in Thuringia, according to the previously applicable and weaker protective norms of the GDR’s radiation protection law” (Nuclear Free Future Foundation et al., 2022, p. 25), although this state and its legal system no longer existed at the time of final repository. In addition, the area of concern was significantly expanded with the fall of the Berlin Wall, since the follow-up costs were also financed by West German citizens. The “German taxpayers have spent about 6.8 billion Euros until 2020 for the cleanup of the legacy of uranium mining in Saxony and Thuringia” (Nuclear Free Future Foundation et al., 2022, p. 23). This shows that affected areas are subject to permanent change. The current public is supposed to contribute to finding a final repository for high-level radioactive waste within the borders of a state entity that is only about 30 years old, and this for a period of one million years, including ten ice ages. The idea of state is itself not even 400 years old, so that it can be assumed that well before one million years, in all modest probability, a country like Germany might no longer exist in its present territorial form.

The impermanence of the territory of the community of concern is also underlined by the fact that the current state itself is younger than the planned repository for high-level radioactive waste will last. The bottom line is that the participation community constituted on the basis of this closure appears to be inadequate for the long-term repository for high-level radioactive waste. With regard to the time horizon, the spatial interests are not covered by the present selection. Due to the loss of validity of the current area of responsibility, groups that have not been taken into account to date will in the future also be formally integrated into the risk community. Fundamental decisions around a repository will then already have been made, although the inconsistency of this narrowly focused approach was clear from the beginning given the global concerns.

Finally, social closure based on the characteristic of nation-statehood involves the exclusion of people who, as a consequence of German nuclear power use, are confronted with radioactive waste in other regions of the world. Here, the final repository siting appears as a phenomenon which, in view of the global production cycles (especially of uranium), has come out of nowhere. The fuel rods used¹³ for German society were produced under conditions of the considerable exploitation of humans and their environment in other regions of the world (Isidoro Losada, 2016). For example, debates about reparation payments for damages in uranium mining areas on

the part of the polluters from the private sector and the state as well as the end users are consistently omitted from the German search for a final repository. The Aarhus Convention of the United Nations Economic Commission for Europe offers individual citizens a right of appeal and right of action (UNECE, 1998). However, this approach does not offer adequate public participation across borders, as only 47 states have ratified this treaty, hardly any citizens are aware of it, and the possibilities for taking legal action are considerably restricted by individual access to legal remedies.

Radioactive waste has also been created at these sites and will continue to exist into the distant future. A political calculation of the nationally-institutionalized final repository commission and legislator can be recognized with regard to a nationally-led repository planning process: The guilt of causing damage is to be buried – out of sight, out of mind. For example, claims for reparations payments are also buried. Here again the socio-spatial closure takes effect. Compensation is not discussed because people from, for example, extraction areas in other regions of the world are not considered in the StandAG or in procedural practice. For example, uranium was extracted for Germany at the Ranger mine in Australia. This mine is located on the land of the Mirarr indigenous group. In 2013 alone, “one million liters of radioactive sludge” (Nuclear Free Future Foundation et al., 2022, p. 31) flowed into the Mirarr environment, so there is a direct link here to the use of German nuclear energy and ultimately to questions about the consequences around the world. This brings us to dealing with survivors of people who lost their lives in uranium mining for Germany’s nuclear industry. Public participation here operates largely in the dark, partly because the Gronau fuel element factory, for example, has to this day concealed the origin of its uranium from the German population.

With a repository in Germany, there is the assumption that the global (exploitation) connections will be veiled even more, due to a lack of visibility among the German population. Furthermore, this repository policy can be used externally as a component of interstate competition and as a moral advantage over other states. The current site selection procedure is deeply embedded in a continuity of colonial thinking, as global interrelationships are completely ignored and negative consequences are therefore externalized.¹⁴ As a result, an externalizing country like Germany becomes morally superior, which can lead to processes of devaluation, finger-pointing and the supposed construction of being developed compared to countries in the Global South. This is because a “successful” final repository for high-level radioactive waste is fundamentally based on outsourcing practices in the form of, for example, overexploitation of people and nature in uranium mining areas in the Global South. Politically, this can lead to relationships of dependency between governments, as Germany could be seen as a role model, even though this colonial mentality ultimately reinforces global inequalities. Yet the destruction of the natural environment in the uranium mining areas is in many cases due to lifestyles in the global North (Frank, 1970; Lessenich, 2016). The use

12 Soviet-German joint stock company (SDAG).

13 Here, the difference between an interim (use) and an irreversible use is to be emphasized. This involves the loss of resources that will no longer be available in the future. Here Beck speaks of ecological expropriation (Beck, 1986, p. 50). In German, a linguistic distinction can be made here between *benutzen* and *vernutzen*.

14 For example, there is not a single active uranium extraction site in the European Union (EU), while around 100 nuclear power plants are operated in the EU. The production step of uranium extraction in particular leads to socio-ecological damage. All major uranium companies are located in the Global North, so that valorization takes place primarily in these countries.

of nuclear power is based on an outsourcing of negative consequences to other regions of the world. Public participation in the process of finding a final repository reproduces these global inequalities by keeping the number of people competing for influence in this process small, through a nation-state limitation. In the federal repository procedure, an intergovernmental or even global solution is prohibited by law.

