

Short report containing observations and suggestions for improvements in the U.S. Department of Energy's (DOE) consent-based siting process for one or more consolidated interim storage facilities for spent nuclear fuel

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(11 September 2023)

1 Introduction

This short report is prepared as part of the services required in the Contractual agreement N2300021 between the U.S. Nuclear Waste Technical Review Board (NWTRB) and Piet Zuidema. The report is based upon the review of some material by DOE before attending the meetings with the Board and the workshop, on the preparation of the slides used at the workshop and on the participation in the meeting with a few members of the NWTRB and NWTRB staff on 24 April 2023 in Washington, the workshop on 29 April and the meeting on 30 April both in Idaho Falls as well as discussions with some of the DOE staff during the stay in Idaho Falls.

For the site selection process, several approaches are possible as **different advanced programs** show (e.g., (in alphabetical order) Belgium (for LLW), Canada, Finland, France, Germany, Sweden, Switzerland). A range of issues are considered important, e.g.:

- The **legal and regulatory framework** (what do the applicable laws and regulations require), e.g. nuclear and radiation safety, environmental protection, land-use planning, etc. with some of them also defining which stakeholders need to be involved in the site-selection process.
- The **stakeholders formally involved** in the site selection process besides the implementer / applicant (e.g., parliament, government/ministries/offices/agencies, states/provinces/cantons, other entities (tribes, etc.), communities) with their roles and responsibilities being clearly defined.
- The importance of **providing support to the communities/cantons/states** (resources, experts, methodological guidance/insights) to manage the process.
- The **history of site selection** in the different programs that all experienced some difficulties, in some countries only minor (e.g., Finland and Sweden), in other countries more severe. History sometimes has left its traces (e.g., mistrust in some organizations, (perceived) in-transparency in the process).
- More subtle, the **values of different stakeholders** (explicitly stated or implicitly lived) that do not necessarily fully overlap between the different stakeholders and the importance of the **behavior of individuals in key positions** within the site-selection process (*'It is the persons that make the difference'*).

To get some more insight on the experiences made in the different countries, it might be worthwhile for the NWTRB and/or DOE to get in touch with some of the **senior people that were involved** in the critical phases of site selection in the different countries. This could include:

- Belgium (Jean-Paul Minon, Philippe Lalieux)
- Canada (M. Ben Belfadhel, besides those that have already been contacted such as Liza Frizzell)
- Finland (Timo Aikas, Juhani Vira)
- France (Patrick Landais)
- Germany (Michael Sailer)

- Sweden (Claes Thegerström, besides Saida Engström)
- Switzerland (Markus Fritschi, besides Piet Zuidema)

2 Observations and suggestions

Based on the DOE-reports on the consent-based site selection process looked at before the meetings, on the presentations made and the discussions taken place at the meetings / workshop and the experience made in Switzerland, some observations and suggestions are made on the proposed consent-based site selection process for nuclear facilities. First, the observations are briefly described and then the suggestions to address the observations are discussed. Both the observations and suggestions focus mainly on the weaknesses and the positive aspects are hardly discussed; thus, the note is biased towards the negative side with the aim to contribute with this to the improvement of the planned site selection process. Finally, a big caveat should be made: first of all, I am not in depth familiar with the current site-selection process and may thus have overlooked important information and, second, I may have misunderstood some of the writing or discussion. In this sense, be critical about my remarks and apologies for any mistakes.

2.1 The difficulties & challenges in the US consent-based site selection process

2.1.1 With currently **available and planned material** (with the proposed additional material often not that clearly described), it will be a **challenge to provide convincing arguments for communities to engage** and to eventually host a nuclear facility.

From the reports it seems that ‘the benefit outweighing the drawbacks’ would be the main motivation for a community to site a nuclear facility. However, I did not get a clear picture on the material to be developed on this or other aspects; for me it is not clear what messages are planned to be conveyed and with what these messages are underpinned to make communities to engage. The idea to use the implemented consortia for getting ‘down the road’ on developing some ideas / material is good, but it still needs thoughts on the content and on how to put this in practice. Especially the message ‘benefits should outweigh the drawbacks’ without providing some ideas on how to describe / quantify some potential benefits (and what the communities have to do for that) and drawbacks, does not give a sufficiently ‘warm feeling’. Furthermore, nothing was said about the distribution of benefits and drawbacks – are they evenly distributed, or could it happen, that some have all the benefits while others have all the drawbacks in heterogeneous community / region? ... or could the benefits be very local, and the drawbacks be more widely spread? These issues should be mentioned / discussed; if this becomes an issue at a later stage and is now not mentioned this could again lead to some mistrust.

