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Study on Surcharge Revenue from Imported Nonparty Waste

A Report to the 85th Legislature

**Study on Surcharge Revenue from Imported Nonparty
Waste**

A Report to the 85th Texas Legislature

Prepared by

Radioactive Materials Division

SFR-117

November 2016

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Executive Summary

In 2011, the 82nd Texas Legislature passed Senate Bill 1504 relating to the disposal or storage of waste at, or adjacent to, the Texas Low-Level Radioactive Waste Disposal Compact Facility. The bill charged the Texas Commission on Environmental Quality (TCEQ) with conducting “a study on surcharge revenue from imported Nonparty Waste.” Now codified in the Texas Health and Safety Code (TH&SC) Chapter 401 §207(h-1), the study evaluates operations and expenses of the compact waste facility (CWF) licensee; disposal expenses and various costs associated with the facility; and the impact of the surcharge on revenue generated for the State.

In addition to meeting the statutory elements summarized above, the report additionally covers other areas relevant to low-level radioactive waste (LLRW) disposal in Texas and the compact facility licensee including an introduction to LLRW, a brief history of LLRW, surcharge requirements and other expenses for the Texas CWF, waste disposal rates and State expenses that are reimbursed.

TH&SC §401.004 defines LLRW with cross references to the United States Nuclear Regulatory Commission (NRC) and other Texas state agency rules by what LLRW is and what it is not:

LLRW is radioactive material that is:

- discarded or unwanted and is not exempt by board rule adopted under TH&SC §401.106;
- waste, as that term is defined by Title 10, Code of Federal Regulations (10 CFR) §61.2; and,
- subject to concentration limits established under 10 CFR §61.55, or compatible rules established by the Texas Department of State Health Services (TDSHS) or TCEQ, as applicable.

LLRW is not:

- high-level radioactive waste (10 CFR §60.2);
- spent nuclear fuel (10 CFR §72.3);
- by product material (TH&SC §401.003(3)(B));
- naturally occurring radioactive material (NORM) waste; or
- oil and gas NORM waste.

In 1954, use of radioactive materials was permanently altered by passing of the Atomic Energy Act (AEA) which allowed commercial enterprises to use atomic materials. The AEA also authorized the Atomic Energy Commission (AEC) to enter into an agreement with any state or group of states to perform regulatory inspections or other regulatory functions on a cooperative basis, as the Commission deemed appropriate. The State of Texas entered such an agreement with the NRC (AEC’s successor) in 1963.

In 2002, after the withdrawal of Maine, the Texas Compact was formed comprising Texas(the host state) and Vermont.

In 2003 the TH&SC was amended to allow for the creation of two privately run waste disposal facilities to be licensed by the TCEQ. One facility (later termed the Federal Waste Disposal Facility or FWF) disposes of federal facility waste and the other, adjacent facility (the Texas Compact Waste Disposal Facility or CWF), disposes of commercial LLRW from Texas Compact generators.

On September 10, 2009, the TCEQ Executive Director issued a LLRW disposal license to Waste Control Specialists LLC (WCS) to operate the CWF. Since 2011, the Texas CWF has been authorized to accept nonparty waste under the auspices of the Texas Low-Level Radioactive Waste Disposal Compact Commission (TLLRWDCC) and the TCEQ. Construction of the CWF was completed in 2012 and the TCEQ authorized the commencement of disposal operations at the CWF on April 25, 2012.

The Texas CWF is authorized by rule to collect fees based on commission approved maximum disposal rates, as specified in 30 Texas Administrative Code (TAC) Chapter 336 Subchapter N, more commonly referred to as the Rate Rules. The Rate Rules provide a regulatory process to ensure that the disposal rates are fair, just, reasonable and sufficient considering allowable expenses plus rate of return equivalent to what is earned by comparable enterprises. The initial maximum rates were established in 2010 and may be amended to adjust for inflation and volume. The rates for imported nonparty waste are not explicitly stated in the Rate Rules but are assessed relative to the party-state fees. Pursuant to 30 TAC §336.1310, fees charged for disposal of party-state compact waste must be equal to or less than the compact waste disposal fees whereas fees charged for disposal of nonparty waste must be greater than the compact waste disposal fees.

Senate bill (SB) 1504 allowed the Texas CWF licensee to begin accepting LLRW waste for disposal from nonparty compact states if the following conditions are met (TH&SC §401.207):

- The license is amended by the TCEQ to authorize disposal of nonparty waste (amended license issued May 2012);
- If eligible, the waste has been volume-reduced by at least a factor of three unless volume reduction of the waste would change the waste classification to greater than Class C, in which case volume reduction is not required;
- The waste is containerized;
- The waste is not of international origin;
- The nonparty waste disposed of is not more than the greater of:
 - 1,167,000 curies

- An amount of nonparty compact waste equal to 30% of the initial licensed capacity of the facility; and
- Not more than 275,000 curies of nonparty compact waste in any fiscal year; and
- A surcharge is collected from the imported waste generator.