Thirdly, the narrow focus on the repository results in a social closure to actors combating symptoms instead of causes. Here, citizens are sought who are supposed to consider the high-level radioactive waste without addressing the question of its production. This procedure was already running while the production of high-level radioactive waste continued for several years. Still today, members of the government demand the purchase of nuclear fuel elements and thus the production of new waste (*Süddeutsche Zeitung*, 2023). Thus, this procedure is not about first creating the conditions of a *never-again nuclear energy* with regard to the systemic level, for example fixing it in the Basic Law, but about a “market-expansive secondary industrialization of consequences and symptoms” (Beck, 1986, p. 291). The cause of the problem is an industry whose consequence is high-level radioactive waste. However, the problem is not tried to be solved where it arises but is maintained by a kind of “shunting yard” (Beck, 1986, p. 296) and passed on to people living in the future. Finding a final repository site does not address the root cause, that is, the production of radioactive waste. Instead, only a symptom is treated. On the contrary, a solution of final repository can argumentatively strengthen the production of further waste (We can do it!). As a result, new constraints emerge, described by Beck as “problem-solution-problem-production chains” (Beck, 1986, p. 295). Just how fast-moving political decisions are and how easy it is to change the Nuclear Energy Act has recently been demonstrated by the German government when it unceremoniously canceled¹⁵ the nuclear phase-out at the end of 2022. Not only is the phase-out highly fragile from a legal point of view, but it is also only envisaged in parts. For example, the private-sector uranium enrichment plant in Gronau, the research reactor in Garching and the Jülich Research Center were excluded from the German nuclear phase-out. The conditions for developing new nuclear technologies simply continue to exist. Subsequently, a potential repository is not so much an end point as an element of maintaining the German nuclear complex (also for commercial purposes like in Gronau).

The economic conditions are left out of the process that produced the technology whose wastes will persist as eternal burdens (Brunnengräber, 2019). According to the law, the role of the public is to contribute to the legitimacy of the process, not to critically illuminate and negotiate the relationship between nuclear energy, the enabling system, and high-level radioactive waste. The danger seems obvious; a public participation process that merely mitigates symptoms ultimately props up a system that produces eternal burdens. With this, Beck identifies a “structural disadvantage of politics [because] the economy is not responsible for something it triggers,

and politics is responsible for something over which it has no control” (Brunnengräber, 2019, p. 363). Thus, it also applies for the current case object that politics “not only has the trouble (with publicity [...]), but is also constantly held responsible for something whose denial is becoming increasingly difficult, but whose causation and change is not at all within its direct radius of influence” (Brunnengräber, 2019). Thus, the nuclear industry companies are neither involved nor visible in this process as producers of this kind of waste. The problems are now to be solved by the state, for example in the form of the supervisory, participation, research, licensing and regulatory authority BASE. The quite emotionally charged debate at the public participation forums is currently taking place between critical citizens and state representatives. Originally, the nuclear industry was the enemy of many citizens’ initiatives. This image has changed. Citizens now see the state as the enemy. This is an example of a shift in focus in society as a whole, as “the perceived erosion of the democratic-capitalist social contract is not blamed on “the economy” or the economic functional elites, but rather on “politics” or the “political class”” (Lessenich, 2020, p. 126). In this research field, this picture is further reinforced by the fact that there are personnel continuities between state institutions and the nuclear industry.¹⁶

In this process, the state actors such as BASE and Bundesgesellschaft für Endlagerung (BGE) are responsible for remedying the negative consequences of a high-risk industry, but in doing so they close the space for combating causes by decoupling causation and final repository. The assumption that “the repository issue [has been] decoupled from the issue [...] of nuclear energy use and its dangers” (Weißpflug et al., 2022, p. 4) is thereby misleading. Finding a final repository site is directly linked to the creation of nuclear waste through questions of justice and therefore also through questions of safety. Around the negative industrial consequences, the high-level radioactive waste, a kind of market full of dependencies (in Beck’s words a secondary industry) has emerged which continuously includes political, scientific and, with public participation at the latest, also civil society actors in a system of supply and demand. The market logic is reflected, for example, by the compulsion for self-preservation. The two state institutions mentioned above owe their existence first and foremost to the nuclear industry – without the problem there is simply no need for problem solvers. On the part of the citizens to be involved there are dependencies, such as for recognition, concern or remuneration, which can lead to bias. In such a system there exist incentives that ultimately preclude a fundamental oppositional role in the participation formats. Thus, these actors also become

¹⁵ The term “lifetime extension” appears misleading, as the Nuclear Energy Act had to be amended by the German Bundestag for this purpose. The phase-out that was originally negotiated and enshrined in law was thus canceled.

¹⁶ This can be seen in individual cases such as BGE managing director Steffen Kanitz moving to RWE or Bruno Thomauske moving from the Federal Office for Radiation Protection to Vattenfall (the former is a nuclear licensing authority for the latter). But also at the institutional level Deutsche Gesellschaft zum Bau und Betrieb von Endlagern für Abfallstoffe (DBE), which was majority-owned by the nuclear industry, eventually became part of the BGE. According to pseudonymous statements by a BGZ employee, an estimated 80% of BGZ employees at its site came from the nuclear company PreussenElektra, formerly E.ON. BGZ also took over the two interim storage sites Ahaus and Gorleben with about 150 employees of Gesellschaft für Nuklear-Service (GNS), which is a subsidiary of the four German nuclear energy companies and manufacturer of the CASTOR container.

