

Progress Towards New Radioactive Waste Disposal Capacity in Texas

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ABSTRACT

During the past 25 years, the development of disposal options for radioactive waste in the United States of America (USA or U.S.) has faced a multitude of challenges preventing or delaying the opening of new facilities or restricting the operation of existing facilities. At the end of 2005, there are 11 operating low-level radioactive waste (LLW) disposal sites; eight operated by the U.S. Department of Energy (USDOE) and three operated by private entities. All of them are or soon will be restricted in terms of the LLW they can take, including restrictions based on the origin of the waste. Furthermore, despite a legal mandate dating back to 1980, none of the ten congressionally approved multi-state Compacts has developed a new LLW-disposal facility. As a result, the General Accounting Office (now the Government Accountability Office) expressed concerns in June 2004 about the availability of disposal options for Class B and C LLW (see www.nrc.gov) for at least 34 states beyond June 2008. The following solutions are currently being discussed:

1. Allowing non-USDOE waste generators access to all existing LLW-disposal facilities.
2. Allowing non-USDOE waste generators access to USDOE's disposal facilities.
3. Providing a new waste-disposal capacity for all LLW at a facility currently operated by USDOE or by private industry on land owned by the federal government.
4. Allowing the USDOE to take ownership of commercial LLW and then dispose of it at LLW-disposal facilities operated by or available to the USDOE.

In 2004 and 2005, Waste Control Specialists LLC (WCS), which already operates a 5.4 square kilometer hazardous, toxic, and radioactive waste treatment and storage, and hazardous and toxic waste disposal site in Andrews County, Texas, initiated the following three new initiatives that may provide timely partial solutions to the nation's radioactive waste disposal needs:

1. Applied for a LLW disposal license.
2. Applied for an 11e.(2) byproduct material disposal license (see www.nrc.gov).
3. Petitioned for a rulemaking on disposal in Texas of waste determined by the U.S. Nuclear Regulatory Commission (USNRC) to be "exempted" from radioactive waste disposal requirements.

The LLW disposal license will authorize WCS to dispose of LLW generated in Texas or Vermont, the two states in the Texas Compact, in one disposal facility and, in a separate, adjacent facility, waste generated by the federal government. Pursuant to the applicable Texas statute, the decision on WCS' LLW-disposal license application is expected no later than in

December 2007. Based on this schedule, WCS projects the opening the two related near-surface LLW-disposal facilities before July 1, 2008. Although the schedules for the licensing of the 11e.(2) byproduct material disposal facility and the rulemaking on the USNRC exempt waste are not governed by a statutory-mandated schedule, based on available information at the end of 2005, WCS projects being able to dispose of 11e.(2) byproduct material in late 2006, and USNRC-exempted waste no later than in November 2006.

Recognizing that the licensing of any radioactive waste disposal facility is governed not only by technical considerations but also by local acceptance and political and organizational agendas, WCS remains convinced that all three proposed WCS disposal solutions will ultimately succeed; that is, *it is a question of when rather than if they will become available*. This conclusion is based on:

1. The known national needs for new radioactive waste disposal capacity and enhanced security.
2. The minimal risk posed to humans and the environment due to the prevailing excellent geological and climatic conditions at the Andrews County site.
3. The extensive hazardous, toxic, and radioactive waste management experience possessed by WCS.
4. The active interest, knowledgeability, and support of the local communities.
5. The degree of financial assurance provided by WCS, which exceeds requirements.
6. Confidence in State of Texas support for the national initiative to reinvigorate nuclear power in the USA. The national initiative promises to reduce energy price volatility (the adverse consequences of which the state has experienced); reduce greenhouse gas emissions; reduce national dependence on foreign energy sources; and promote economic and national security.