The licensee must enter into a contract to accept nonparty waste. The contract must be reviewed by the TCEQ and the fees must be greater than fees for disposal of party state LLRW waste. Once the contract is negotiated an additional surcharge fee of 20% is added to the contracted fee amount.

There are several additional fees that, by statute, the Texas CWF is required to pay (see section 2.3 below), as well as posting of financial assurance in accordance with the TH&SC §401.2085.

The TCEQ is authorized to recover certain costs incurred by the Commission in the administration of the CWF license [30 TAC §336.103(c)]. Since the CWF licensee began operations, the TCEQ has collected License Administration and Site Inspection Fees for work done by TCEQ staff totaling \$9,541,367.

The table below details the revenues paid to the State for disposals at the Texas CWF. In particular, the row labeled “Nonparty LLRW Disposal Fee” represents the surcharge for out-of-Compact disposals and totals over two-thirds of the total revenues generated thus far.

Revenue by Fiscal Year

Type of Fee	2012	2013	2014	2015	2016	Totals
By Product Material Disposal	\$0	\$0	\$0	\$0	\$0	\$0
Process and Storage Waste	\$143,681	\$34,063	\$47,708	\$35,012	\$1,068,560	\$1,329,024
Compact Disposal State Fee	\$630,689	\$1,500,969	\$999,629	\$2,841,272	\$887,593	\$6,860,151
Federal Disposal State Fee	\$0	\$0	\$391,983	\$380,693	\$185,025	\$957,701
Other Radioactive Operations	\$0	\$0	\$0	\$0	\$0	\$0
Nonparty LLRW Disposal Fee	\$2,522,276	\$5,910,178	\$3,666,357	\$11,037,231	\$3,132,315	\$26,268,358
TLLRWDC Fee	\$0	\$372,341	\$252,730	\$710,318	\$221,898	\$1,557,287
Totals	\$3,296,646	\$7,817,551	\$5,358,407	\$15,004,526	\$5,495,391	\$36,972,521

Based on the revenue presented in the table above, fees generated from disposal of nonparty waste is significant.

Evaluation of the data revealed that the volumes for 2014 consisted of a large shipment (14,130 cubic feet) of nonparty Class A waste in July 2014. The total 2014 volume was 16,299 cubic feet. Class A waste has a lower surcharge fee than Class B and C because it has a lower charge per cubic foot. The surcharge per cubic foot disposed for July 2014 is lower than the surcharge fee rate for the remaining months of 2014 due to the acceptance in July 2014 of the Class A waste. Regarding revenue from surcharge fees, data shows the surcharge fee is being collected at an average rate of \$471.84/ft³ (excluding FY 2014) and \$404.26/ft³ with the 2014 data factored in.

To date, roughly 80% of the total volume of LLRW disposed in the Texas CWF is nonparty state volume while the remaining 20% is Texas Compact volume. Additionally, 94% of the total radioactivity disposed in the Texas CWF is nonparty state curies while the remaining 6% is Texas Compact curies. The higher volume of nonparty waste disposed results in increased surcharge fees.

Several factors exist which may cause delays, or impediments, from keeping a steady stream of waste from being shipped for disposal. Whether the waste is nonparty or party state waste, it will go through the same technical processes at the generator's facility, or at a processing facility, to be made ready for disposal. One primary impediment preventing generators from shipping waste is the cost of disposal. Interim storage may be a more acceptable option to generators when the waste is lower volume and class. This prevents some generators from shipping waste to the Texas CWF. Additionally, regulatory impediments also exist for disposal of nonparty waste.

Because disposal records and pricing structure of the three disposal sites outside of Texas are not publically available and could, at best, only be estimated, precise data about LLRW disposal costs or pricing are not possible to obtain, therefore, that analysis is beyond the scope of this report.

The primary cost drivers for disposal of waste have been reported to result from volume of disposal in individual shipments not other surcharges or base disposal charges. Cost based pricing seems very dependent on the overall volume of waste disposed, rather than radioactivity, waste form, or particular waste stream.

With no concrete data available from which to draw definitive price-volume relationships, predicting revenue changes based on pricing and/or surcharge adjustments becomes a speculative exercise. While it is reasonable to assume that lower pricing may increase volumes, the highly-regulated nature of this "marketplace" may indeed render pricing as nearly irrelevant in many disposal decisions.

Revenues to the State since the Texas CWF operations began have totaled \$37 million collected from disposal fees. Of this total, over \$26 million, or ~70%, have been collected from nonparty generators subject to the surcharge provision.