2.1.2 A **process with insufficient separation of roles and responsibilities** with DOE having too many roles. DOE defining the process (the rules of the process), being the implementer (having a vested interest in the outcome of the process) and also being in charge of running the process without any clearly implemented control-process (e.g., by putting interim results / the path forward to independent review and approval e.g. by an independent stakeholder) may - based on the experience made in Switzerland - lead to failure due to insufficient acceptance by society.

The **combination of the role of DOE as implementer with DOE’s other roles** (architect of the process, process-owner during execution of the process) is in contrast to the Swiss ‘sectoral plan’, where Nagra as implementer has an important role, but is not the dominating in the process. Equally or even more important is the **process owner as neutral entity** to keep the process on track – the role of the neutral process owner seems to be missing in the currently

proposed US consent-based site-selection process. Also, the other stakeholders like the cantons (with their experts) seem to be missing – the **states seem not to have a formal role**. In the US, the regulator has its role, but that role seems not to be very prominent in the interaction with other stakeholders. This is in contrast to the Swiss ‘sectoral plan’, where the regulatory bodies, the cantons with their expert groups, the regional conferences (with their decisions at the general assemblies) and with their expert groups are all involved in the process. All these stakeholders have clearly defined formal roles in their active involvement in the site selection process. All of them also provide **input to decision-making** during the review or in the consultation phase and are heard when preparing the decision by the Federal Government.

Then, there are also some specific issues of US process such as managing the history with some groups not having been treated fair or not having been recognized as involved – it is clearly acknowledged in the reports / presentations that improvements are needed but how this is then put into practice is at least for me still pretty vague – this is acceptable, but as the development and implementation of process is already advancing (see initiated Consortia), this becomes an urgent issue to clarify on how to put things in practice.

- 2.1.3 **Completeness of the current description of the site selection-process:** There seem to be issues that are currently not fully covered by process-description (e.g., criteria to be used when too many communities volunteer, upfront screening of site suitability from the safety and/or technical feasibility point of view (accessibility, site conditions), etc.).
- 2.1.4 Reluctance to embark in a process because of **mistrust in the key actor** (DOE) that should drive the process (DOE, to a lesser extent the Congress that has not taken more pro-active actions), partially also magnified by the (perceived) missing transparency in past activities / processes managed by these actors (mainly DOE). This mistrust in DOE in combination with DOE having (too) many roles might lead to tensions in the site selection process and most likely makes the planned site selection process difficult if no measures are being taken. In the reports and in the discussion, I did not see anything put in practice to mitigate mistrust in DOE.
- 2.1.5 The **challenge for the communities (and/or other entities) to manage the process** of forming an opinion about hosting a consolidated interim storage facility (role of elects, heterogeneity of people with the risk of polarization, etc.) with the risk that a community does not come to any conclusion within the available time.

As additional challenge comes from the poorly defined **role of the neighboring communities, of the state and of other entities** (e.g., the tribes). If not clarified in the process description, this could well lead to additional conflicts already very early in the process.

With these things being unclear, to me the attractiveness of embarking on the site-selection process with the currently available material seems not to be very high. The reservations get even bigger, when taking the **time allocated to the different steps** of the process into account – in my view (based on the experience in Switzerland) – the time is too short to manage the process in a community, except if DOE provides soon a clear description of the process that demonstrates convincingly that this can be managed in the time suggested; if already available, the corresponding report should be made available to the consortia.

With only very limited time available, it could well happen that a community will not be able to manage and ‘fall out of the process’ in the time available and will be left with a ‘polarized’ society in its community **in a less favorable societal situation** than before getting involved in the site selection process – the process of polarizing society has been observed in some programs at certain stages in their site selection process.

- 2.1.6 The current **legal / political framework potentially may provide only limited possibilities to improve the situation** (other / additional actors formally involved in the process; the way of running the process), time available for the process, more clear description of the waste management program (incl. disposal), etc.).

As far as I understood it and as several other people also have expressed their reservations during the meetings, there seem to be only limited feasible possibilities to change something related to the process and the formal actors involved with the currently given political / legal framework; law gives few possibilities for change, and the topic is not high enough in the agenda of Congress to change the law or give other directions to administration.

2.2 Some suggestions to address some of the challenges

- 2.2.1 **Provide some perspectives** to make the reasons for engaging better visible to the communities – suggestions related to 2.1.1.

In my view, there is a need to better **explain the overall waste management** program with transparent & convincing arguments why new sites for consolidated interim storage are needed, that the waste will eventually be disposed in a repository with transportation being needed to bring the waste from their current location to the consolidated interim storage facilities and eventually from there to the disposal site(s). Then, very clear statements are needed about the high level of safety achievable for transportation, interim storage and disposal, if adequate sites are chosen and the facilities are properly designed, and transport is properly performed. These issues should be made very clear, and the message being conveyed by a neutral (not DOE) and trustworthy organization. It should also be made clear that moving the waste from their current location is not for safety reasons but because of legal obligations (as far as I understand it – if safety concerns would also be a reason, this would again be serious for credibility and trustworthiness).

