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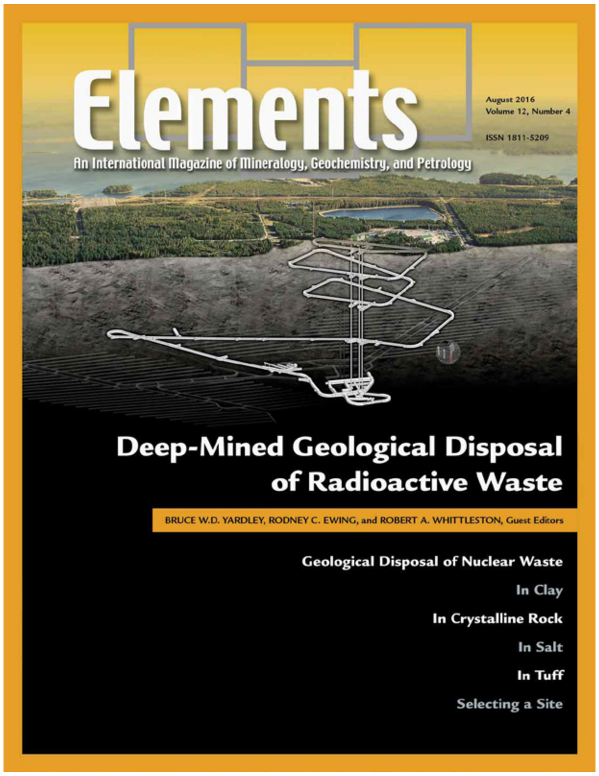

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Selecting a Site for a Radioactive Waste Repository: A Historical Analysis

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Every nation that has adopted a strategy for the long-term management of its high-level radioactive waste (HLW) and spent nuclear fuel (SF) has opted for disposal in a deep-mined, geological repository. Identifying a site for such a facility has proven to be a technical and social challenge. Over the last 50 years, both challenges have been met (at least so far) in only three out of the ten countries that have tried. This historical experience makes clear how important it is to gain social acceptability for a site's selection: such acceptability is a prerequisite for policymaking in democratic societies. The inability to gain social acceptability has proven to be the Achilles' heel for most efforts to choose a repository site.

Keywords: radioactive waste; geological repository siting; social acceptability

INTRODUCTION

In 1957, a committee convened by the US National Academy of Sciences advanced a blueprint for addressing the long-term management of high-level radioactive waste (HLW) and spent nuclear fuel (SF) (Hess et al. 1957). This committee proposed that the waste could be disposed of hundreds of meters underground in specially constructed mined cavities. If a site were properly chosen, a repository system comprising both natural and engineered barriers would provide a high level of protection from the toxic effects of the waste. This approach has been embraced by all countries that have decided on a long-term management strategy.

As these countries have discovered, however, a proposed repository site must not only be technically suitable but also be socially acceptable.[2] For many years, the implementers of national waste-management programs believed that social acceptability could be secured by relying on the authority of science and the power of government. In pluralistic democracies, however, such shortcuts are rarely workable. Achieving a sustainable level of social acceptability requires, at a minimum, a transparent process that respects the views of interested and affected parties, that appreciates the authenticity of those beliefs, and that incorporates into action the positions held by others. Crafting such a process has been problematic. Indeed, the quest for social acceptability has become the Achilles' heel of most national site-selection efforts. Those interested in avoiding this pitfall in the future need to understand why the pursuit of social acceptability has so often failed, and why that understanding, in turn, needs to be grounded in prescriptions for what to do next.

HISTORICAL EXPERIENCE

The search for technically suitable and socially acceptable repository sites for HLW and SF began in the mid-1960s. Since then, some two dozen discrete site assessments have been launched in ten countries. Seventeen were terminated. Of those, work was halted in 14 because the implementer was unable to secure a sustainable level of social acceptability. In only three countries—Finland, France, and Sweden—has the site-selection process reached what appears to be a stable conclusion (NWTRB 2015).[3] Herein, six case studies will illustrate the wide range of outcomes that can arise once a nation commits to identifying a location where HLW and SF might be isolated and contained for hundreds of thousands of years. NWTRB (2015) provides additional information and examples.

