

## LOW-LEVEL RADIOACTIVE WASTE DISPOSAL: STATUS OF THE CENTRAL INTERSTATE COMPACT NEBRASKA PROJECT

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### ABSTRACT

The licensing process for a low-level radioactive waste (LLRW) disposal facility in Nebraska has encountered obstacles not previously anticipated. Various issues have arisen since the license application was submitted in July 1990. In early 1993 the State of Nebraska issued a notice of intent to deny the application based on its interpretation of regulations of site suitability issues (i.e., presence of wetlands, frequent ponding, and poor drainage of the site). At the same time, the Nebraska governor's office filed a lawsuit alleging a lack of community consent in the siting process. The state's technical and completeness reviews of the license application also presented challenges to the project. The project has reacted to these issues by developing and implementing strategies to ensure continuation of the license application review process. These events, however, have affected the project cost and schedule.

### BACKGROUND

The Central Interstate Compact (CIC), formed in 1980, consists of the states of Arkansas, Kansas, Louisiana, Nebraska, and Oklahoma. In 1987 CIC chose US Ecology as the developer and operator of a proposed LLRW disposal facility, and US Ecology selected Bechtel National, Inc. as the prime engineering subcontractor. Early in 1988 a host state selection process resulted in Nebraska being named as the first host state. When it became evident that Nebraska was a candidate for the first host state, the governor at that time, Kay Orr, announced ten conditions under which Nebraska would agree to be the host state. These conditions, later codified in state law, included one that required the developer to make every effort to locate the facility in an area where there was evidence of support.

Shortly after Nebraska was named as the first host state, US Ecology began an extensive effort to involve Nebraskans in the site selection process.

With help from the League of Women Voters, a 12-member Nebraska Citizens' Advisory Committee was established. This committee provided US Ecology with input that was used to refine the site selection criteria and proposed facility design. During 1988 the committee held six public meetings in various regions of Nebraska.

Nebraskans also helped refine the site selection criteria and the proposed facility design through two series of workshops held in the spring of 1988. Later, during the county-level screening process, the project held additional workshops in 14 counties to gather public comments on drafts of maps that identified which areas were planned to be excluded.

In all, in 1988 the project held over 50 public and technical meetings with Nebraskans as part of the site selection process. Also in 1988, US Ecology gave 50 presentations on the project to Nebraska civic groups, elected officials, concerned citizens groups, and the general public.

During 1988, site suitability criteria were applied to areas of the state until 87 potential siting areas were identified. The project team agreed that any parcel of land within these potential siting areas would, after site characterization, have a very strong likelihood of being licensable. Because the proj-

ect did not hold the right of eminent domain, it became necessary to locate landowners within these potential siting areas who would be willing to grant purchase options for their land and forego income from either agricultural or ranching sources for a year to permit site characterization work to take place. This was accomplished in December 1988, and the final option agreements were signed in January 1989 for land in three separate and geologically distinct areas of the state.

In March 1989 onsite characterization work began. By the end of 1989, sufficient data had been gathered to show that a site near Butte in north-central Nebraska had yielded a higher degree of confidence for successful licensing than the other two sites and was subsequently designated as the preferred site. A license application for a facility at the Butte site was filed with the State of Nebraska in July 1990.

The Nebraska Department of Health (NDOH) and Nebraska Department of Environmental Quality (NDEQ) are involved in the licensing review process. State statutes assigned NDEQ to be the lead agency for licensing the facility. NDOH, meanwhile, has specific responsibilities for the use and control of radioactive materials. Both agencies set forth almost duplicate regulations regarding site suitability and operating performance criteria patterned after 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste." A significant difference in the departments' regulations, however, is that NDOH regulations regarding site suitability and performance specifically exempt the CIC project from compliance with their regulations.

### LAWSUIT REGARDING COMMUNITY CONSENT

While this work was proceeding, the residents of Boyd County became sharply polarized into two camps. The Village of Butte, which the project viewed as the host community, was extremely supportive of the project, but residents of the other towns and villages in the county farther from the proposed facility were strongly opposed. This opposition eventually solidified into formal organizations who insisted that a countywide vote be held to determine whether community consent existed for that facility. Whenever the issue arose on a statewide level, Governor Orr made frequent public statements

verifying that through the actions of the Butte Village Board, the local support requirement in her ten conditions had been satisfied.