To involve the communities, it is very important that they have a clear **understanding of the commitment** they make. Thus, a clear message should be given by an accepted and credible actor that informs about the **key characteristics of the planned consolidated interim storage facility (safety, impact on the environment, etc.)** that is only temporarily used, with a duration of storage of approx. xxx years (a rough number should be given to be trustworthy) and not about indefinite / final storage. Thus, the **strategic plans for disposal** should be made clearly visible and for that, it would be very helpful to make a clear statement about Yucca Mountain – not mentioning anything could again endanger trustworthiness of DOE as key actor in the siting process.

The assumed community motivation in the US site selection process seems to be built upon the concept of the **benefits outweighing the drawbacks** without any mention of the important role a hosting community playing in **contributing to solve an issue of national importance** – thus, it also has an ethical component (as it was strongly argued e.g. by the KASAM committee in Sweden but also elsewhere (e.g. by the EKRA committee in Switzerland)). In my judgement, in Switzerland (for this issue, it is probably not comparable to the US), no community / canton would want to host a repository only because of the expected (rather limited) benefits – it is much more the recognition that the disposal issue needs to be solved and if there are good reasons to have it in community xx (for disposal because of its geology), then community xx and the corresponding canton yy are ready to accept that. This, however, required that the Federal Government and the corresponding ministers explicitly acknowledged the importance of the

participation / cooperation of the communities and the cantons in the site selection process, also through their periodic visits in the corresponding siting communities / cantons.

To be clear about the benefits and drawbacks, provide a **neutral & understandable description of the benefits & the drawbacks** when hosting an interim storage facility – have (internal) generic studies that illustrate the different benefits (and on how to 'mobilize' them) and drawbacks (and on how to limit them). For this, think about developing generic studies on 'socio-economic-ecological impact' for different typical situations, first as internal reports to form an opinion, with the potential to develop the studies into open reports that give some insight on the important factors to make sure that benefits outweigh drawbacks to help the communities to assess whether hosting a facility will be beneficial for them. Here, an important issue is also the limited duration of storage – thus, the direct benefits will expire after a certain time and if no other long-lasting beneficial activity has been developed (the importance of co-design), the benefits will be lost.

2.2.2 **Modify the site selection process** – suggestions related to 2.1.2.

It is suggested to involve besides DOE **other formal stakeholders** in the site-selection process with clearly defined roles & responsibilities because DOE has in the current process proposal too many roles (as analogue - in a credible competition, one cannot be one of the teams participating and be the referee at the same time).

It might be especially important to think about the possibility to integrate **another entity at the government level** (department, agency, office) **as process owner**.

Furthermore, clarify and **explain the roles and responsibilities of the direct counterparts of the communities**, (states, other entities (tribes, etc.)) and how they are interacting with one another in the site-selection process.

Then it is important to clarify how **environmental justice** (justice in the process, justice in the outcome, justice in recognition) are put in practice. The scientific studies made by DOE are for sure very useful, but it should be made very clear how the results will be put in practice in the site selection process very soon to make them available to the consortia in time.

Transportation seems also to raise some worries. It is not clear in how far **transportation influences the siting decision** about interim storage facilities and in how far and when the communities along the transportation routes get involved in the discussion (the mention of intervention teams along the route being ready). In my view this should be clarified as soon as possible.

Think about the **time schedule** of the site selection process: Taking the experience made in Switzerland (and elsewhere) into account, the time schedule for the US site selection process seems to be very optimistic. In Switzerland, it turned out that involving the public and the other stakeholders took much more time than originally expected whereas the time needed for preparing the technical material could roughly be done in the timeframes envisaged.

2.2.3 **Completeness of the current description of the site selection process** – suggestions related to 2.1.3.

It is strongly recommended to perform some 'virtual walk down' of the site selection process to get a better understanding on how the site selection process could actually work and what could happen – this can provide some additional input on how to organize the site selection process. In Switzerland, some internal 'simulation games' were performed for some phases to get some insight before the start of these phases and to provide some clarification to all participating in

the process. Maybe, something like this is in reach of the consortia in their process of building 'capacity' (together with DOE).

2.2.4 **Credibility** of the DOE as one of the key stakeholders – suggestions related to 2.1.4.

From the input provided by the RFI's, there are some clear indications that **regaining trust** in DOE (and other actors?) might be an important issue before starting with the consent-based site selection process.