Canada

In 1996, the Canadian government established a panel to review the safety case that had been developed by Atomic Energy of Canada Limited (AECL) to dispose of SF in granitic basement rock. The panel concluded (Seaborn Panel 1998, p 2):

"From a technical perspective, safety of the AECL concept has been on balance adequately demonstrated for a conceptual stage of development, but from a social perspective, it has not… The concept in its current form does not have the required level of acceptability to be adopted as Canada's approach for managing nuclear fuel wastes."

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2 Research conducted under the rubric of "science and technology studies" supports the proposition that assessments of "technical suitability" and judgments about "social acceptability" are not independent of each other. The distinction drawn between "facts" and "values" by logical positivists does not hold for issues where technical uncertainties are high and conflicts over goals are intense. Just how that interdependence manifests itself varies from issue to issue and case to case. Readers interested in this subject should refer to NWTRB (2015) (pp 145–157) to see how that interdependence expressed itself in the search for repository sites.

3 The remaining case is the selection of the Waste Isolation Pilot Plant (WIPP) repository site in New Mexico (USA) to dispose of transuranic waste generated in the US nuclear weapons complex.

To reconstitute its waste management program, Canada brought into force the Nuclear Fuel Waste Act in 2002, which assigned responsibility to a new utility-owned entity, the Nuclear Waste Management Organization (NWMO).

Between 2002 and 2005, NWMO held public meetings and consultations throughout the country. Afterwards, the NWMO proposed to implement its Adaptive Phased Management plan, which was rooted in voluntarism. Communities would be invited to learn about the implications of hosting a repository for SF. They could withdraw for any reason up to the point when large investments to develop a facility would have to be made (NWMO 2005). In 2007, the Canadian government accepted NWMO's proposal.

In 2010, a set of site-suitability criteria was finalized by the NWMO that would be used to determine whether there were locations within any volunteer community that might be suitable for developing a repository. What distinguishes NWMO's approach was that the criteria not only specified technical characteristics of a suitable site but also included requirements that "go beyond safety" to consider the well-being of a community and its neighbors (NWMO 2010).

Twenty-two communities expressed an interest in learning more about hosting a repository for HLW and SF (Fig. 1). Once these communities became engaged, NWMO conducted assessments of potential sites against the requirements. As of June 2016, nine localities had passed through the first round of assessments. Of the 13 communities no longer involved, none withdrew of their own volition.

NWMO's leaders recognized that repository siting can be an extremely fragile process. The achievements of the NWMO thus far are due, in part, to the organization's internal culture, which gives much more than lip-service to respectful listening: it allows localities and First Nation tribes to set the terms of their interactions. By all external indicators, it would appear that NWMO has developed a reservoir of trust and acceptance of those with whom it engages.