In conclusion, although waste disposal at the Texas CWF has clearly generated a positive source of revenue for the state, the financial benefits for Texas could certainly have been greater if annual disposal levels had reached the limits established in statute. Given this historical record and lacking any specific data to calculate market-specific price points with which to inform the rate setting process, the most conservative course of action is to leave the surcharge at its current level unchanged.

There may be validity to arguments that marginal reduction in the overall cost of disposal at the Texas CWF would lead to increased disposal and, therefore, overall increased revenues to the state, but the most appropriate mechanism to verify this trend would be discrete adjustments to individual components of the rate, apart from the state surcharge.

Finally, considering the ongoing needs of generators of radioactive waste, both in the Texas Compact and those in the over thirty states without access to their own compact disposal site, the Texas CWF, and subsequently the State of Texas, should see significant financial benefit. Far more than ongoing generation, however, a significant source of revenue from waste disposal in the future will come from the decommissioning needs of the three nuclear power plants within the Texas Compact and of the 86 nuclear power plants currently operating in nonparty states without a current disposal site. Given such a very large quantity of waste that could be brought for disposal at the Texas CWF in the future, it may presently be premature to alter the surcharge for nonparty disposal.

1. Introduction

1.1 Background and Summary

The 82nd Texas Legislature passed Senate Bill 1504 in 2011 charging the TCEQ with conducting “a study on surcharge revenue from imported Nonparty Waste.” Now codified in the TH&SC Chapter 401 §207(h-1), the study is to review operations and expenses of the CWF licensee; evaluate disposal expenses and various costs associated with the facility; and evaluate the impact of the surcharge on revenue generated for the State.

In addition to meeting the statutory elements summarized above, the report also covers other areas relevant to low level radioactive waste (LLRW) disposal in Texas and the compact facility licensee. First, TCEQ offers a brief discussion of what LLRW is, and what it is not, followed by a brief history of LLRW disposal in the United States and the Texas Compact. Additionally, TCEQ will discuss the surcharge requirements as well as other expenses collected from the CWF licensee and expenses reimbursed. Then a discussion, as promulgated at Title 30 Texas Administrative Code (30 TAC), Chapter 336 Subchapter N, of how rates are determined for nonparty waste imported to the compact will be presented.

1.2 Definition and Classes of Low-Level Radioactive Waste

LLRW is defined in Texas Law with cross references to the United States Nuclear Regulatory Commission (NRC) and other Texas state agency rules. LLRW is defined by what it is and by what it is not in the TH&SC §401.004:

It is radioactive material that is:

- discarded or unwanted and is not exempt by board rule adopted under TH&SC §401.106;
- waste, as that term is defined by Title 10, Code of Federal Regulations (10 CFR) §61.2; and,
- subject to concentration limits established under 10 CFR §61.55, or compatible rules established by the Texas Department of State Health Services (TDSHS) or TCEQ, as applicable.

LLRW is not:

- high-level radioactive waste (10 CFR §60.2);
- spent nuclear fuel (10 CFR §72.3);
- by product material;
- naturally occurring radioactive material (NORM) waste; or oil and gas NORM waste.

LLRW is classified for disposal as either Class A, Class B, or Class C waste according to a number of regulatory classification methods set forth in 10 CFR §61.55. Basically, Class A is the least radioactive, or least hazardous, and Class C is the most radioactive, or most hazardous. All classes of LLRW may contain

either short-lived or long-lived radionuclides, or a combination of both. LLRW is generated in connection with normal activities that involve radioactive materials in locations such as:

- Nuclear power plants;
- Hospitals;
- Laboratories;
- Industries that manufacture and use radioactive materials;
- Institutions of higher learning; and
- State and local governments.

1.3 History of Low-Level Radioactive Waste Disposal

Prior to 1954, the U.S. Government controlled all atomic energy activities and facilities. Passing of the Atomic Energy Act (AEA) in 1954 changed that by allowing for civilian participation in the atomic field and the industrial use of radioactive materials by private industry to be regulated by the U.S. Atomic Energy Commission (AEC). Subsequently, many private entities began using radioactive materials in industry, medicine, science, and research. Because of the now widespread use of radioactive materials, the AEA also authorized the AEC to enter into an agreement with any state or group of states to perform regulatory inspections or other regulatory functions on a cooperative basis, as the Commission deemed appropriate. The State of Texas entered such an agreement with the NRC (AEC's successor) in 1963.

To address the issue of the disposal of LLRW, Congress passed the Low-Level Radioactive Waste Policy Act (LLRWPA) in 1980 (Public Law 96-573) (42 U.S.C. Sections 2021b-2021j). This statute creates a regional approach to LLRW disposal by providing that LLRW produced by non-Department of Energy (DOE) activities would be managed on a state or regional level. It encouraged the formation of regional compacts and in each compact one state would be designated as the host state of a disposal facility.