In January 1990 E. Benjamin Nelson announced his intention to run for governor of Nebraska. The incumbent, Governor Kay Orr, continued to hold the position that the compact process should be supported, but she pledged a vigorous and ongoing review of the license application to ensure that the facility would not be licensed unless the developer proved to the state reviewers' satisfaction that the facility would be safe. Candidate Nelson pledged to not allow the facility to be constructed until it was proven beyond any doubt that it would be totally safe and secure — for all time.

However, as the campaign progressed, Mr. Nelson took a continually stronger position against siting the facility in Nebraska. He pledged to call a moratorium on the siting process, expressing doubt in its need and questioning the manner in which Nebraska was selected.

Just a few weeks before the November election, his position became crystal clear. Speaking to reporters after a speech less than 20 miles from the proposed site, he stated that if he were elected governor, it was unlikely that a facility would ever be built in Boyd County or anywhere else in Nebraska.

Mr. Nelson was elected governor by a narrow margin and took office in January 1991. While it was soon determined that he did not have the legal authority to call a moratorium (which would have required stopping the ongoing license review process), he continued to state that he would use any legal means to stop the project. One of his first actions was to replace the directors of the NDEQ and NDOH, the two agencies responsible for license review.

The 1990 election also resulted in changes to the Natural Resources District that included the project site and to the Boyd County Board of Supervisors. Both groups, which had been essentially neutral until that time, quickly voiced their opposition to the project. The change in position of these groups, along with the change of governor, prompted yet another group to undergo a major change in membership, philosophy, and direction.

The Boyd County Local Monitoring Committee was created by the legislature to help ensure that the needs and resources of the area were taken into account as the project progressed. The committee is funded by the CIC project. Of the ten members, four are appointed by the governor, two by the Natural Resources District, two by the Boyd County Board of Supervisors, and the remaining two by municipalities located near the site. Initially, committee members were supportive or neutral toward the project. Within a year, however, the only remaining member supportive of the project was the representative of Butte, the community closest to the site. Some members, such as the previous chairman (a governor-appointed), were simply replaced. Others, such as the Chairman of the Butte Village Board, became disenchanted and resigned.

The resulting change was dramatic. Although in the past the atmosphere of the public attending monitoring committee meetings had at times been tense, the developer and committee had some opportunities to exchange ideas and information. After the committee adopted a position opposing the project, citizens supporting the project stopped attending meetings, and the atmosphere became more hostile. Committee members made it clear that they were unable or unwilling to control the crowds. The new chairman (who had previously helped organize the county opposition group) made frequent

public statements that seemed sympathetic to those individuals harassing and threatening project staff. Ultimately, the project made the decision that, for reasons of personal safety, attendance at the meetings could not continue.

The Boyd County Local Monitoring Committee continues to use project resources to fight the project. In recent years, it has filed or intervened in several suits against the developer and CIC.

The state legislature, during four different sessions, considered bills that would have required local or regional voter approval for the project. All of the proposed legislation failed for various reasons, including a general consensus within the legislature that requiring any such vote was simply bad public policy.

Another major difficulty these proposals faced was a lack of consensus about what should constitute "community." Some proposed legislation defined the community as an area within a specific radius of the site. Other proposed bills defined the community as the county. One bill went so far as to suggest that the community should encompass the local Natural Resources District, which includes portions of several counties.

The legislature has remained unwilling to require any form of local voter approval, which is significant, especially in light of the strong support Governor Nelson has given to such legislation since taking office.

These unsuccessful efforts to add a local voter requirement to state law were followed in late 1992 by an informal poll of Boyd County residents, sponsored by the Local Monitoring Committee with the full public support of Governor Nelson. Although the secretary of state indicated that any results of the poll would not have the force of law, the poll was conducted in accordance with state election and polling requirements, and residents were asked simply to vote yes or no to having the facility built in Boyd County. Project supporters viewed the poll as an instrument to stop the project. They objected to a poll being held in spite of the legislature's unwillingness to require local voter approval and, therefore, boycotted it. The poll results were overwhelmingly against the project.