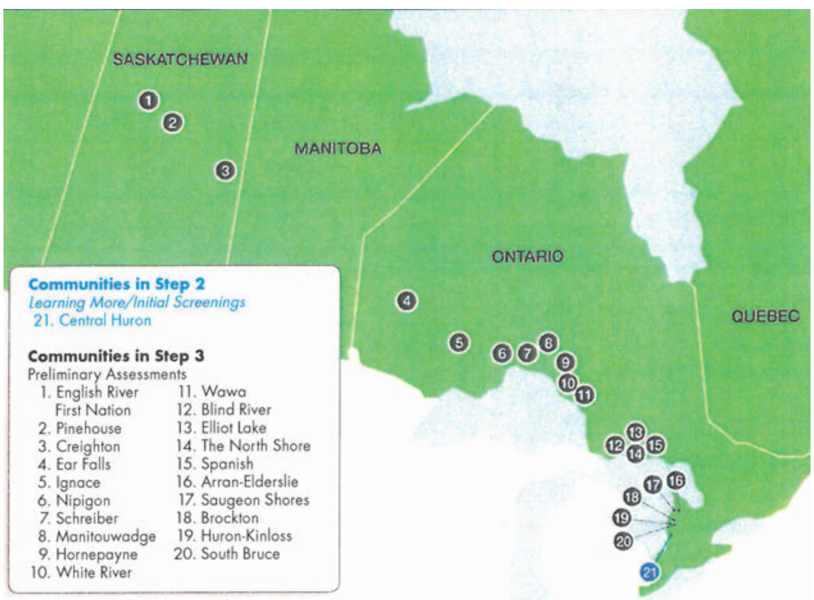

Figure 1 Map of the local communities in the Canadian provinces of Saskatchewan and Ontario who participated in the initial screenings (Step 2) and preliminary assessments (Step 3) for hosting a deep-mined, geologic repository for high-level radioactive waste and for spent nuclear fuel. Courtesy of the Nuclear Waste Management Organization.

France

Beginning in 1987, the French implementer known as ANDRA, then part of the larger Atomic Energy Commission, sought to investigate sites for a repository for HLW in four host rocks: granite, schist, argillite/clay, and salt. Without much advance notification, technical teams arrived at four locations, prepared to carry out a series of surface-based geological investigations. This approach prompted the mayors of each town to organize voter initiatives, which overwhelmingly rejected the studies. Opponents took to the streets, causing the French government to threaten to bring in the police to protect the geoscientists.

By late 1989, the protests had become so intense that Prime Minister Michel Rocard declared a moratorium on the studies and set in motion a parliamentary process to revise France's siting strategy. In 1991, a new law, the Research in Radioactive Waste Management Act, came into force. The legislation reconstituted ANDRA as an independent body and charged it with finding sites for two underground research laboratories, one in clay, the other in granite. If the geology at either of the sites proved to be technically suitable, ANDRA would seek permission to develop a repository.

In 1993, the law's author, Christian Bataille, was appointed mediator and charged with creating a sustainable consensus and a responsible, democratic, and transparent process. He told the French newspaper *Le Monde*, "I propose to verify the geological feasibility of the projects that will be volunteered by interested regions, and not, as was done before, attempt to convince populations of the sites [that were] pre-selected for their geological qualities" [as quoted in Mays (2004)]. Bataille subsequently met with local leaders in eight of France's departments (a department being a type of regional subdivision used in France). Following those consultations, Bataille concentrated his efforts on four areas: Vienne, Meuse, Haute-Marne, and Gard. Vienne is underlain by crystalline rock; the others by clay/argillite.

In 1997, the technical overseer of the French waste-management program, the National Committee on Scientific Evaluation, published an influential critique that effectively removed the Vienne site from further consideration.[4] Soon it became clear that the Gard site was socially unacceptable, at least to wine producers in the community who were concerned about risks to the public image of the wine produced nearby. As one industry representative argued, "Wine is 40 percent liquid and 60 percent dreams" (Barthe and Mays 2001). Subsequently, only a merged Meuse/Haute-Marne candidate site remained. Communities along the border of the two departments welcomed their selection as a site for an underground research laboratory (Fig. 2), knowing that the laboratory might be the precursor for an operating repository.

Under the 1991 legislation, however, underground research laboratories had to be established *both* in clay/argillite and in granite to support claims about the "feasibility" of constructing a repository in both host-rock types. The disqualification of the Vienne site led the government to appoint what was colloquially termed the "Granite Mission" to determine whether a community sitting atop a suitable crystalline rock formation might be willing to volunteer.

4 Personal communication with the French Embassy representatives and according to the Third Committee Assessment Report to the National Committee on Scientific Evaluation in Paris, France, September, 1997.

Figure 2 Investigators mount an experiment inside the Meuse/Haute-Marne (France) underground research laboratory. Photo Courtesy of ANDRA.

From the outset in 1999, however, the mission inherited conflicting, and perhaps incompatible, mandates. On the one hand, it was limited to considering only 15 areas, preselected by the BRGM (the French national geological survey) on an "indisputable" technical basis. On the other, it was expected to engage in a "collegial consultation" exercise with the chosen communities.

Demonstrations arose once the BRGM's candidate sites became publicly known. Hundreds of mayors and leaders of general and regional councils signed petitions against the mission's work and refused to meet with it. The mission's members sought to engage with the communities from afar. But the hostility facing the mission could not be finessed, and the government abruptly cancelled it in May 2000.