INTRODUCTION

Waste Control Specialists LLC (WCS) is currently authorized to receive, treat, and store hazardous, toxic, and radioactive wastes, and to dispose of hazardous and toxic wastes at its 5.4 square kilometer (km²) (1,338-acre) site in Andrews County, Texas (Fig. 1). In 2004, in response to then-projected national needs for new radioactive waste disposal options, WCS launched *three new disposal initiatives* for the following radioactive waste categories:

1. Class A, B, and C low-level radioactive waste (LLW) (see www.nrc.gov).
2. 11e.(2) byproduct material (as defined in Title 1, Chapter 2, Sec. 11e.(2) of the Atomic Energy Act of 1954 [1], as amended) (see www.nrc.gov).
3. Waste determined by the Texas Department of State Health Services (DSHS) or the U.S. Nuclear Regulatory Commission (USNRC) to be “exempted” from radioactive waste disposal requirements (see www.nrc.gov).

The remainder of this document is organized as follows. Next is the background section. It summarizes principal LLW laws, regulations, and radioactive waste classification schemes in the USA; identifies the existing available LLW disposal sites for the nation; and discusses current WCS operations at the Andrews County site. The background section is followed by a description of the three new WCS disposal initiatives, including an update on their respective status at the end of 2005. A summary of the authors’ main observations and conclusions ends

the main text. A full listing of references, which are identified in the text by numbers in brackets [1-9], follows the main text. Key words are indicated in *italics* throughout the text.