Thus, it might be useful to **compile an inventory of the issues** that did lead to distrust, and some thought (e.g., through social science studies) should be given on how best to **address (or not address) these issues** to regain trust. If distrust applies also to other important organizations, the same should be done for them. This, because **we are in a 'trust business'**.

An additional element that contributes to credibility is **continuity** that should be ensured also for **higher-level persons** (e.g., in case of change of administration). Furthermore, higher-level persons (e.g., head of siting process) should be **senior, credible and trustworthy, with high social competence** (with the ability also to listen) and able to 'build bridges' between seemingly inconsistent views and attitudes. To summarize, the availability of a senior person (the face of DOE for waste management) that has **oversight and provides trust and confidence and will survive changes in administration** (providing continuity) is an important element for success – this is besides **stability and continuity** of the program an additional but an important element of **maintaining institutional momentum** in the process.

An additional element is **caring about the 'well-being' of the community** by giving high priority to public health, safety and the protection of the environment – this could be reflected in the process by making as a first step in the contact with a community an assessment whether the community has potential to meet the corresponding criteria – such an early assessment is in my view a clear signal of taking this very seriously.

According to the experience made elsewhere, **adequate behavior in the dialogue** between the public (communities etc.) and the stakeholders with a professional role is essential (e.g. the importance to listen, to know and respect the values of your partners, not to have always the last word, to communicate at an adequate level of detail / complexity, providing context, etc.). In my view, it is important to **educate the persons** actively involved in the site selection process to ensure the adequate behavior of all 'professional' stakeholders. Adequate behavior might be an issue where the **social science studies** by DOE could contribute to. If not, probably some specific studies / education (to raise the awareness) might be useful.

A very important behavior element is the **'going to them'** and not **'ask them to come to you'**. Thus, DOE (and the other formal stakeholders) should prepare for going many times to all of the communities involved.

2.2.5 The task of **enabling the communities to manage their part of the site-selection process** – suggestions related to 2.1.5.

For communities, the task of managing their active participation in the site selection process without any **external support** is according to the experience made elsewhere very challenging. In Switzerland, the process owner organized at least in the initial phase professional support for the communities by independent specialists / experts to set up the process in the communities. This also included issues like 'make sure that all voices are heard' (and not only those of the ones that shout loudest / most often).

With respect to the communities, in Switzerland in the ‘sectoral plan’ much emphasis was put on **involving the ‘neighbors’** with clearly defined roles and rules – how the ‘neighbors’ will be involved in the US process seems not yet to be clearly defined. It is strongly recommended to give early enough some thought on where to ‘draw the boundary’ when discussing hosting a nuclear waste facility – how will the neighbors to the host community be considered as they may well suffer from some of the drawbacks but not from the benefits? Additionally, the **role of the states** should be defined.

Then, it should be thought about in how far it is useful to ensure that **the processes in the different host communities** are run in a roughly comparable manner (e.g., the issues discussed, the priorities and sequence of discussing the issues, the methodologies applied to form opinions / to make decisions / to come to a consent, etc.); this might also include to **provide the communities with checklists** that help them not to forget something and thus provide them with the ‘starting point’. This might be important because sooner or later the host communities will talk with one another and if they find out that some have done it more cleverly than others, this might lead to some ‘hard feelings’. Thus, deviations from each other are very welcome, if they are deliberately made but not if they happen ‘by accident’ (because of not knowing better).

Finally, it may be important that the **process owner follows the process of each community ‘silently’** (without interfering, if possible) to take note of the most important factors that lead to the final decision – to host or not a consolidated interim storage facility to roughly understand the ‘why here and not there’ - was it the judgement by the community? (... for ‘good’ (clearly expressed) reasons) or was it the DOE? (... again for ‘good’ (clearly expressed) reasons). It might be important to have internally some understanding of the factors that did lead to siting, as this understanding may later be asked for.

- 2.2.6 Some of the **suggestions made are currently most likely not implementable** (e.g., getting a process-owner independent of implementation) – suggestions related to 2.1.6.

To implement some of the suggestions might require **some change in the Nuclear Waste Policy Act or in the directions given by Congress**. Thus, there are good reasons trying to get **some members of Congress more strongly involved and committed** to solve the waste issue (e.g., as part of the **revival of nuclear**) – this applies not only to site selection for consolidated interim storage but to waste management in general (including to reach a decision about Yucca Mountain).

In a very extreme case, the **whole waste management approach could be reorganized** by giving the nuclear power plant owners / operators the full responsibility for managing their spent fuel, as it is the case e.g., in Finland, Sweden and Switzerland. That would lead to **clearly independent stakeholders** in the site selection process; industry being responsible for implementation and the government bodies overlooking the adherence to law and guidance.