Early in 1993 the governor used this poll as evidence of a lack of community support and filed a suit against the CIC Commission and US Ecology requesting that work on the license application and on the Butte site be halted because of the lack of community consent. The main legal argument set forth by the commission and US Ecology in challenging the lawsuit and seeking its dismissal was that it was not filed in a timely manner. (Any party aggrieved by a commission decision is allowed 60 days to bring an action, but approximately 3 years had passed.) The commission and US Ecology also argued that no state or federal law requires a formal vote to determine community consent and that former Governor Orr, the initiator of the community support concept, had already deemed that community consent had been achieved.

The judge dismissed the governor's lawsuit in October 1993, citing primarily the expiration of the 60-day window of opportunity for filing a suit by an aggrieved party. He also discussed some merits of the case, including Governor Orr's statements of her condition being satisfied. To overcome another obstacle (see NOTICE OF INTENT TO DENY below), US Ecology reconfigured the site during 1993 by defining it as a 44.5-hectare (110-acre) tract within the original 129.5-hectare (320-acre) half-section of land. This prompted the governor to file a second community consent suit (within 60 days of the reconfiguration) alleging that US Ecology did

not obtain community consent to select this new site. In a summary judgement, this suit was also dismissed. The state appealed the decision on the first suit but stated that it would not appeal the second decision. The appeal is scheduled to be heard by the U.S Court of Appeals in St. Louis during March 1994.

The Local Monitoring Committee, in conjunction with the governing body of Boyd County, has also recently filed a suit regarding community consent. A hearing date will probably be set for the first part of 1994.

#### NOTICE OF INTENT TO DENY

During the site screening process, the project recognized that wetlands existed on many sites within the potential siting areas. This was not viewed as a deterrent to licensing or a nonconformance with site suitability requirements. Both federal and state regulations stated that waste could not be disposed of in a wetland. Because the project design consisted of aboveground, reinforced-concrete disposal vaults, the facility could be located on the sites in a manner that would avoid interference with any wetlands. A delineation of onsite wetlands was performed in 1989 and agreed to by the Corps of Engineers and the State of Nebraska.

Shortly after the governor filed the first community consent lawsuit, NDEQ and NDOH notified US Ecology that they intended to deny its license application, citing as a basis the presence of wetlands on the site. The notice included the state's interpretations of disposal, disposal site, disposal unit, buffer zone, and facility. Even though waste would be placed in a disposal unit (part of the disposal site), the definitional path of the agencies led to the conclusion that, in essence, the presence of wetlands in the buffer zone (part of the facility) would preclude disposal of waste in the facility. The fact sheet accompanying the notice of intent to deny the license application clearly showed that the directors of the respective agencies made their decision based upon an interpretation of their regulations. No consideration was given to the technical review of the application, the health and safety issues currently being studied, or the performance assessment. Because no disqualifying technical aspects of the facility or its performance were identified up to that time during the license review process, the project decided to investigate whether the site boundaries could be changed to exclude all wetlands.

The original facility design had two distinct disposal cell areas: one relatively large area of approximately 12 to 14 hectares (30 to 40 acres) for the Class A unit, and the second area consisting of the Class B/C unit and, as part of the original design concept, a cell for mixed waste. The mixed waste cell had already been eliminated from the design because the project had decided not to seek a Resource Conservation and Recovery Act Part B permit to allow disposal of mixed waste.

Without the presence of a mixed waste cell, it was not difficult to relocate the Class B/C unit into the general area of the Class A unit and shift the entire waste unit complex approximately 85 meters (280 feet) from its previous position. The final result was a reconfigured site of approximately 44.5 hectares (110 acres) compared with the original 129.5 hectares (320 acres). The minimum distance from the Class A unit to the nearest site boundary decreased from approximately 275 to 165 meters (900 to 540 feet); for the B/C unit, it decreased from approximately 335 to 220 meters (1,100 to 720 feet). These distances will be more than ample for attenuating radiation fields to well below any regulatory limit.