“part-participants and legitimizing instances of continuing constraints” (Beck, 1986, p. 292) by helping to enable and maintain public participation while omitting combating causes. The participation process does not offer any specific dialog spaces for criticizing the system and the industry, since the focus is narrowed to combating symptoms.

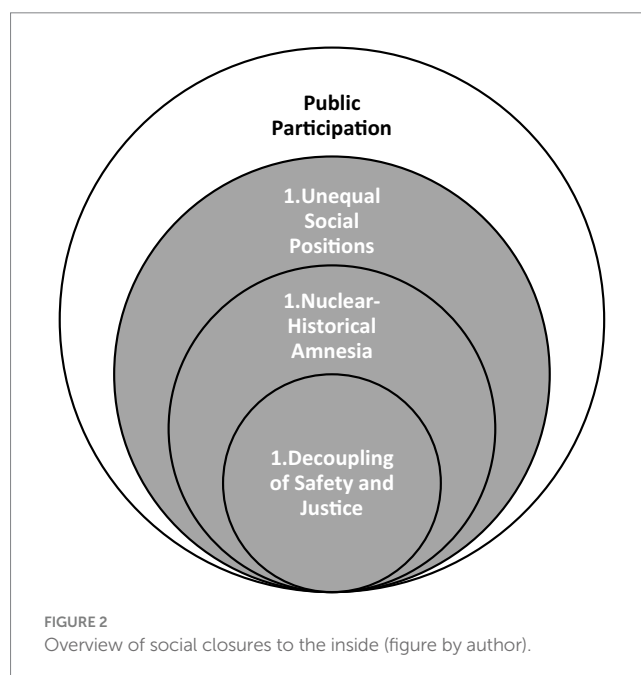
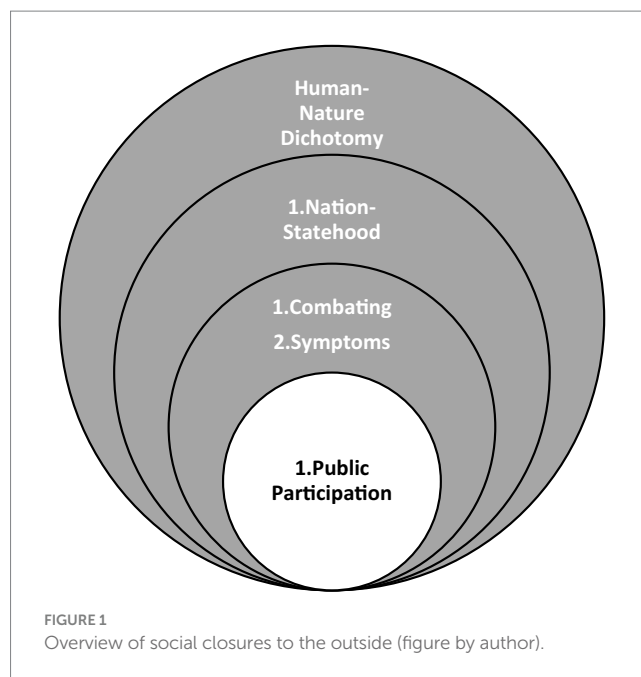
Ultimately, the consequences of a repository can only be estimated and thus prevented to a certain extent, so that a symptom solution can even generate further, new problems which in turn will burden people living in the future over a long period of time. In the siting regions, for example, there may be social upheaval or ecological damage. In addition, a repository creates a network of new necessities, which generates and maintains constraints around, for example, maintenance and monitoring as well as the preservation of knowledge. A repository will involve the construction and operation of a conditioning plant and an input storage facility, so that people in the siting region will be directly affected by the process beyond the transport of the casks to and from the repository. “Compensation for unavoidable damage” (ESK, 2023, p. 4) is already being anticipated. Thus, a repository cannot be seen as a solution to the problem of nuclear energy but as an attempt to address the symptom of high-level radioactive waste. However, radioactive waste will cause further problems in the future. And citizens involved in the participation procedure are explicitly urged to treat only the symptom.

All three of the outward social closures shown can currently be seen in the field of public participation (Figure 1). Although social inequalities result from this, these processes are reproduced instead of reduced. Beck writes that a characteristic of the “meritocracy [is] the (pseudo) legitimization of social inequalities [which] will only unfold in its full problematic in the future” (ESK, 2023, p. 159). Things are quite similar here. The German procedure does not call into question these three phenomena of closure: Making the natural environment different to humans, nation-state containment and symptom focus. Both the legislature and the executive Federal agencies follow a procedure that implies these exclusions as having no alternative.

4.3 Social closure to the inside

Processes of inward social closure can be observed within the group that is closed to the outside world. The analysis focuses on various structures and modes of operation through which the participants are either advantaged or disadvantaged in their actions. Three processes are highlighted below: a negation of social differences, nuclear-historical amnesia, and the decoupling of safety and justice (Figure 2).