Initially, there were disposal sites opened in six states. Over time, three of the six closed due to filled capacity and/or operational issues. The remaining three quickly closed or restricted LLRW waste being received due to the large amounts coming in from commercial generators outside their compact or jurisdiction, thereby ensuring adequate capacity for waste generated within their respective compacts. Prior to the Texas CWF opening and the recent changes in law and rules regarding importation of nonparty LLRW, most facilities throughout the United States that generate LLRW had limited to no options for safe disposal of their LLRW.

In 1981, the Texas Legislature created the Texas Low-Level Radioactive Waste Disposal Authority (TLLRWDA) to site, develop, operate, close, and decommission a Texas LLRW disposal facility. By 1998, the TLLRWDA had

chosen a site along with a design of the facility to dispose of LLRW. An initial Disposal Compact was formed between Texas, Maine and Vermont in 1993, but by 2002, Maine had withdrawn leaving Texas and Vermont.

In 2003 the TH&SC provisions regarding the siting and operation of commercial LLRW disposal facilities for the Texas Compact were amended. The amendment allowed for the creation of two privately run waste disposal facilities to be licensed by the TCEQ. One facility (later termed the Federal Waste Disposal Facility or FWF) disposes of federal facility waste while the other, adjacent facility (the CWF), disposes of commercial LLRW from Texas Compact generators.

On September 10, 2009, the TCEQ Executive Director issued a LLRW disposal license to Waste Control Specialists LLC (WCS). Construction of the CWF was completed in 2012 and the TCEQ authorized the commencement of disposal operations at the CWF on April 25, 2012.

Since 2011, the TH&SC §401.207 allows for a system of importation of nonparty waste into the CWF. The Texas Low-Level Radioactive Waste Disposal Compact Commission (TLLRWDC) also promulgated rules regarding importation in both 2011 and 2012, which includes TCEQ certification through a written evaluation that the waste is authorized for disposal under the license.

2. Fees

2.1 Fees for Low-Level Radioactive Waste Disposal

A licensee who receives low-level radioactive waste for disposal pursuant to the Texas Low-Level Radioactive Waste Disposal Compact established under TH&SC, Chapter 403 shall collect a fee to be paid by each person who delivers LLRW to the Texas CWF for disposal. The collected fee is based on commission approved maximum disposal rates, as specified in 30 TAC Chapter 336 Subchapter N.

Subchapter N, commonly referred to as the Rate Rules, introduces the mechanism by which the maximum disposal rate at the Texas CWF is set by the Commission. The Rate Rules set a regulatory process to ensure that the disposal rates are fair, just, reasonable and sufficient considering allowable expenses plus rate of return equivalent to what is earned by comparable enterprises.

2.1.1 Initial Determination of Rates and Fees

To begin the process of setting a rate, the Commission required the licensee to submit an application to the TCEQ to aid the Commission in setting the initial disposal rates and fees for the disposal of radioactive waste.

The application provided the Commission with information to determine an appropriate inflation adjustment, volume adjustment, extraordinary volume adjustment and relative hazard as required under section 30 TAC §336.1309(e).

The application was submitted by WCS on June 01, 2010, pursuant to 30 TAC §336.1309 of the Rate Rules, and it was used to set initial rates. The application included the following factors for consideration as identified in 30 TAC §336.1307:

- Allow the licensee to recover allowable expenses.
- Provide an amount to fund local public projects under TH&SC §401.244.
- Provide a reasonable opportunity to earn a reasonable rate of return.
- Provide an amount necessary to pay licensing fees, facility fees, financial assurance and reimburse the commission for the salary and other expenses of two or more resident inspectors employed by the commission pursuant to TH&SC §401.206.

Using the information gathered, an initial rate was set, which became the maximum disposal rate.

2.1.2 Amending the Rates

The maximum disposal rates are to be adjusted according to rule to incorporate inflation and volume adjustments. Such adjustments will take effect unless the commission authorizes an alternate schedule. The licensee also has the power to initiate a rate change in the maximum disposal rate under certain provisions. To initiate a rate change, an application will be submitted and processed.

2.1.3 The Rate Schedule

Table 2.1 shows the current disposal rates for the CWF for base disposal rate charges for both volume and activity. Table 2.2 details current surcharge fees, or additional fees, assessed for party compact waste disposal.