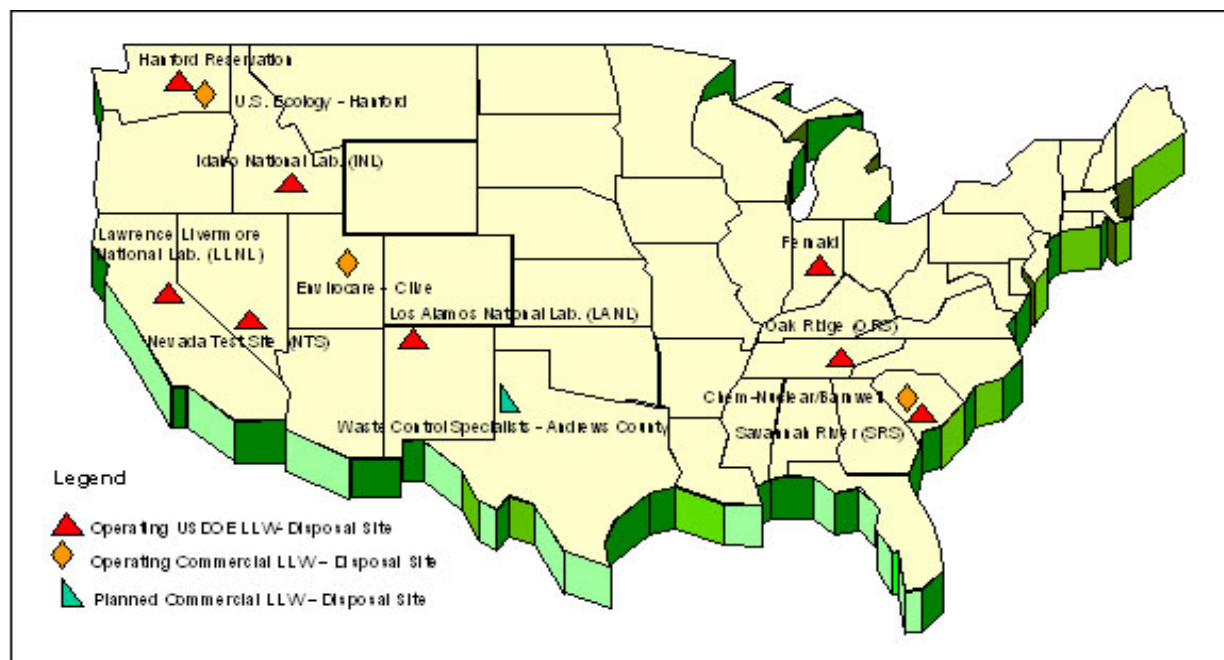


Fig. 1. Existing and planned LLW-disposal sites in the USA

BACKGROUND

Main LLW Laws, Regulations, and Waste Classification Schemes in the USA

The Atomic Energy Act of 1954 [1] and the Low-Level Waste Policy Act of 1980 (LLWPA) [2], as amended in 1985 (*LLWPAA*) [3], provide the statutory foundation for the safe management and disposal of LLW in the USA. *The LLWPA*, among other things, declared the states to be generally responsible for the disposal of LLW generated within their respective boundaries and allowed states to form multi-state compacts (Compacts). The intent of the legislation was that at least one LLW disposal site in each Compact would provide the required disposal option for all the members of the Compact. It also allowed a Compact to exclude LLW waste generated outside their respective borders (on a state-by-state basis, such exclusivity would otherwise be unconstitutional).

At the end of 2005, there are ten Compacts and ten unaffiliated states. There are, however, the following disposal options and related hierarchies of criteria and requirements for safe disposal of LLW in the USA based upon who generated the LLW and where it is to be disposed:

1. *Federally-generated LLW* can be disposed of at both federally- and certain commercially-operated sites (Fig. 1). When disposed of at USDOE-operated sites, USDOE Order 435.1 [4] applies. When disposed of at commercial sites, criteria and requirements prescribed by the USNRC [5] and/or host state agencies apply. As illustrated in Fig. 2, the USDOE and the USNRC have slightly different radioactive waste classification systems.

2. *Commercially-generated LLW* (Fig. 2) can only be disposed of at commercially-operated sites in compliance with criteria and requirements prescribed by the USNRC and/or state agencies.

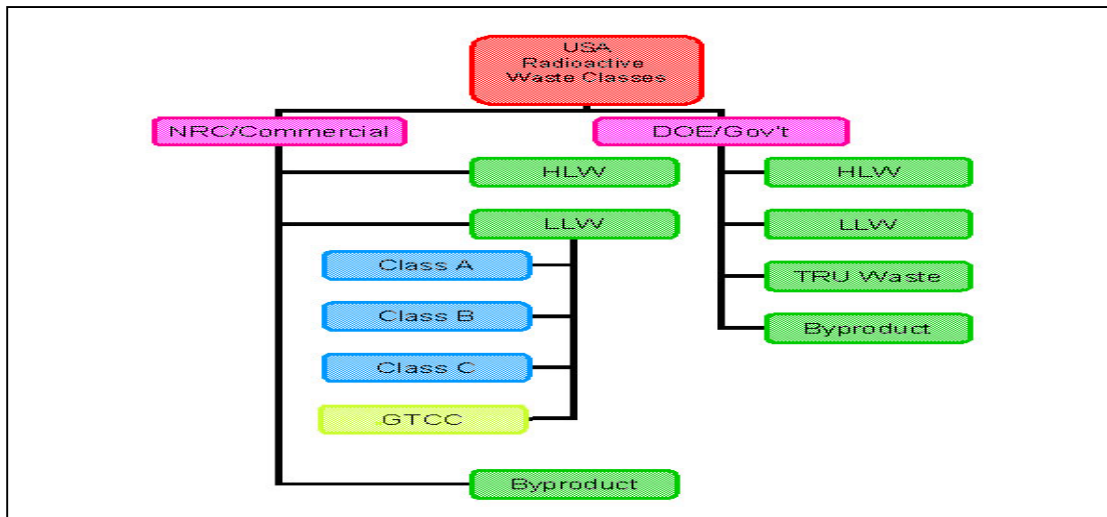


Fig. 2. The USDOE and the USNRC radioactive waste classification systems

The legal framework for the WCS LLW disposal license application is set forth in 78th Texas State Legislature Regular House Bill 1567 (HB 1567) [6], which was signed into law by the governor of Texas on June 20, 2003. Pursuant to HB 1567, the Texas Commission on Environmental Quality (TCEQ) shall render a licensing decision no later than in December 2007 (Fig. 3). WCS plans to develop and open a portion of each landfill within six months of the TCEQ's licensing decision, i.e., by July 1, 2008.