Firstly, in the field of public participation in the search for a repository site, different social starting positions are negated and, as a consequence, all people in this group are treated as if they were equal. As a result of this equalizing mode of operation, people who are socially better off are given preferential treatment, while people who are worse off find it difficult or impossible to gain access. Within the German procedure of finding a final repository site, the narrative of a single, homogeneous public that will come to a consensus is taken for granted. This appeal to the collective responsibility of the German population is countered by the fact that (nuclear) energy has been used very unequally across German society (Großmann et al., 2017). In particular, wealthy social classes leave a significantly larger nuclear



footprint. For example, across countries, the top 10% use about 20 times more energy than the bottom 10% (Oswald et al., 2020). There is a further contradiction in that those wealthier strata of society have greater capital (Bourdieu, 1982, 1992), which they in turn can use to their advantage in the process of public participation.

The focus on unequal social positions is crucial, since public participation is structured by them to a high degree. The historically shaped unequal distribution determines a person's social position in a social structure that can be described in terms of four types of capital (Bourdieu, 1982, 1992). These are social, economic, cultural and symbolic capital. With regard to economic capital, for example, there is a powerful connection here, because “those who are wealthy, well qualified and integrated into the labor market are more visible in the

public sphere than poor or unemployed people” (Böhnke, 2009, p. 56). In addition, citizens are increasingly giving up their civic engagement when they become impoverished (Böhnke, 2009, p. 59).

Further reasons for disadvantage can be described by the other types of capital. The view of purely formal access restrictions in public participation neglects exclusionary, milieu-specific factors such as socialized interest in the subject matter, available time, common technical terms, personal contacts to process participants, behavioral certainties among these groups and prejudiced identity affiliations like regional origin. These factors are by no means unknown in academic literature, since it is precisely the lack of time, rudimentary expertise, rhetorical skills and a self-confident demeanor that are among the common factors for non-participation (Jörke, 2010). The previous formats of public participation were largely blind to these disadvantages, because only those who appeared self-motivated and expressed themselves were included.

Dominant social categories are largely ignored in the federal repository procedure. In addition to the category of nation-state (place) described above, class, gender and race are the three most dominant social structuring categories (Martín Alcoff and Mendieta, 2003). With regard to gender, initial research data can already be drawn from existing analyses. In the *FKTG* procedure, men participated at least twice as often as women (Schwarz et al., 2021b, p. 14), and in the *FES*, men took twice as many speaking turns in the observed AGs (ratio m/w=2:1). In addition, a preference for academically educated people is clearly visible in the aspect of communication. The educated middle class dominates the process on the basis of better social positions, expertise, technical language, neologisms or the ability to think analytically. This becomes clear in the regular thematization by the participants in the events that have already taken place. This resulted, for example, in the working group on repository didactics at the *FKTG*, which was called for by interested citizens and addressed the topic of understanding. Although the participation process is already well advanced, there has been no systematic elaboration of social structures by the state organizations leading the process. This shows a need for research in the form of a social structure analysis of the participants, however there is no information about this from the organizer of the formats. Without knowledge of how the field is structured and appropriate regulation, however, those who can articulate themselves from their privileged position are heard first and foremost.

As described earlier, it can be assumed that other structural inequalities are also at work in public participation. A first indication of this can be found in the first names of the participants listed above, which do not reflect Germany’s society. It is worth examining the assumption that, as in German society, the characteristics of (dis)ablism (Wansing et al., 2022) and experience of racism (Bös, 2020) also limit participation in terms of “access to resources such as market or organizational power, education and income” (Bös, 2020). For example, the Federal Environment Agency also emphasizes in the context of environmental participation procedures “that the probability of participation of actors is essentially determined by their socio-structural disposition” (Rohr et al., 2017, p. 12). Moreover, the “White Male Effect” is already known with regard to risk perceptions (Finucane et al., 2000; Kalof et al., 2002; Kahan et al., 2007; McCright and Dunlap, 2013) and to climate skepticism (Krange et al., 2019), so that behavioral patterns of this dominant group, such as a self-overestimation by white male to execute gigantic infrastructure

projects (deep geological construction project for a million years), can also be assumed for the identification of the final repository site. A person’s self-confidence is fundamentally dependent on his or her social position and consequently the more privileged they are, the higher their self-confidence will be (Houben and Rehbein 2022, p. 261). Thus, even the gigantic targeting of public participation leads to the preferential treatment of better-off people, as they have the necessary self-confidence in the sense of a supposed self-efficacy. The social figure of the “old white man” (Lessenich, 2022, p. 113) is merely the most visible result of the negation of socio-structural disadvantages in public participation.

Social capital in the form of social networks, among other things, significantly determines access to participation. In the field of repository siting, for example, the institutions of the National Monitoring Committee (NBG) and the Council of the Young Generation (RdjG) stand out. The former came into being after a random sampling according to parity criteria of gender, age, region of residence and resulted in a pool of 170 people. These then determined an electoral body which in turn was responsible for the final selection of citizens. The latter was established out of the state-initiated process and was, in particular, a result of the *FKTG*. Neither institution, however, takes class-specific categories into account, so that once again a level playing field is assumed. Yet, knowledge about both institutions (NBG and RdjG) is already dependent on personal access, for example, via people from one’s own environment who are already involved. The age-based preferential treatment of “young” people may seem obviously warranted, but here there remain the fundamental contradictions of not taking unequal social positions into account. Institutions such as these reproduce predominantly homogeneous class structures, for example with regard to academically shaped knowledge, and in decision-making processes there prevail particularly charismatic, more media-present people with more conformist positions (Rendueles, 2022, p. 217 ff.). At the same time this creates a new injustice, in that organized citizens gain an advantage over non-organized citizens. They are simply perceived, heard and included more strongly.