Table 2.1. Base Disposal Charge

1A. Waste Volume Charge	Charge per cubic foot (\$/ft³)
Class A LLRW - Routine	\$100
Class A LLRW- Shielded	\$180
Class B and C LLRW	\$1,000
Sources	\$500
Biological Waste (Untreated)	\$350
1B. Radioactivity Charge	
Curie Inventory Charge (\$/mCi)	\$0.55
Maximum Curie Charge (per shipment) (excluding C-14)	\$220,000/shipment
Carbon-14 Inventory Charge (\$/mCi)	\$1.00
Special Nuclear Material Charge (\$/gram)	\$100

Table 2.2. Surcharges to the Base Disposal Charge

2A. Weight Surcharge – Weight (lbs) of Container	Surcharge (\$/container)
10,000 to 50,000 lbs	\$10,000
Greater than 50,000 lbs	\$20,000
2B. Dose Rate Surcharge – Surface Dose Rate (R/hour) of Container	Surcharge per cubic foot (\$/ft³)
1-5 R/hour	\$100
Greater than 5 to 50 R/hour	\$200
Greater than 50 to 100 R/hour	\$300
Greater than 100 R/hour	\$400
2C. Irradiated Hardware Surcharge	
Surcharge for special handling per shipment	\$75,000/shipment
2D. Cask (Shielding Waste) Surcharge	
Cask handling surcharge per cask	\$2,500/cask

2.1.4 Rates for Imported Nonparty Waste

The rates for imported nonparty waste are not explicitly stated in the Rate Rules and are referred to relative to the party-state fees. Pursuant to 30 TAC §336.1310 fees charged for disposal of party-state compact waste must be equal to or less than the compact waste disposal fees whereas fees charged for disposal of nonparty waste must be greater than the compact waste disposal fees.

While not specifically listed in the Rate Schedule table, the rate schedule is still used to determine the minimum fees by which nonparty waste can be accepted for disposal at the Texas CWF as outlined in 30 TAC §336.1310.

2.2 Surcharge Fee

Senate bill (SB) 1504 in 2011 allowed the Texas CWF licensee to begin accepting LLRW waste for disposal from nonparty compact states if the following conditions are met (TH&SC §401.207):

- The license is amended by the TCEQ to authorize disposal of nonparty waste (amended license issued May 2012);
- If eligible, the waste has been volume-reduced by at least a factor of three unless volume reduction of the waste would change the waste classification to greater than Class C, in which case volume reduction is not required;
- The waste is containerized;
- The waste is not of international origin;
- The nonparty waste disposed of is not more than the greater of:
 - 1,167,000 curies
 - An amount of nonparty compact waste equal to 30% of the initial licensed capacity of the facility; and,
 - Not more than 275,000 curies of nonparty compact waste in any fiscal year.
- A surcharge is collected from the imported waste generator.

In order to accept waste from a nonparty importer, the CWF licensee shall negotiate a contract with the generator and the contract must be approved by the TCEQ executive director in accordance with stipulations of TH&SC §401.2456; 30 TAC §336.1317(b); and Attachment C, Compact Waste Disposal Facility Acceptance Criteria of Radioactive Materials License R04100.

Under TH&SC §401.2456 the rates are negotiated based on both price per curie and price per cubic foot. Associated fees from the contract must be greater than, as applicable:

- The compact waste disposal fees under TH&SC §401.245, determined by the commission, that are in place at the time the rates are negotiated; and,
- The interim compact waste disposal fees under TH&SC §401.2455 as set by the executive director that are in effect when the rates are negotiated.

Contracts negotiated for disposal of nonparty waste must be negotiated in good faith; conform to applicable antitrust statutes and regulations; and be nondiscriminatory. Additionally, any contract rates for disposal of nonparty waste must generate fees sufficient to meet the criteria for party state compact waste under TH&SC §401.246(a) and (c).

Once the licensee for the Texas CWF has negotiated a contract for disposal of nonparty waste and the contract has been approved by the executive director, in accordance with TH&SC §401.207(g), the surcharge fee is assessed to be an additional 20% of the total contracted rate. The 20% assessed surcharge fee is then added to the total contracted rate.

For example, if the Texas CWF negotiates a contract to dispose of nonparty waste and the negotiated contract is for \$1,000,000, the surcharge is then assessed at 20% so $\$1,000,000 \times 0.2 = 200,000$; so the resulting total contracted rate assessed for this contract would = \$1,200,000.

Fee information is submitted and evaluated on a regular basis. Applicable fees, including surcharge fees, are collected at that time. In accordance with TH&SC §401.207(h) and 401.307(b), surcharge fees are deposited in the environmental radiation and perpetual care account without regards to the balances of either account.

2.3 Additional Fees and Expenses

In addition to the regulated disposal rate and surcharge fee imposed on nonparty waste, there are additional fees imposed on the Texas CWF facility operator, waste generators, or similar stakeholders involved in the operation of the disposal facility.

A complete list of all the fees and surcharges statutorily authorized or required by Chapter 401 of TH&SC regarding transportation of LLRW includes:

- The TDSHS may impose a fee on shippers for shipments to the LLRW disposal facility, not to exceed \$10 per cubic foot and may provide additional revenue to support the TLLRWDC [§401.052(b)(5); §401.052(d)(2)].
- The LLRW facility license holder may impose a fee on the person making a shipment that is not properly processed and packaged [§401.226(a)].