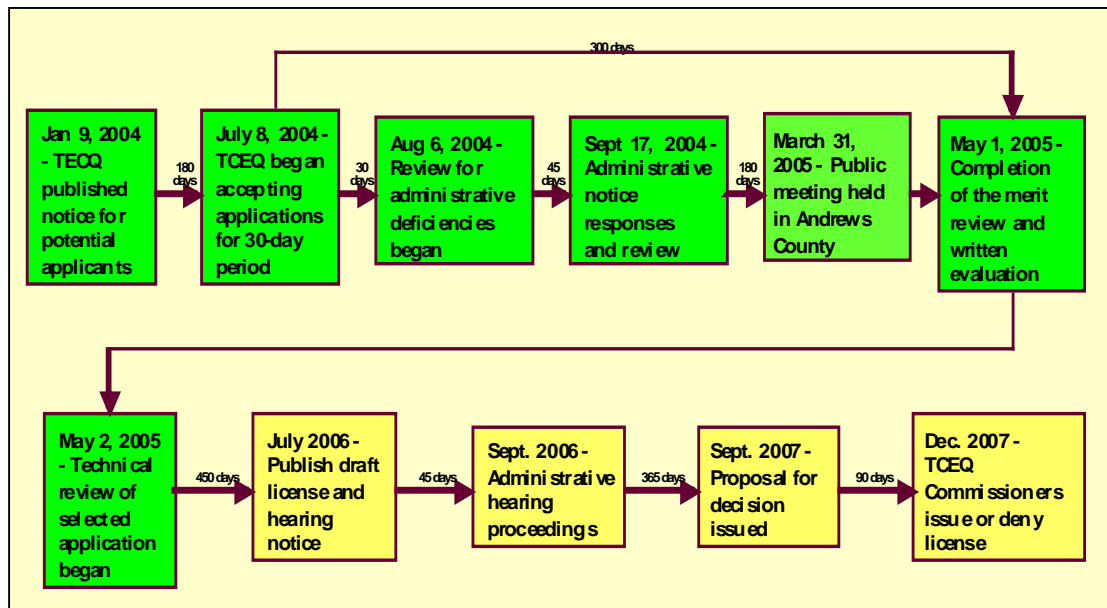


Fig. 3. Texas House Bill 1567 schedule for the licensing of a LLW disposal site in Texas (boxes/milestones marked in green have been completed; boxes marked in yellow remain).

Existing LLW-Disposal Sites

As illustrated in Fig. 1, 11 sites in the USA are currently authorized to receive and dispose of one or more categories of LLW (Fig. 2). Eight sites are operated by the USDOE and three are operated by private entities. Following are concise descriptions of these sites. (The Lawrence Livermore National Laboratory site is only used for safe disposal of small quantities of on-site generated waste and is not described below.)