If the decision about the location takes place under privilege-blind conditions, this will be at the expense of disadvantaged people, since they have fewer resources in the struggle for interpretation, for example, to articulate problems and assert their own approaches to solutions. From a psychological perspective, this kind of disadvantage leads, for example, to citizens who are worse off either not expressing their opinions at all or only doing so with a delay and, in the latter case, often limiting their statements significantly (Keltner et al., 2003; Lewin Loyd et al., 2010). Above all, knowledge of a repository siting process is particularly unevenly distributed. It can be assumed that the majority of people in Germany might never have heard of this process and consequently will not be able to participate in the decision. The broad social consensus is currently much more contrasted by a *broad social ignorance*.

Finally, a particularly striking example of an inward closure due to unequal social conditions is time prosperity¹⁷ as distinct from time

¹⁷ For the concepts of time prosperity and time necessity, see Rosa (2017). Beck used the concept of time sovereignty in a similar meaning (Beck, 1986, p. 230).

poverty. Time prosperity means the freedom to live the way we want, i.e., a state in which people can make their own decisions about their time and lifestyle (Rosa et al., 2014, S.9). All socio-economic situations can be affected by time poverty, but time prosperity occurs predominantly in better-off social positions. People who have a high level of time prosperity can participate in participation formats at an advantage and play a greater role in them than others. One reason for this is that it requires a great deal of work, communication and understanding, which are unequally distributed depending on social position, which is by no means to be understood as a human trait but rather to specific class structures. Freely available time can be directly exchanged for cultural capital. In addition to exclusive access to participation procedures, this also involves privileged positions concerning knowledge and communication. If a public sphere is created where the necessities of the private sphere are satisfied (Arendt, 2003), then participation in the public sphere is fundamentally dependent on privileges. For example, people who engage in unpaid care work in their private lives are disadvantaged in this process because they have less creative freedom and are more burdened compared to people not doing care work. In turn, constraints of a private nature are closely linked to wage dependencies, be it the financing of livelihood or the fulfillment of social expectations.

Given such a structure, voluntary work therefore favors people without any dependencies, such as the need to work, to raise children or to provide care. This aspect was even emphasized by those who already have access to the process and are heard in it. Representatives of the National Monitoring Committee stating to the environmental committee of the Bundestag described, for example, a demoralization¹⁸ of civil society in the procedure (NBG, 2022). In the opening speech of the last participation procedure *FES*, representatives of the planning team reported about preparatory meetings finishing as late as just before 2 am. In short, this procedure appeals mainly to privileged, better-off people and institutional participants who participate in their quality as paid representatives of an organization. Representatives of the planning team also report on a form of work that overtaxes almost everyone. The problem, they say, lies in the amount of work that cannot be done and a high volume of information that cannot be provided in the context of an honorary appointment. This began already during the preparation for the *FES*, which had a deterrent effect, as several hundred pages of documents were shared. A very high burden due to the workload was also already reported by the participating citizens in the previous *FKTG* (Themann et al., 2021a, p. 7 and p. 15), so that this problem runs through the entire process of public participation without, however, having been adequately addressed by BASE or the BGE in the meantime.

In sum, the goal of creating tolerance among citizens for the siting decision remains a highly distorted project, due to blindness to social differences and that most of the people lack knowledge about the repository project. The restriction to an interested public completely ignores the fact that people's interest in the repository project is essentially dependent on their social position and ultimately reproduces existing inequalities.

Secondly, public participation is structured inwardly by a nuclear-historical amnesia. Thereby, an ahistorical perspective is pursued,

because aspects such as an ecological debt or unequal starting positions of municipalities as well as regions are negated recurrently in nuclear history. The lesson from the nuclear history of the Federal Republic of Germany anchored in the StandAG is to treat all municipalities and regions as if they were equal, so that now with this public participation a "forgetting of unequal conditions" is pursued. Equalization, however, prevents equality. Considerations of the advantages and disadvantages to be included were thus made impossible in advance.

The supposed solution to this problem placed in the StandAG is a veil of oblivion in the form of an exclusive focus on aspects of geological and public management sciences. The claim that only geological arguments matter negates the social embeddedness of geology as well as seemingly legitimizing existing inequalities – "the egalitarian surface of the market, democracy, legal institutions, and ideology obscures the structures of inequality" (Houben and Rehbein 2022, p. 86). In other words, this egalitarian approach once again favors the already better-off.

People in structurally weak regions in particular are again at risk of being disadvantaged by such equalization. Historically, siting decisions have been very unevenly distributed. The nuclear industry siting decisions, such as the salt dome in Gorleben or nuclear power plants like the one in Gundremmingen (Rau, 2020), mostly involved remote, structurally weak communities with socially worse-off populations (Meyer, 2022, p. 20). As was the case then, structurally weak regions today must resist the lure of additional tax revenues and potential compensation based on practical constraints, while structurally strong regions can politically trade their capital for site avoidance. This is also where a complex influence on those involved in the process takes effect, which is already clearly visible, for example, in the financing of regional coordination offices, the organization of expert conferences, or statements by state politicians¹⁹ expressed in leading media.