A complete list of all fees and surcharges statutorily authorized or required by Chapter 401 of TH&SC regarding disposal of LLRW includes:

- The surcharge fee discussed in section 2.2 above;
- The LLRW facility license holder must reimburse the TCEQ for the salary and other expenses of two or more resident inspectors [§401.206].
- The TCEQ may impose a fee on nonparty compact waste generators for failing to comply with volume reduction requirements [§401.207(d-2),(d-3)].

- The TCEQ may impose a fee on the LLRW facility license holder to cover the administrative costs of adjusting, correcting, or otherwise modifying the license [§401.218(d), and §401.301].
- The TCEQ must collect a nonrefundable \$500,000 application processing fee from the applicant for a compact waste disposal facility license [§401.228(3) and §401.229].
- If the costs to TCEQ to process an application for a compact waste disposal facility license exceed the \$500,000 application processing fee, the TCEQ may assess and collect additional fees from the applicant to recover the costs [§401.229].
- The LLRW facility license holder must transfer to the commissioner's court of the host county 5% of gross receipts from compact waste received at the CWF and the FWF [§401.244 and §401.271].
- The LLRW facility license holder must transfer to the state general revenue fund 5% of gross receipts from compact waste received at the CWF and the FWF [§401.2445 and §401.271].
- As mentioned previously, the waste disposal fee, also known as the compact disposal rate, is determined by the TCEQ and defined by rule. The LLRW facility license holder must not charge compact generators a fee for waste disposal above that rate and must not charge nonparty, or out of compact, generators a fee for waste disposal below that rate [§401.245, §401.2455, §401.2456 and §401.246].
- The TCEQ shall collect a portion of the waste disposal fee that is calculated to support the activities of the TLLRWDC [§401.249(f)].
- In order to join the Texas Low-Level Radioactive Waste Disposal Compact, the prospective party state must pay to Texas a \$25 million fee. If a party state joins after January 1, 2011, the fee is set at \$30 million, and if the party state joins on or after September 1, 2018 and before September 1, 2023, the fee is set at \$50 million. [§401.250(a-b)].
- The TCEQ may collect an additional fee of 5% of the annual license fee to be deposited to the Environmental Radiation and Perpetual Care Account, subject to certain caps in Sec. 401.307 [§401.301(d)].

2.3.1 Fees Collected as Cost Recovery

The TCEQ is authorized to recover certain costs incurred by the Commission in the administration of the Texas CWF license and for on-site inspection and monitoring performed by Commission staff [30 TAC 336.103(c)]. These costs

are tracked and reported for review by Commission management, and invoiced to the Licensee for reimbursement. The TCEQ is authorized to recover certain costs incurred by the Commission in the administration of the CWF license [30 TAC §336.103(c)]. Since the CWF licensee began operations, the TCEQ has collected License Administration and Site Inspection Fees for work done by TCEQ staff totaling \$9,541,367.

2.3.2 Financial Assurance

Besides operating fees, the Texas CWF licensee must post required State of Texas Financial Assurance (FA) in accordance with the TH&SC §401.2085. The FA provides the State funds in the event that a licensee is no longer functioning as an institution and its facility and related improvements have to be closed and remediated. Specifically, these funds provide for:

- decommissioning and closure;
- post-operational surveillance;
- institutional control; and,
- corrective action.

Funds for these costs are typically provided through financial instruments in the form of: Trust Funds, Surety Bonds, Letters of Credit, Insurance Policies, etc. These instruments are reviewed and approved by TCEQ's Financial Administration Division. Review and approval occurs during the initial approval of a license and annually on the anniversary of issuance of the license. The annual review ensures the FA has been updated to reflect any changes in the licensed facility, its operations and/or the annual inflation factor.

FA estimates are based on the licensee's Decommissioning Cost Estimate (DCE). DCE's are submitted with the original license application, and are provided by the applicant. Typically, DCE's include the following areas: the Grounds, Buildings, Other Facilities, Site Improvements, Wells, and Impoundment Areas. Additionally, these costs include air sampling, ground water sampling, and maintenance in post closure.

For the CWF licensee, based on a license amendment dated August 2014, holds the following FA amounts:

- for decommissioning, closure and post-operational surveillance over \$43 million;
- for post-closure over \$23 million; and,
- corrective action over \$20 million.

3. Analysis

3.1 Revenue

Table 3.1 below details the revenues paid to the State for disposals at the Texas CWF. In particular, the row labeled "Nonparty LLRW Disposal Fee" represents

the surcharge for out-of-Compact disposals and totals over two-thirds of the total revenues generated since the Texas CWF operations began.