Although pockets of opposition remain, in 2006, the communities around the Meuse/Haute-Marne underground research laboratory strongly supported the passage of legislation designating a "transposition zone" around that site as the location for a repository to dispose of France's HLW.

Germany

In 1973, the West German government proposed the development of a nuclear waste-management center, consisting of a commercial reprocessing plant, a centralized storage facility for vitrified HLW, and a repository. When the process for identifying a site for this nuclear waste-management center broke down three years later, the government of the State of Lower Saxony decided to search for a site on its own. It began a four-phased process that assessed more than 100 settings. Four possible sites—at Wahn, Lichtenhorst, Höfer, and Gorleben—entered the final round of evaluation. Gorleben emerged as the presumptive choice, notwithstanding concerns about its proximity to the East German border (Tiggemann 2010).

Although the population around Gorleben early on supported the development of a repository (Numark et al. 1989; Section II, pp 2–12), political forces outside Lower Saxony soon made themselves felt. For many, the process that led to Gorleben's selection appeared to be arbitrary, totally lacking in transparency, and technically suspect (Appel 2006; Hocke and Renn 2009). Moreover, by the early 1990s, Germany's strong commitment to using nuclear energy started to be questioned. The Social Democratic Party, pushed to the Left by an emerging Green Party, abandoned its support of nuclear power. Technical discussions about the suitability of the Gorleben site at the political level in the central government and in Lower Saxony were increasingly dominated by partisan positions.

After a coalition between the Social Democratic and Green Parties won the 1996 national election, the critics of Gorleben now governed. In June 2000, the federal government and four nuclear utilities reached an agreement on the fate of the site. Although the government conceded that several technical considerations would not, in fact, disqualify the site, the document noted five specific generic issues where "doubts" had been raised. Because "further exploration of the Gorleben salt dome cannot contribute to the clarification of these outstanding questions," a moratorium on site investigations, which was slated to last from three to ten years, was put in place (quoted in Ahlström et al. 2001, p 30). Except for a brief period in late 2010, when the Christian Democratic Party regained sole power in federal elections, the moratorium has not been lifted. The decision in 2011 to phase out nuclear power by the mid-2020s opened the door to the passage of radioactive waste-management legislation in 2013. Under the law, an independent siting commission was authorized and instructed to make recommendations for a new siting process. As of June 2016, the commission had not completed its work.

Sweden

The utility-owned Swedish Nuclear Fuel and Waste Management Company (SKB) initiated efforts to identify a repository site for its SF in 1977. The first test drillings were in crystalline bedrock at Finnsjön, close to the Forsmark nuclear complex north of Sweden's capital, Stockholm, and at Kråkemåla, near the Oskarshamn nuclear power station south of the capital. These early studies evoked little notice. Desiring to obtain representative samples of the granite, SKB expanded its investigations shortly thereafter. Local residents strongly criticized the company for failing to consult prior to launching its investigations. In Kynnefjäll, ~135 km north of Gothenburg, community groups built a guard hut on a hillside overlooking the sole road to the proposed test site. In Almunge, ~75 km north of Stockholm, the confrontations between the demonstrators and SKB were so intense that the Minister of Energy and the Environment rebuked the company for its autocratic behavior.

By 1988, a new generation of leaders at SKB realized that they had to obtain the consent of the municipalities before site investigations could be resumed. It is unclear why they failed to recognize this condition sooner. Long-established law in Sweden gives municipalities a strong voice in the repository approval process.[5]

Four years later, SKB sent an invitation to all 286 municipalities asking whether they would permit "feasibility" studies to be carried out within their borders. Only two—Malå and Storuman—in the north, far away from Sweden's twelve operating reactors, were initially open to the possibility. Proponents and opponents, many from outside the

5 Swedish municipalities can veto the granting of a *license* to construct a repository, not the choice of site. However, that possibility, in a practical sense, forced SKB to obtain permission to carry out the feasibility studies and the more detailed surface-based site investigations.

two municipalities, stimulated a vigorous debate. Referenda were held in each community. In Malå, 54% voted against the studies; the figure in Storuman was 71%.