The industry will be completely relieved of the burden of determining the location, so that there will not even be a debate about a possible merger of the newly affected parties created by a repository and the companies of the nuclear industry with their existing sites. On the contrary, the companies will benefit from a massive increase in the value of their plant sites once the power plants have been dismantled and the waste has been literally foisted on another community. There is also a need for research where those households are located that have used an above-average amount of (nuclear) energy. There is a lack of knowledge, particularly with regard to the unequal causation and facilitation of nuclear energy. As a result, all people in Germany are held equally responsible, from the nuclear past to the present. Energy-intensive corporate locations as well as wealthy, energy-intensive communities are equated with energy-poor ones. Thus, the procedure does not include any intention to consider socio-spatial aspects of justice, for example with regard to the enabling of nuclear energy or the socio-ecological damage caused by nuclear energy.

¹⁸ Those involved described the image of attrition.

¹⁹ "Prime Minister Markus Söder strictly rejects the idea that two-thirds of Bavaria should be considered for a final repository," <https://www.sueddeutsche.de/bayern/bayern-atommuell-endlager-soeder-1.5047773>.

The history-blind procedural approach is strongly reminiscent of assumptions of a terra incognita²⁰ or a state of tabula rasa²¹ that were widespread in the context of colonial and hegemonic land grabs in previous centuries. Ignorance of the harm to previously unaffected people and unequal social positions is a blank space in the German site selection procedure that can be interpreted as a historical continuity. As then, the justification for the efficacy and evidence of social inequalities is incumbent on the worse off today. As long as these inequalities are not addressed, the assumption of irrelevance and equality holds.

There is no doubt that these are complex issues of causation, affectedness and unequal positions of negotiation. For example, the communities close to a power plant were able to build local infrastructure paid for by the tax revenues and benefits of the operators. The current and future residents of these communities also benefit from the tax revenues collected at the time, for example through the use of the infrastructure financed by them. Paradoxical remains the situation of those residents who have protested against a nuclear power plant or interim storage facility but whose community has at the same time profited economically from it. These aspects must be negotiated. Otherwise, public participation based on the assumption that all communities are equal ultimately reproduces existing inequalities.

Thirdly, the functioning of public participation is characterized by the decoupling of safety and justice. Both aspects are decoupled by the narrow focus on geological aspects. Authors of BASE claim that “the priority in managing a repository for nuclear waste is safety [...] only the best possible safety should be decisive” (Weißpflug et al., 2022, p. 15). The best possible safety of a site aimed at according to StandAG is thereby limited to one discipline. Due to the primacy of geology, a specific kind of expert knowledge is not only prioritized but determined as the only valid one, so that cross-disciplinary and overall societal perspectives are missing within the ongoing consideration. Here, considerations of justice seem to be prior to geology, but *de facto* they are placed second to it.

This makes the experiential or lay knowledge of the broad population to be involved irrelevant for the actual site selection. Instead, the political motive of the public participation procedure is obviously meant as preventive de-escalation. With this, the authorities de-qualify the broad masses in terms of their ability to understand, since supposedly the subject matter is initially only understandable to highly specialized experts (Weißpflug et al., 2022, p. 5). However, comprehensibility is always a question of knowledge transfer, the choice of language and the degree of abstraction, i.e., adaptable characteristics depending on the target group. A purely technocratic procedure that is incomprehensible to the majority leads to widespread non-interest, as is currently observable. Thus, the procedure itself has a depoliticizing effect. On the other hand, the fairest possible siting leads to the safest possible repository, since only by including the most controversial perspectives in the sense of a

corrective, crucial gaps for safety can be uncovered (Fiorino, 1990; Nanz and Leggewie, 2018). After all, one goal of public participation is to institutionally provoke knowledge conflicts through “an interdisciplinary, diverse composition of advisory bodies as well as the inclusion of stakeholders and laypersons [...]” (Münkler, 2022, p. 12). Provocation is absent from the German repository project, as repository siting is dominated by geology and issues of equity are confused with egalitarianism.

Following Weber’s understanding of “objectivity” (Weber, 1904, p. 22), an essential meaning of “social science [is] to face and deal with the impossibility of certain knowledge, not to deny it factually” (Dobusch, 2022, p. 39). The narrow focus on geology, on the other hand, resembles ideology. Seen through the singular-disciplinary lens, the complex subject of a repository for high-level radioactive waste appears manageable. The *technofix* on the basis of supposed controllability is communicated to the citizens in the participation process and set as a framework for participation. The former president of the German authority responsible for high-level radioactive waste, Wolfram König, sees in the repository “a permanent safety for human and the environment” (BASE, 2022a, p. 6) and pleads for keeping the waste away from the biosphere. But the biosphere extends to about five kilometers below ground, so that a repository at a depth of about 300 meters will stay in the biosphere. No matter the depth, nuclear waste will always remain part of the Earth’s ecosystem and never becomes completely unattainable. The idea of permanently removing nuclear waste from people as far as possible seems arbitrary with maintaining the option of retrieving nuclear waste. During the ongoing German process, plans are already being discussed as to how deep-stored nuclear waste can be accessed again. The StandAG states that the possibility of retrieval must be provided for the duration of the operating phase of the repository and the possibility of “Bergbarkeit” (the unplanned retrieval of radioactive waste as an emergency measure) for 500 years after the planned closure of the repository. Restricting the site selection process to the discipline of geology therefore ignores the aspect that this waste will continue to be part of social processes.