Table 3.1. Revenue by Type of Fee by Fiscal Year

Type of Fee	2012	2013	2014	2015	2016	Totals
By Product Material Disposal	\$0	\$0	\$0	\$0	\$0	\$0
Process and Storage Waste	\$143,681	\$34,063	\$47,708	\$35,012	\$1,068,560	\$1,329,024
Compact Disposal State Fee	\$630,689	\$1,500,969	\$999,629	\$2,841,272	\$887,593	\$6,860,151
Federal Disposal State Fee	\$0	\$0	\$391,983	\$380,693	\$185,025	\$957,701
Other Radioactive Operations	\$0	\$0	\$0	\$0	\$0	\$0
Nonparty LLRW Disposal Fee	\$2,522,276	\$5,910,178	\$3,666,357	\$11,037,231	\$3,132,315	\$26,268,358
TLLRWDC Fee	\$0	\$372,341	\$252,730	\$710,318	\$221,898	\$1,557,287
Totals	\$3,296,646	\$7,817,551	\$5,358,407	\$15,004,526	\$5,495,391	\$36,972,521

3.2 Surcharge Revenue for Non-Compact Waste

Data was gathered for the surcharge fees collected from 2012-2016 for nonparty waste per volume. Figure 3.1 shows the surcharge fees collected relative to the amount of waste, by volume. The data indicates that, generally, surcharge fees collected increases with volume of imported (nonparty) waste received for disposal into the Texas CWF. The exception was for the year 2014. This exception is clearly evidenced in Figure 3.2 below.

Evaluation of the data revealed that the volumes for 2014 consisted of a large shipment (14,130 cubic feet) of nonparty Class A waste in July 2014. The total 2014 volume was 16,299 cubic feet. Class A waste has a lower surcharge fee than Class B and C because it has a lower charge per cubic foot. The surcharge per cubic foot disposed for July 2014 is lower than the surcharge fee rate for the remaining months of 2014 due to the acceptance in July 2014 of the Class A waste.

In conclusion, the data shows the surcharge fee is being collected at an average rate of \$471.84/ft³ (excluding FY 2014) and \$404.26/ft³ with the 2014 data factored in.

Figure 3.1. Surcharge Revenue versus Imported Volume

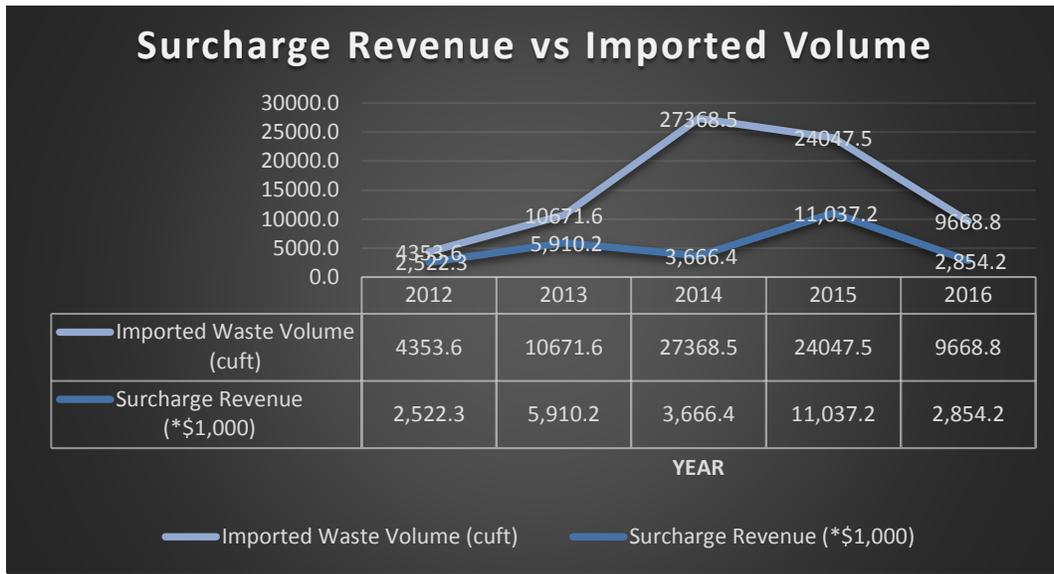
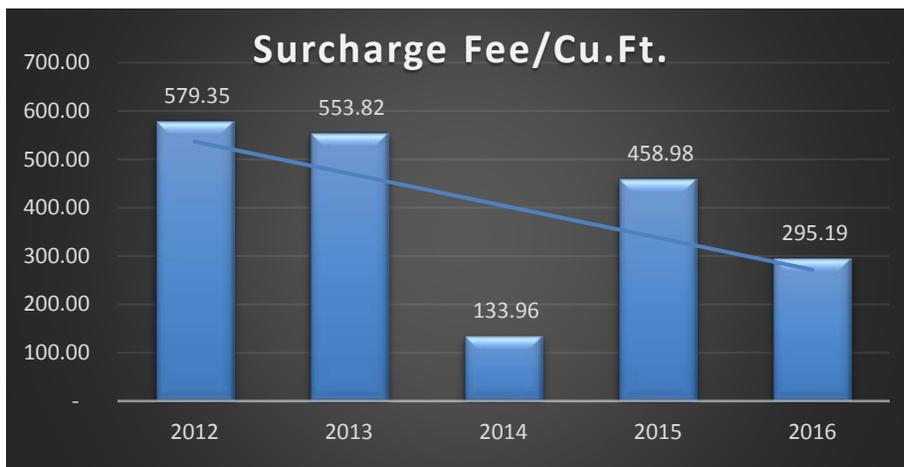