SKB subsequently wrote to the five municipalities hosting existing nuclear facilities—Nyköping, Oskarshamn, Östhammar, Varberg, and Kävlinge—asking whether, on second thought, they might be interested. The first three agreed; the last two declined. Shortly thereafter, three neighboring municipalities—Älvkarleby, Hultsfred, and Tierp—agreed to accept the feasibility studies. Eventually, SKB eliminated Älvkarleby because of the complexity of its hydrogeology. Nyköping and Tierp dropped out.

In the final analysis, SKB's choice boiled down to the Laxemar site in Oskarshamn and the Forsmark site in Östhammar. (The Hultsfred site was too far removed from SKB's nautical transportation system.) For nearly a decade, SKB personnel embedded themselves in both municipalities. Acting in a transparent and open fashion, they extensively engaged the residents and established strong bonds of trust with them. By the time site investigations ended in 2009, officials in both municipalities raised no objections to the selection of a site within their communities.

United Kingdom

For decades, the United Kingdom focused on the disposal of its intermediate-level and other non–heat generating waste forms. That tack ended in 2008 when the British government issued a White Paper (the name given to a governmental proposal) adopting the "Managing Radioactive Waste Safely [MRWS] Program" (DEFRA 2008) for all wastes. Much like Canada's Adaptive Phased Management approach, the MRWS process called for volunteers but, in contrast, emphasized the idea of partnership with local governments. In the event, only three local authorities in Cumbria (northwest England and the home of the Sellafield site where most UK waste is stored, but which is also a major tourist destination) were prepared to engage.

A partnership to explore the possibility of hosting a repository was formed that included the three local authorities (Cumbria County Council and the subordinate Allerdale and Copeland Borough Councils in West Cumbria), 12 nongovernmental organizations, and four neighboring local authorities. In 2012, the partnership issued a comprehensive report (West Cumbria MRWS Partnership 2012). This report identified three key issues that were still unsettled: (1) whether a specific suitable site should be identified before moving to the next step in the process; (2) whether the right of withdrawal should be codified in law and not simply be a policy of the current government; (3) what benefits should be offered to a community hosting a repository.

Efforts to obtain a definitive response from the central government to these open issues were only moderately successful. The Department of Energy and Climate Change (DECC) reiterated the findings of the British Geological Survey (now the Institute for Geological Sciences) that, somewhere in West Cumbria's 1,890 km^2 of possibly suitable land, a specific site could be found and that DECC's technical overseer would review the suitability of any proposed site. DECC strengthened its previous commitment and promised to seek legislation that would tighten a community's right to withdraw. It also promised to make specific funding proposals for benefits within 18 months of a decision to go to the next step in the siting process.

On 30 January 2013, the three councils in Cumbria decided whether to move forward with the MRWS process. The Allerdale and Copeland Borough Councils voted strongly in favor; but the wider regional Cumbria County Council voted to withdraw. Under the rules, "three green lights" from the borough, county, and central government authorities were necessary to go forward. The county's negative vote brought the MRWS process to a halt.

The story of what happened on that January day by the Cumbria County Council is still not fully known but whatever the root cause of the county's veto, DECC hopes to learn from the experience. In 2014, another White Paper announced a new approach that differed in important ways from the MRWS process. DECC would first ask Radioactive Waste Management (RWM, a government-owned company) to assess the geological suitability of all regions of the UK (excluding Scotland), and would itself bring forward initial actions on community representation and community benefits before asking for communities to volunteer. The term "partnership," which was at the core of the first White Paper, has disappeared. Both the DECC and RWM are scheduled to complete these three "initial actions" by the end of 2016, when volunteer communities will be able to come forward.

United States of America

Efforts to site a repository for defense and commercial HLW and SF in the United States have been numerous and complex. What follows is an abbreviated description of one key siting choice. For more information on this and other siting attempts, see Carter (1986), Lomenick (1996), Vandenbosch and Vandenbosch (2007), Walker (2009), and NWTRB (2015).

The US Congress passed the Nuclear Waste Policy Act (NWPA) in 1982. This law envisioned a detailed and complicated process in which as many as nine sites would be winnowed down through disinterested technical analyses, first to five and then to three. The Department of Energy (DOE) would conduct the analyses and would recommend to the president the three locations where extensive underground site investigations would be carried out. How did that final winnowing step play out?