It is overlooked that the aspect of safety is fundamentally linked to a human coexistence that is as just as possible. In this context, it must be taken into account that high-level radioactive waste will continue to be part of society, even becoming increasingly accessible to many, because of increasing geological activities and by means of technological developments,²² such as its democratization. Even if, in about a century, the waste will be buried and, despite all the risks, there has not been, for example, subsidence, an earthquake, or damage to groundwater that would cause new injustices, the waste will nevertheless continue to influence human coexistence. The knowledge of this alone will result in fear, blame or attempts at instrumentalization, which can lead to individual or collective attempts to retrieve high-level radioactive waste.

20 This term was used to describe areas not yet “discovered” by Europe, supposedly “empty” areas, and thus to negate, devalue and, not least, in large part destroy already predominant populations of a continent.

21 Tabula Rasa describes a state of emptiness in which all prior influence is negated.

22 The one-sided reading of technological optimism is particularly visible in this case study. While assumptions about future technical developments, for example with regard to transmutation, are often negotiated, an increasing technologization of the broad society and the resulting simplified accessibility to a deep geological repository has so far not been addressed by any technical event or even funding project.

5 Discussion

This section reflects on the findings of the analysis of social closure. First, the processes of social closure shown consistently also include a temporal component, which suggests biases in the decision-making process. For example, a decision by the current social group is subject to temporal externalization because it is made for the benefit of current actors. The decision of what to do with a one-million-year risk has been (a deep geological repository) and will be (exact location) determined in the upcoming decades. The assumption that this risk can be handled in this way only becomes possible via the time advantage of having the decision monopoly at present. Assuming that adequate decisions in this regard can be made implies taking advantage of one's own position. Based on the claim that this high-risk technology can be handled, a supposedly necessary action is constructed by the legislator and the industry. Pretending to act on behalf of future living people, the present society can also legitimize its benefiting from nuclear energy with the supposed solution of the problem of high-level radioactive waste by way of a final repository.

Subsequently, it is necessary to place the findings within the broader context of the existing economic and social system. In this system, there are the market economy beliefs of an ever further potentiating technological optimization, a compensation of the affected repository community as well as the supposedly equality between potential sites. This, in turn, is based on a valorization and venality which is exploited by (not only economically) capital-strong actors to their advantage. The citizens to be involved are embedded in this system, shaped by it and restricted by structural dependencies. As argued in this paper, the unequal social positions are crucial for the access, understanding, and comprehension of public participation. According to StandAG, a single (to a few) municipality(ies) alone will bear the burden of an entire industry, an entire country for at least a million years. This can be interpreted as a disadvantage of one municipality compared to all others in all probability.

From a relational perspective, the pursuit of maximum safety conversely means an initial situation for the selection of a repository site of maximum danger. This danger is here brought to one place, and consequently a community is deprived of many of its future options. Mechanisms of trivialization take effect, such as by attempts to make this problem object (more) acceptable through positive reinterpretations. Through compensatory measures, the affected location is supposed to become more attractive, although in a cynical²³ way people are still attracted to a place of danger through these measures. The citizens involved are confronted with these mechanisms inherent to the system in the participation procedure. Whether they can detach themselves from them cannot be answered conclusively here, but the extremely powerful influences can be pointed out. An example of this is the scenario in which the citizens agree with the disadvantage of a siting community and approve of this decision. Already in the 1980s, Beck (1986, p. 159) foresaw that in the German meritocracy social inequalities are (seemingly)

legitimized and “remaining or intensifying inequalities coincide” (Beck, 1986, p. 158). This means, for example, that the bundling of burdens onto one municipality is legitimized under the pretext of a trustworthy procedure (for example through participation, transparency and the claim of being science-based). However, there is no causality here: Regardless of whether the procedure is trustworthy or not, the bundling of burdens can already be interpreted as being unfair. Consequently, the participation procedure acts as a reproduction of existing inequalities which, in their bundling with procedural inequalities, reinforce existing inequalities, for example with regard to participation.

Thus, in the field of the search for a final repository it becomes no less clear that, in the Beckian sense, capitalism continuously incorporates new participants but as a result will also produce further crises. The citizens involved run the risk of being instrumentalized by this process of increasing acceptance. While high-level radioactive waste was initially the product of the nuclear industry, it is now political, scientific and also civil society actors who are incorporated into a potentiating, system-immanent reproduction of social inequalities. This can also reveal further conflict potentials in the future, for example when citizens involved are held responsible for the site selection and the accompanying (de) legitimation. Here, history would repeat itself, for example, with regard to the legitimization of a high-risk technology, since the establishment of an exploratory mine for a repository in the Gorleben salt dome had already functioned as proof for the operating license of German nuclear power plants. According to the German Atomic Energy Act, nuclear power plants were allowed to be operated given the existing quasi-repository. Another example can be found in the nationally narrowly guided final repository site finding which in turn delegitimizes supranational efforts regarding the handling of high-level radioactive waste. As part of the process, the citizens involved are implicated in these consequences. In particular, their role is to generate legitimacy for decision-making.