Shortly after the governor filed the lawsuit and the state agencies announced their intent to deny, the Southeast Compact Commission apparently felt that Nebraska was not making adequate progress towards licensing a facility and subsequently terminated access to the Barnwell, South Carolina, waste disposal facility by generators in the CIC region. The Southeast Compact Commission advised the State of Nebraska, the CIC Commission, and its major generators to develop a report and present it to the commission to show that progress, in fact, was being made towards licensing a facility and that appropriate contingency plans were in place in the event the Butte site was ultimately deemed not licensable. This advice triggered a series of meetings between the aforementioned parties, and a progress report was developed for presentation to the Southeast Compact Commission. This report essentially summarized the progress made by CIC and the State of Nebraska, which incidentally, was substantially greater than the progress made by most other compact regions or lone states. After receiving this report, the commission deferred any judgment or decision about regranting access until the outcome of the intent to deny and the community consent lawsuits became known.

In August 1993 the US Ecology/Bechtel project team completed the site reconfiguration and the general facility description section of the safety analysis report (SAR) to show that the new site is free of wetlands, ponding, and flooding. Additionally, an addendum to the SAR's companion document, the environmental report, was prepared summarizing impacts of the reconfigured site. Comparison of the specific impacts listed in the original environmental report with the data contained in the addendum shows that no impact on the environment was made by reconfiguring the site.

#### INTERPRETATION OF STATE REGULATIONS

While the state was reviewing this 30-page "mini" revision to the SAR, NDOH tried to have the project commit in its license application that it would comply with the regulations of that department. Earlier, it was noted that NDOH and NDEQ had promulgated similar regulations regarding site suitability, design, and performance. The difference is in areas relating to specific site characteristics to be sought when selecting a site. For example, while the regulation the project is following (NDEQ Title 194) states that the facility cannot contain a 100-year floodplain as defined in Executive Order 11948, the related NDOH regulation states that "the site shall not be in an area which has a greater than one percent chance of flooding." Determining whether a floodplain as noted in NDEQ's regulation exists is a fairly straightforward process. Going through the noted executive order, the Federal Emergency Management Agency labeled the facility area as being in zone X (having less than one square mile of upstream drainage area) and therefore not being in a floodplain. Because of the ambiguity in the precise definition of the term "flooding," determining whether the site has less than a one percent chance of flooding (as stated in the NDOH regulation) is more difficult. Most importantly, the project strongly resists having to comply with two almost identical sets of regulations, not necessarily because of the difficulty in complying with or understanding the regulations, but because each agency could interpret its regulations differently, also, because both agencies have certain licensing responsibilities, both have an opportunity to deny the application.

### LICENSE APPLICATION REVIEW PROCESS

The license application filed in July 1990 consists of the 11-volume SAR and the 2-volume environmental report. The SAR was prepared in accordance with NUREG-1199, "Standard Format and Content of a License Application for a Low-Level Radioactive Waste Disposal Facility," and the environmental report was prepared in accordance with Regulatory Guide 4.18, "Standard Format and Content of Environmental Reports for Near-Surface Disposal of Radioactive Waste." The state review team began its work by formulating comments concurrent with reviewing the application for completeness. In October 1990 the state advised US Ecology that the application was incomplete in 26 specific areas. The project felt that a complete application had been filed based on the guidance provided in NUREG-1199 and NUREG-4.18. There were numerous areas where the state appeared to be asking for additional information or more complete data, rather than just ruling whether information was provided at all. In any event, upon receipt of the list of incomplete areas, the project began assembling and providing additional information to the reviewers. During this time, the project received the state's first round of technical comments, including 473 for the SAR and 249 for the environmental report. The project's technical team and the state's technical reviewers met to better determine the nature of the state's requests for additional information in the completeness issue and to clarify the first-round comments. These meetings were of great value in clarifying the questions so that the project could better focus on the specific nature of each comment and more precisely define the work required to submit an acceptable response.