USDOE-operated LLW-disposal sites

1. *The Fernald Site* (www.fernald.gov) has one active disposal facility. It only accepts waste from the environmental clean-up of the Fernald Environmental Management Project.
2. *The Hanford Reservation Site* (www.hanford.gov) has eight radioactive waste burial grounds that accept on-site waste from the USDOE's environmental cleanup activities except mixed LLW (MLLW), which is currently stored pending the development and opening of an on-site Resource Conservation and Recovery Act (RCRA) compliant disposal facility. Ninety-nine percent (%) of the waste is LLW and MLLW. Hazardous waste comprises <1%. Pursuant to a May 2005 court decision, the Hanford Reservation Site cannot receive LLW from any other site. Additionally, a recently enacted state law prohibits the USDOE from accepting out-of-state waste at the Hanford Reservation site until the site has been cleaned up.
3. *The Idaho National Laboratory (INL) Site* (www.inl.gov) has two disposal facilities - the Subsurface Disposal Area (SDA) at the Radioactive Waste Management Complex and the Idaho CERCLA Disposal Facility. Both facilities only accept waste generated at the INL (including the Naval Reactors Facility and the Argonne National Laboratory-West, which is now part of INL). The SDA is expected to cease operations in the near future.
4. *The Los Alamos National Laboratory (LANL) site* (www.lanl.gov) has four active units for disposal of LLW and asbestos from 31 on-site Technical Areas (generators). Thirty-six landfill cells (pits and trenches) and 208 land-disposal shafts have been closed to date but the ongoing monitoring and evaluation of the performance of these disposal cells and shafts might result in the retrieval and re-disposal of some or all of this waste.
5. *The Nevada Test Site (NTS)* (www.nv.doe.gov) has two active LLW-disposal areas - Area 3 Radioactive Waste Management Site and Area 5 Radioactive Waste Management Site. In Area 3, the waste is disposed of in subsidence craters formed by the underground detonation of nuclear weapons and in 13 Greater Confinement Disposal Units (GCDU) boreholes. Only LLW (primarily bulk debris) from on-site generators and ~15 approved off-site generators is accepted in Area 3. Area 5 hosts (a) four operational pits; two for LLW, one for MLLW, and one for LLW containing asbestos, and (b) three operational trenches designed to receive classified LLW. Area 5 currently accepts LLW from ~15 approved off-site generators, LLW and MLLW from on-site generators, and classified waste.
6. *The Oak Ridge Site (ORS)* (www.oakridge.doe.gov) has one active and one planned disposal facility - the Solid Waste Storage Area 6 and the Environmental Management Waste Management Facility, respectively. The ORS currently accepts short-lived LLW (primarily fission product-contaminated wastes) from on-site generators. Area 6 is also the currently active disposal site for fission-product LLW in GCDUs and for suspect waste in shallow land burial units; however, it does not accept MLLW.
7. *The Savannah River Site (SRS)* (www.srs.gov) has one active and one currently closed radioactive waste disposal area - the E Area Vaults and the Saltstone Disposal, respectively.

As shown in Fig. 1, at the end of 2005, *there are only three privately-operated LLW-disposal facilities in the USA* serving the ten Compacts and the ten unaffiliated states shown in Fig. 4. However, the access to the three privately-operated LLW-disposal facilities is restricted in terms of types and origin of LLW that may be disposed. Furthermore, on July 1, 2008, the access to the Barnwell site will be limited to members of the Atlantic Compact only. As a result, in 2004, the General Accounting Office (GAO) (now the Government Accountability Office) expressed concerns about the lack of a disposal option for Class B and C LLW for at least 34 states beyond June 30, 2008 [7].

Current WCS operations at the Andrews County site, Texas, and related authorizations

Current waste management activities at the Andrews County site are summarized below [8]:

- **Treatment** of RCRA, Toxic Substances Control Act (TSCA), and radioactive mixed waste in a 500-square-meter (m^2) stabilization building (SB) or in an adjoining 500 m^2 mixed waste treatment facility (MWT) (item 5 in Fig. 5). Mixed wastes can only be treated in the MWTF.
- **Storage** of up to 51,057 cubic meters (m^3) of hazardous, toxic, and radioactive waste at any time with the following building/area limitations: (a) Up to 227 m^3 in the SB (item 5 in Fig. 5); (b) Up to 1,040 m^3 in the Container Storage Building (CSB) (item 4 in Fig. 5), including up to 5,000 208-liter-drum equivalents of RCRA, exempt, and non-hazardous wastes; (c) Up to 2,477 m^3 in each of the three Bin/Bulk Storage Units (BSUs) (item 6 in Fig. 5), and (d) Up to 42,489 m^3 of low-specific activity (LSA) waste, including 11e.(2) byproduct material on the 0.04 km^2 LSA storage pad (item 11 in Fig. 5).
- **Disposal** of up to 3,440,000 m^3 of (a) RCRA and TSCA Land Disposal Restrictions (LDR) compliant waste, and (b) pre-approved USNRC-exempt waste in the RCRA Class C landfill (item 7 in Fig. 5) meeting the criteria defined in the authorizations, licenses, and permits.