The authors of BASE also use the term “acceptability” to call for more respect and appreciation of a political decision on a location and distinguish this from the attempt to merely procure acceptance (Weißpflug et al., 2022, p. 8–9). However, both objectives, obtaining acceptance and striving for recognition, do not imply that the public involved could reject the decision-making process or evaluate it as incomprehensible. Acceptability and seeking acceptance are therefore not as fundamentally different as they are portrayed. In both cases, the procedure is intended to create legitimacy. This is problematic because the procedural goal of consensus appears contradictory in this case: An extreme minority is supposed to bear the overall burden of nuclear waste. Because a consensus across society in the narrower sense means the illusory consent of everyone, consensus in the broader sense is ultimately the rule of the majority over a minority. To counteract this, a procedure for maximum minority protection with affirmative measures would be needed. Instead of making everyone equal, there would be the need to make the best possible effort in such a procedure to protect the available municipalities from a repository.

As demonstrated, an “elitist project” looms in repository siting (Smeddinck, 2021, p. 502–503). However, all social closures also, conversely, hold transformative potentials that can strengthen public participation. Further research is needed to elaborate on these transformative potentials and implement them in practice. To counteract an “elitist project,” for example, there is a need of power-sensitive public participation, above all by giving preference to

²³ The evaluation of cynical is based on the fact that incentives are set here that are intended to have a persuasive effect. Well aware of the massive potential dangers of high-level radioactive waste, communities in emergency situations or financial dependencies are exposed to these incentives.

marginalized voices, since these are not heard to a particular extent. This means that people from disadvantaged positions in society should be given priority in the process.

This involves, for example, the format of the participation procedure. Up to now, it has been assumed that interested parties come to the participation events and that access restrictions are negated in the process. A power-sensitive approach turns this assumption around and seeks participation from those who are to be involved (Denk, 2024b). Contrary to the current conception in the German procedure, in which citizens come to centralized events of BASE and BGE, there is a lack of formats of targeted outreach to worse-off people. A first approach here is the BASE-Info-Mobile,²⁴ a state-organized traveling exhibition, which goes to selected cities for citizen dialog. However, this format operates on the principle of indiscriminate distribution instead of targeted support for the less well off. The prerequisites for interest in the event are once again knowledge of the event and an advanced level of education. In the end, it remains central locations in cities to which people must come in a self-motivated manner. A freely accessible format without affirmative subsidies for marginalized people always favors better-off people, so that up to now an effect of depoliticization has resulted from the aim to empower through participation after appropriation of state actors – legitimacy through non-participation. As a result, the few citizens involved benefit. Through these processes, one's own opportunities are maximized, for example regarding problems that are externalized, and the weight of one's own decisions is increased vis-à-vis people living in the future – one believes that one is doing the right thing. This side of participatory processes has not been adequately addressed in earlier literature.

6 Conclusion

With this theory-based document analysis, for the first time, a model of social closures could be developed for the political field of public participation. This closes an existing research gap conceptually and theoretically, as identified by Brunnengräber et al. (2024) or Themann et al. (2023), since questions on social closures have so far been addressed individually but not in a systematized and comprehensive way. In this research, it can be seen that the organizers of the public participation procedure do not take into account who is not involved and why. This might lead to the oversimplified legitimization pattern that citizens supposedly show a lack of interest. At the end of this analysis, an oxymoron comes to mind – *the exclusive public*. This self-contradictory group appeal (the participation procedure is intended to address the German public, but it remains exclusive and thus appears contradictory) is emblematic of the kind of public participation examined here. This procedure excludes a supposedly different kind of nature, the majority of the world's population, and actors responsible for causing the problem. It structures participants internally based on the aspects of unequal starting positions, nuclear history, and the primacy of geology. This

analysis shows a need for further research in course of which the respective aspects of closure are pursued further in individual studies in order to test the conclusions reached and further develop the theoretical approach adopted in this article.

In this participation process, the exclusive public has a legitimizing role that more nuclear waste could be generated in the future. This means that the usefulness of the entire procedure is at stake as long as the closure processes are not counteracted. Public participation is fundamentally undermined by the fact that the private nuclear industry has been completely excluded from the process with regard to waste generation, responsibility and future prevention. As a basis for such a procedure, there is no legally binding agreement that the industry will never again produce high-level radioactive waste, the constructed object to be solved as necessary (to have to dispose of the radioactive waste). Such a civil contract has neither been negotiated in the Basic Law nor even at a supranational level, for example at the United Nations. In addition, the German nuclear complex continues to produce nuclear fuel rods, thus nuclear waste, and “uranium enrichment and uranium centrifuge technology make Germany a silent nuclear power that keeps the technical path to the atomic bomb open” (Nuclear Free Future Foundation et al., 2022, p. 38). The participation process therefore currently lacks the basic requirements for a successful process from the perspective of justice and security. In its current form, the political activation of citizens in this particular field is ultimately legitimizing a nuclear complex that neglects causes like nuclear waste generation, contexts like unequal responsibilities, impacts and resources as well as systemic issues like the exploitation of nature and its immanence in the economy.

Data availability statement

The original contributions presented in the study are included in the article/[Supplementary material](#), further inquiries can be directed to the corresponding author.

Ethics statement

Ethical approval was not required for the study involving human data in accordance with the local legislation and institutional requirements. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and institutional requirements.

Author contributions

AD: Writing – original draft.

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²⁴ According to the federal agency, about 3,700 people nationwide participated in 13 appointments in 11 cities between May and October 2022 (BASE, 2022b).

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpos.2024.1271062/full#supplementary-material>

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