The project submitted its responses to the 26 completeness review issues to the state as they were completed. After receiving and reviewing all responses, the state sent a supplemental list of still-open completeness review items to the project. At this time, a breakdown in communications between the project and the state's review team became apparent. However, the project provided additional information for the completeness review. Finally, after reviewing that information, the state sent a third letter to the project advising that three items were still incomplete.

It became obvious that the communication breakdown was worse than originally thought. Another meeting was held with the state reviewers, and the project was finally able to pinpoint the information wanted by the state. The primary open item was the state's requirement that the application contain a list of all regulations, including regulatory guides and NUREGs, that the project was not complying with or had taken exception to. The project furnished this list to the state, and on December 26, 1991, the state advised that the application was deemed complete. Approximately one month later, the project submitted to the state its responses to the first-round comments.

In the early days of the project, many meetings were held between project and state personnel to determine the general content of the license application and the extent and type of site characterization, including sampling and analysis, to be performed. In addition, the state reviewed the conceptual and preliminary design as it evolved for the Butte site. This was of major importance because neither the project team nor the state had experience in reviewing an aboveground disposal facility license because none had ever been licensed or built. Although the project team had a great deal of experience in

licensing both belowground facilities and nuclear power plants, no precedents existed for an aboveground facility.

The state eventually prepared a licensing manual, which would have been of great benefit during the application preparation process. However, the manual did not contain sufficient information for project personnel to determine the nature and extent of the state's review procedures. This information was gathered more on an informal, piecemeal basis during technical review meetings and as part of other conversations with state personnel.

The most critical issue for the state reviewers was performance assessment, and they rigorously questioned all of the site characterization data used for formulating the models used for pathways analysis. The reviewers did not necessarily question the validity of the data obtained, but rather the conclusions made by project team members and the interpretations of the data used to support those conclusions. In addition to questioning these interpretations and conclusions, the reviewers focused very heavily on the groundwater modeling and radionuclide transport performance assessment.

The site has a relatively shallow depth to groundwater, with the major impermeable barrier to the downward movement of groundwater being a strata of Pierre Shale ranging in thickness from 152.5 to 305 meters (500 to 1,000 feet). This strata begins approximately 7.6 meters (25 feet) below ground, which was an advantage to the project in its modeling efforts because it indicated an absence of complex geology. In addition, the site has a relatively simple unconfined groundwater system located near a regional groundwater and topographic divide and recharged by precipitation slowly infiltrating into the single hydrogeologic unit underlying the site. A site-specific, relatively simple, straightforward, two-dimensional flow model was used to determine pathways and potential offsite doses from a contaminant release into the groundwater. The state technical reviewers and the project technical team disagreed about the interpretation of the recharge/discharge aspect of the groundwater system. Many of the disagreements expressed by the reviewers came primarily from geologically trained personnel rather than hydrogeologists. However, when project hydrogeologists met with reviewer hydrogeologists, differences rapidly disappeared. The structure of the state's review process did not give full weight to an individual specialist's opinion or conclusions about the site suitability or facility performance. A specialist's comments and recommendations were forwarded to specific review managers responsible for various chapters of the SAR and environmental report. These comments and conclusions were then reviewed by the review manager, who decided whether they were appropriate to include in the formal report or the next round of comments. The various review managers then provided input to a five-person overview committee consisting of senior review team managers and NDEQ and NDOH managers. It was at this point in the process that agency policy questions were formulated and referred to the agency directors for a final interpretation or ruling about the appropriateness of including a comment in a subsequent review round. As was the case during the formulation of the first and second rounds of project responses to the state's comments, numerous technical meetings were held with state reviewers to discuss the project's approaches in responding to comments and to give the reviewers a preliminary description of the response to ascertain whether it would address their concerns. Again, this was helpful, but only up to a point.