By the end of 1984, the DOE had identified five potential sites for the first repository. Three were salt formations: Deaf Smith in Texas; Richton dome in Mississippi, and Davis Canyon in Utah. In addition to these three were two sites at nuclear weapons complexes: one in volcanic tuff at the Nevada Test Site (Yucca Mountain), and one in basalt at the Hanford Reservation in Washington. According to the NWPA, the suitability of each site would be evaluated against nearly two dozen individual criteria contained in DOE's *Siting Guidelines* (DOE 1984). The evaluation would be based almost entirely on existing surface-based investigations and the available literature.

The *Siting Guidelines* provided minimal directions on how sites *in different host rock* would be compared. The DOE proposed three methods for aggregating the scores across the various criteria: averaging, pairwise comparison, and utility estimation. Comments from the five affected states strongly criticized all of DOE's methodological options. But the most telling critique came from a panel convened by the National Academy of Sciences (NAS). It reviewed the draft evaluations and concluded, "The methodology of comparative assessment is unsatisfactory, inadequate, undocumented, and biased and should be reconsidered" (Parker 1985).

The DOE launched an intensive program to develop a more technically defensible procedure for comparing the five sites. In 1996, it adopted an intricate and sophisticated technique called "multiattribute utility analysis" (MUA). This choice passed muster with the NAS panel but did little to convince the finalists in Nevada, Texas, and Washington.

These states brought lawsuits and lobbied Congress to void their selection. They vowed sustained opposition and actions that would continually thwart DOE's activities to move forward with site selection. These threats compounded the political turmoil that DOE was already experiencing. In 1987, Congress passed the Nuclear Waste Policy Amendments Act, which instructed DOE to limit its site investigations to Yucca Mountain.

During the next two decades, DOE conducted wide-ranging laboratory studies and underground investigations. In 2002, over the State of Nevada's opposition, Congress approved President George W. Bush's determination that the Yucca Mountain site be chosen as the country's first repository for HLW and SF. In 2008, DOE submitted to the Nuclear Regulatory Commission (NRC) a license application to construct the repository.

Two years later, following sustained opposition from the State of Nevada, the DOE sought (unsuccessfully) to withdraw the license application, claiming that the project was unworkable (Chu 2010). President Barack Obama instructed the DOE to form the Blue Ribbon Commission on America's Nuclear Future (BRC) to recommend a new path forward for managing the country's HLW and SF. In 2014, the commission released its report, which endorsed the creation of a new consent-based process for siting a repository. In the meantime, under court order, the NRC staff resumed its evaluation of the license application and published its *Safety Evaluation Report (NRC 2010-2015)*. If Congress provides additional funds, that report and the nearly 300 technical objections submitted by the State of Nevada will become the subjects of an adjudicatory hearing before an independent panel.

As of June 2016, the BRC's proposals have languished in Congress where strong support still exists for developing a repository at Yucca Mountain. Until that political logjam breaks, the waste-management program in the United States will remain in limbo.

LEARNING FROM HISTORY

A report from the International Atomic Energy Agency observed (IAEA 2007, p 40):

"Members of the general public and representatives of local communities recognize that they have a clear stake in the outcomes of [siting] decisions and almost always seek to have their views taken into account by the policy elites."

What motivates those voices, both pro and con?

Standard and Special Effects

Social scientists distinguish between "standard" and "special" effects created by the introduction or closure of large institutions, such as universities, factories, or prisons. Among the first type of impacts are changes in employment, taxes, and traffic congestion. The second type arises because of public perceptions of the risk associated with an institution's activity. These perceptions generate concerns about the stigmatization of communities and their agricultural products, about psychological distress, and about the loss in value of property located "too close" to the institution. Public perceptions of the risk associated with nuclear waste-management facilities are especially powerful in spawning special effects (Slovic 1987).