WCS has safely operated the Andrews County site (Figs. 1 and 5) since 1997 in compliance with the following main Federal and State authorizations, licenses, and permits [8]:

1. Industrial Solid Waste and Hazardous Waste Storage, Processing, and Disposal (= RCRA) Permit HW 50358 granted by TCEQ in August 1994.
2. Authorization TXD 988088464 granted by the U.S. Environmental Protection Agency (USEPA) in December 1994 for Treatment, Storage, and Land Disposal of TSCA wastes.
3. LLW Treatment, Processing, and Storage License L04971 granted by the Texas Department of State Health Services (DSHS), as amended October 2005.
4. USNRC exemption to treat and store Special Nuclear Material (SNM) below certain concentration and possession limits.

The 5.4 km^2 fenced site is located in a portion of the contiguous 54.75 km^2 land parcel owned by WCS, of which 4.0 km^2 extend into New Mexico. Eunice and Hobbs (New Mexico) and Andrews (Texas) are the three closest communities to the site, located 11, 32, and 50 km from the site, respectively. As evidenced by testimonies provided by local residents and their elected officials at several public meetings and written support by local civic organizations and community leaders, the existing and the proposed operations at the WCS site benefit from very strong local public and political support. More information on the WCS operations and relevant authorizations, licenses, and permits is available on the WCS web page (www.wcstexas.com).



- LEGEND:
- | | |
|--|-----------------------------------|
| 1. Access road and guarded entrance to the site. | 2. Rail unloading facility. |
| 3. Administration buildings and laboratories. | 4. Container storage building. |
| 5. Stabilization building (left portion) and mixed waste treatment facility (right portion). | 6. Bulk/bin storage unit #1-#3. |
| 8. Area for 11e.(2) byproduct material landfill. | 7. RCRA/TSCA landfill. |
| 10. Area for Texas Compact LLW landfill. | 9. Area for federal LLW landfill. |
| 11. Low-specific-activity waste storage area (including 11e(2) byproduct material). | |

Fig. 5. Aerial view from the South of a portion of the 5.4 km² WCS site on November 8, 2005

NEW RADIOACTIVE WASTE DISPOSAL SOLUTIONS PURSUED BY WCS

During 2004 and 2005, WCS submitted requests to the responsible regulators in Texas to authorize the following three new radioactive waste disposal initiatives at its Andrews County site [8]:

1. On June 21, 2004, WCS submitted a license application (LA) to DSHS requesting authority to safely dispose of up to 781,193 m³ of 11e.(2) byproduct material in a dedicated near-surface landfill (item 8 in Fig. 5).
2. On August 4, 2004, WCS submitted an LA to TCEQ requesting authority to safely dispose of up to 76,460 m³ of *Class A, B, and C LLW* generated within the "Texas Compact" (Texas and Vermont); and up to 4,600,000 m³ of *Class A, B, and C LLW and MLLW* generated or owned by the USDOE in two separate near-surface landfills (items 9 and 10, respectively, in Fig. 5). It should be noted (a) WCS has only applied for a portion of the volume available under HB 1567 for Texas Compact LLW based on its projection of LLW available from this disposal segment, (b) only half the disposal volume for USDOE-owned and generated LLW and MLLW can be disposed during the first five years of operation, and (c) disposal of Texas Compact LLW disposal must commence prior to disposal of USDOE-owned and generated LLW and MLLW.

3. In 2005, WCS petitioned to DSHS for a rulemaking on waste classified by the USNRC and USDOE as "exempt". The first petition was rejected and a modified petition for rulemaking on USNRC-exempt waste only was submitted on October 19, 2005. This request was withdrawn in December since DSHS was proceeding with the rulemaking.

Summarized below is the status of each of the above three WCS initiatives at the end of 2005, including WCS' current understanding of major governing conditions and a best estimate of when the individual disposal solution would be available.