With the transmittal of the third round of technical review comments, key technical issues associated with the licensing of the Butte site are becoming more apparent. US Ecology and Bechtel are continuing to meet with the reviewers to further clarify comments and discuss the planned approach for responding to the comments. US Ecology asks the state to review certain draft comment responses before they are formally transmitted to ensure that they are on target and comprehensive and that they will likely be acceptable to the state during its formal review. These meetings are of benefit to both parties by ensuring that licensing issues are responded to thoroughly and to the satisfaction of the state reviewers.

By reconfiguring the Butte site to eliminate any wetlands from within the site boundary, US Ecology has satisfied the state's regulatory interpretation that the presence of a wetland on a LLRW disposal site deems it unsuitable and thereby unlicensable.

Another key technical issue that developed pertains to the state's regulatory requirement that the void spaces between disposed-of LLRW containers (drums, liners, and low-specific-activity boxes) be backfilled to the extent practical to minimize the potential for long-term subsidence of the capped facility. However, the state also has a regulatory requirement that the disposal units be designed so that the waste will be as readily recoverable as possible. When US Ecology submitted the application in July 1990, it took exception to the requirement for backfilling the void spaces because doing so would not have allowed the waste to be as readily recoverable as possible. (This was the only exception taken to the state regulations.) The CIC LLRW disposal units do not rely on the disposed-of waste to support the overburden weight of the reinforced concrete roof structure and multilayered closure cap system. The disposal units (i.e., reinforced concrete structures) have been designed to retain their structural integrity under a worst-case loading of a capped facility subjected to maximum credible earthquake forces. In addition, the disposal units have been designed to follow the guidance in NUREG/CR-5041, "Recommendations to the NRC for Review Criteria for Alternative Methods of Low-Level Radioactive Waste Disposal" with regards to design and construction practices to ensure the long-term durability and structural integrity of engineered LLRW disposal structures. In its first-

round through third-round comments, the state questioned US Ecology's reason for taking this exception to the regulation. US Ecology responded to the technical and regulatory basis for the approach taken and believes that the CIC design, which does not include backfilling the void spaces, meets the intent of the regulations. Furthermore, concerns regarding long-term subsidence are mitigated by the durability and structural design provisions for the facility. US Ecology is seeking guidance from the state on this matter.

### LICENSING STATUS

US Ecology submitted the license application (i.e., the SAR and the environmental report) to the State of Nebraska for review in July 1990. To date, the state has deemed the license application complete and has sent three rounds of review comments. US Ecology has responded to the first- and second-round comments and is in the process of responding to the third-round comments. The status of the progress made in resolving these comments is summarized in Table I.

US Ecology has spent approximately 4 to 6 months responding to each round of comments at an average rate of 20 to 25 technical manhours for each comment. Licensing (generating and responding to regulatory comments) was delayed in 1993 for approximately 10 months while the project staff prepared for a contested case hearing on the state's notice of intent to deny the license application. The state rescinded the notice of intent in October 1993 and sent third-round review comments to US Ecology shortly thereafter. The Local Monitoring Committee then filed a lawsuit challenging the technical basis upon which the State of Nebraska rescinded its notice of intent, and the outcome of this suit is unknown at the time this paper was published.

The SAR has been revised six times and has been kept current throughout the licensing process. Technical review comments accepted by the state and requiring incorporation into the SAR have been incorporated. The project maintains a rigorous Licensing Document Change Notice (LDCN) process in accordance with its quality assurance program plan and implementing procedures. LDCNs document the review and approval of changes to the SAR and form the basis of SAR revisions. The project also maintains a licensing and design change database to track commitments as the project

TABLE I  
Status of License Application<sup>a</sup>

	Safety Analysis Report	Environmental Report <sup>b</sup>
First-round comments received	473	249
First-round comments closed	279	201
Second-round follow-on comments received	194	48
New second-round comments received	261	63
Second-round comments closed	306	98
Third-round follow-on comments received	149	13
New third-round comments received	264	39
Total number of comments received	998	351
Comments closed	585	299
Comments still open	413	52

<sup>a</sup> Through the receipt of the third-round of comments by the state.

<sup>b</sup> Includes comments on the SAR and environmental report from the public that have been forwarded by the state to the applicant for response.