Social scientists disagree about how extensive and permanent those special effects might be (Jenkins-Smith 2001). But they concur that they have shaped searches for repository sites. In France, opposition from the wine growers around Gard led to the elimination of that site. In the United Kingdom, worries about how a repository in West Cumbria might stigmatize tourism in the Lake District were difficult to diffuse. In the United States, the gaming industry and those connected with it in Nevada were troubled about how a transportation accident involving the shipment of SF to Yucca Mountain might deter tourists from coming to Las Vegas.

A counter to these negative special effects is the promise of positive standard ones. In Canada, community well-being is a principal consideration in the NWMO's siting philosophy. In France, ANDRA has taken the lead in bringing new employment opportunities to the Meuse/Haute-Marne region. But the promises have to be concrete. In the United Kingdom, DECC offered benefits but declined to specify precisely what they might be. Proponents of the Yucca Mountain repository believed that Nevada's opposition would be withdrawn if the state was presented with a deal that was too good to be refused. Yet none was put on the table.

The dynamic between standard and special effects leads naturally to one element of a siting strategy: concentrate efforts on economically underdeveloped and nuclear communities. Following such a strategy, either explicitly or implicitly, brought SKB to Östhammar and ANDRA to Meuse/Haute-Marne.[6] By contrast, Nevada had a bustling economy, and the promise of economic benefits for accepting the Yucca Mountain site was not such a powerful argument. Nevertheless, the sparsely populated host county remains quite supportive because of the economic benefits accompanying the development of a repository. But, as the next section of this article maintains, balancing positive standard effects and negative special effects is not the only challenge facing those responsible for selecting a repository site.

Trust and transparency

The NWMO (Canada), ANDRA (France), and SKB (Sweden) have established authentic interactions with communities as a critically important organizational priority. By all accounts, they have been successful in forming strong bonds of trust with local populations. The process used to select the Gorleben site in Germany and the US DOE's exercise of discretion when it carried out the MUA analysis both contributed to and reinforced the view that the organizations involved were not trustworthy.

In two respects, trust and transparency play essential roles in the repository-siting process. First, trust and transparency lower the local community temperature that siting controversies inevitably raise. Tough trade-offs have to be made. When disagreements emerge, a full reservoir of trust allows those opposed to a particular choice to view it in the most favorable light, especially if the rationale for the decision is transparent. Conversely, if that reservoir is depleted, a vicious cycle can develop in which increased opposition becomes increasingly likely (Carter 1986).

Second, advancing the case for the projected safety of a repository developed at a specific site requires complex technical arguments, which may be open to differing, even incompatible, interpretations. Uncertainty will attach to those projections. Even if the uncertainty can somehow be bounded, it may be understood differently by interested and affected parties. If trust has been established, however, they will be more likely to accept the assessment of a site's proponent (Flynn et al 1992).

6 It also brought the Finnish implementer, Posiva Oy, to the community hosting the Olkiluoto reactors and the US Department of Energy to southeast New Mexico (USA) for the Waste Isolation Pilot Plant.

Allocating Power Between the Center and the Periphery

National political traditions can affect the repository siting process. In Sweden, allocating strong power to municipalities is a long-standing practice. Applying it in the case of selecting a repository site is unexceptional. In France, the communities were given the power to decline an underground research laboratory, but once they accepted it, they lost the formal power to object to a repository.

How power is distributed between the central government and local authorities, including the United States' tribal nations, is a particularly delicate issue in countries that embrace federalism. In Germany, the states and the federal government were often at odds about whether to develop the Gorleben site, a situation that paralyzed the process for several decades. In the United Kingdom, Cumbria County Council exercised a veto during the MRWS process. It is unclear what power, if any, that level of government will retain under the siting strategy now being fleshed out by the UK. In the United States, a state can object to a presidential decision on selecting a repository site, but its dissent can be overruled by a majority vote in Congress, as it was in the case of Yucca Mountain.

MOVING FORWARD

Waste-management programs in Germany, Japan, the United Kingdom, and the United States are currently deliberating about how to re-create processes that can identify a technically suitable and socially acceptable site for a repository. Each country is attempting to develop "consent-based" siting processes that are compatible with its political culture. Although such an approach has resulted in the selection of sites in Sweden and France, it has not, so far, been successful in the United Kingdom, and a consent-based case failed in Japan (NWTRB 2015). Moreover, many interested and affected parties maintain that such a process cannot—and need not—be pursued in the United States, at least when it comes to a repository for HLW and SF.