The *11e.(2) byproduct material* LA is being reviewed by the DSHS. In December 2005, DSHS announced that its decision on the *11e.(2) byproduct material* LA is expected by March 2006 but the license is not expected until about six months later. WCS plans to commence the *11e.(2) byproduct material* disposal operations within six months of receiving the required license.

Following the administrative completeness review, the TCEQ commenced the technical review of the *LLW* LA on May 2, 2005 (Fig. 3). On September 19, 2005, TCEQ provided WCS the first of two planned Technical Notices of Deficiency (TNOD). WCS responded to the first TNOD on November 30, 2005 and the TCEQ has 60 days from that date to issue the second planned TNOD. WCS will respond to the second TNOD by March 30, 2006. The, pursuant to HB 1567, *the TCEQ's draft license and the related hearing notice are due no later than in July 2006* (Fig. 3). The *LLW* LA process has proceeded according to the schedule defined in HB 1567 (Fig. 3) hitherto and WCS expects the final license to be issued in December 2007 and to commence *LLW*-disposal within six months thereafter.

The DSHS' rulemaking on the *USNRC-exempted waste* is expected by November 2006. Since all the required infrastructures and appropriately trained workers are already in place, WCS would be able to and plans to commence the related disposal operations within days of the effective date of the rulemaking.

MAIN OBSERVATIONS AND CONCLUSIONS

In our opinion, the three fundamental prerequisites for the safe development, operation, and closure of any radioactive waste disposal facility are:

1. Safety.
2. Financial resources to meet planned and unplanned events.
3. Local acceptance.

Furthermore, the three most common challenges to the safe development, operation, and closure of any radioactive waste disposal facility are:

1. Fear.
2. Personal and organizational "ideological" agendas.
3. Political agendas.

As can be expected, all of the above prerequisites and challenges are present in the processes governing the three radioactive waste disposal solutions initiated by WCS. Hence, in addition to providing the regulator the requested information, WCS is engaged in extensive outreach to

minimize the gap between real and perceived risks both locally and nationally. However, the non-local personal, organizational, and political agendas have proven to be more difficult to contend with because neither local safety, national needs, national security, nor costs seem to be issues of importance.

Notwithstanding the inevitable ideological and political overtones and other challenges affecting the timely progress of the WCS' three new disposal initiatives, *WCS is confident that the prevailing geological conditions and proposed landfill designs are safe and, augmented by the financial, local public and political conditions, will satisfy all legal and regulatory requirements.* Indeed, WCS remains convinced that *the common denominator for all three disposal solutions/initiatives is when rather than if they will open* for the following main reasons:

1. The known national needs for new radioactive waste disposal capacity and enhanced security.
2. The minimal risk posed to humans and the environment due to the prevailing excellent geological and climatic conditions at the Andrews County site.
3. The extensive hazardous, toxic, and radioactive waste management experience possessed by WCS.
4. The active interest, knowledgeability, and support of the local communities.
5. The degree of financial assurance provided by WCS, which exceeds requirements.
6. Confidence in State of Texas support for the national initiative to reinvigorate nuclear power in the USA. The national initiative promises to reduce energy price volatility (the adverse consequences of which the state has experienced); reduce greenhouse gas emissions; reduce national dependence on foreign energy sources; and promote economic and national security.

REFERENCES

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1. Public Law 83-703, *The Atomic Energy Act of 1954*.
 2. Public Law 96-573, *The Low-Level Radioactive Waste Policy Act of 1980*.
 3. Public Law 99-240, *The Low-Level Radioactive Waste Policy Amendments Act of 1985*.
 4. U.S. Department of Energy, *Radioactive Waste Management*, DOE Order 435.1.
 5. U.S. Nuclear Regulatory Commission, *Licensing Requirements for Land Disposal of Radioactive Waste*, Code of Federal Regulations, Title 10, Part 61 (10 CFR Part 61).
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