My own view is that regardless of what approach is settled upon in those nations, unless their waste-management programs learn history's lessons, they will continue to struggle to succeed.

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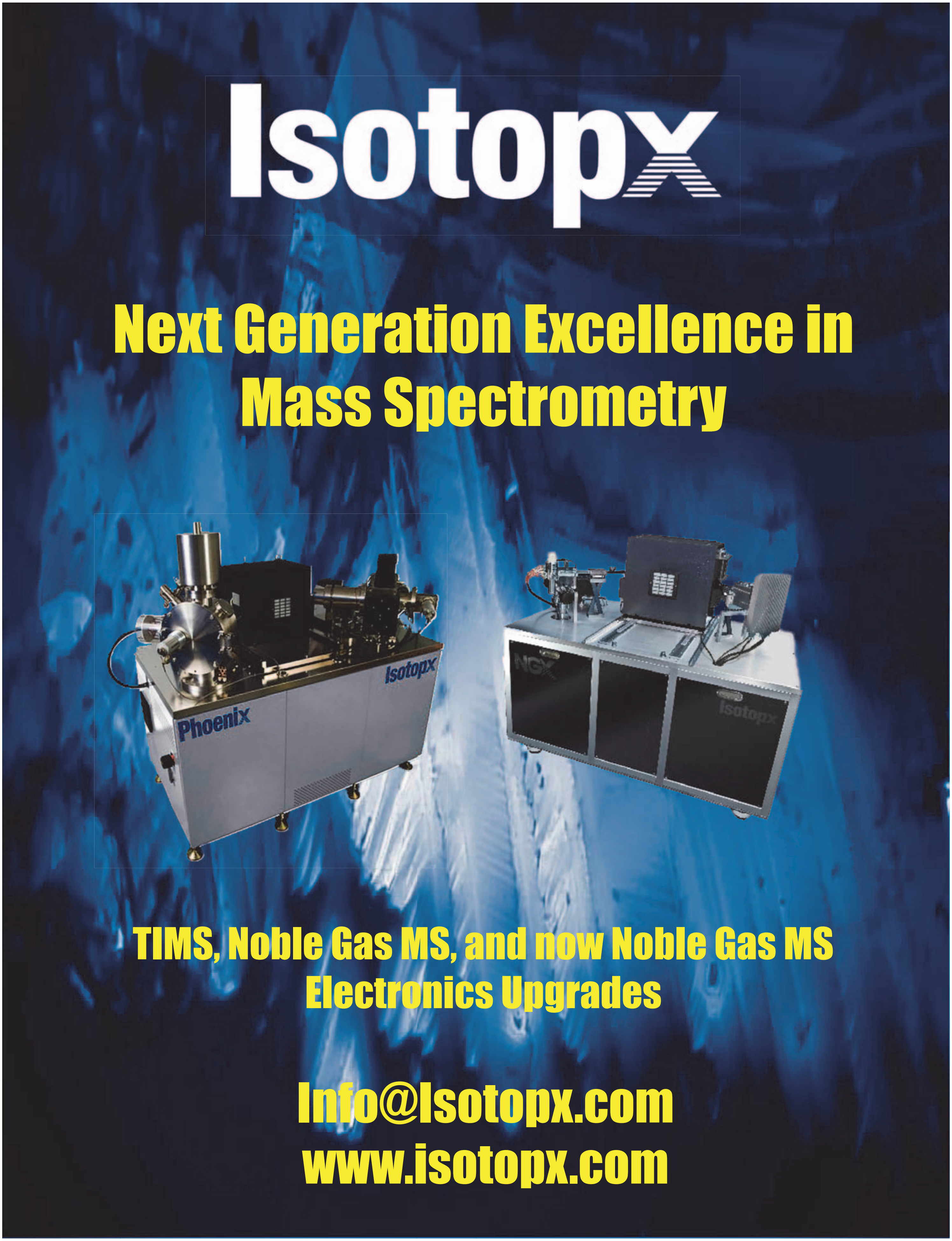
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