Figure 3.2. Surcharge Fees per Cubic Foot



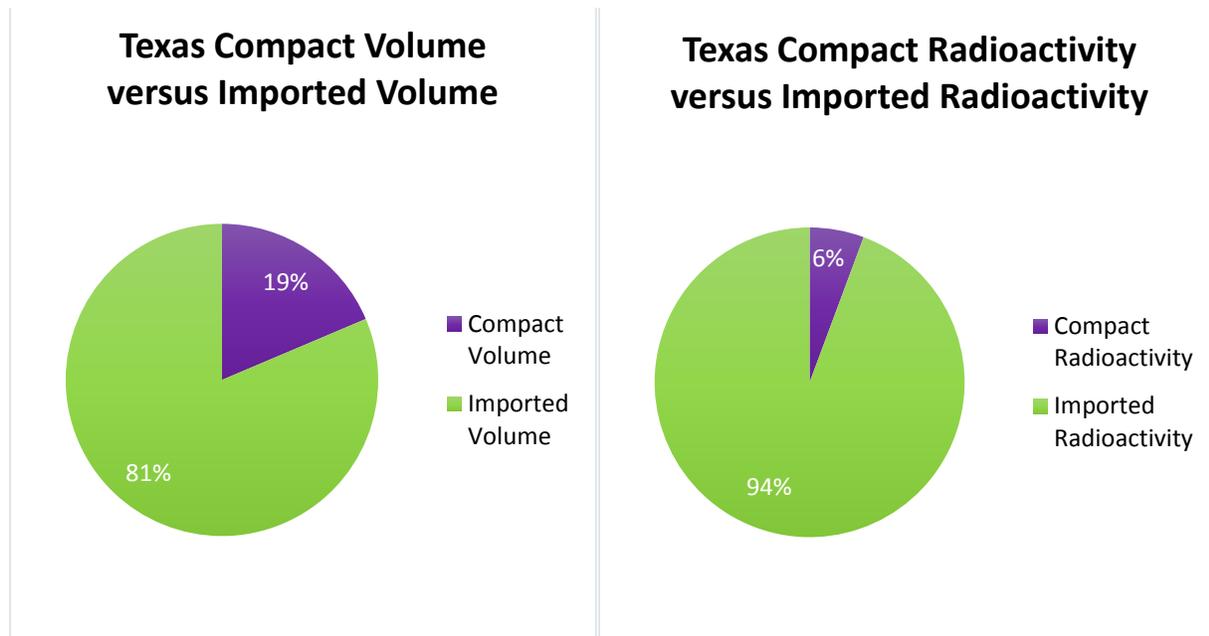
3.3 Compact versus Non-Compact Waste

As previously stated, there is a statutory limit on the amount of waste the Texas CWF may import for disposal from nonparty sources, TH&SC §401.207(e):

- The nonparty waste disposed of is not more than the greater of:
 - 1,167,000 curies
 - An amount of nonparty compact waste equal to 30% of the initial licensed capacity of the facility; and,
- Not more than 275,000 curies of nonparty compact waste in any fiscal year.

To date, roughly 80% of the total volume of LLRW disposed in the Texas CWF is nonparty state volume while the remaining 20% is Texas Compact volume. Also, 94% of the total radioactivity disposed in the Texas CWF is nonparty state curies while the remaining 6% is Texas Compact curies. Figure 3.3. illustrates the volume and radioactivity comparison between Texas Compact and nonparty state LLRW disposed between 2012 and 2016.

Figure 3.3. Texas Compact Volume and Radioactivity versus Nonparty State Volume and Radioactivity Disposed at the CWF.



3.4 Impediments to Disposal

LLRW is produced by six categories of generators: nuclear power plants, the pharmaceutical industry, other industries, medical institutions, research facilities/universities, and some government facilities. The types and volumes of LLRW vary among these six categories of facilities, as do waste management practices. As previously mentioned, LLRW is divided into four classes: Class A, Class B, Class, C and Greater Than Class C (GTCC).

However, all nuclear facilities have to comply with NRC regulations. Currently, there are four destinations for the LLRW in the U.S.: Energy Solutions in Barnwell, South Carolina and Clive, Utah; U.S. Ecology in Richland Washington; and WCS in Andrews, Texas.

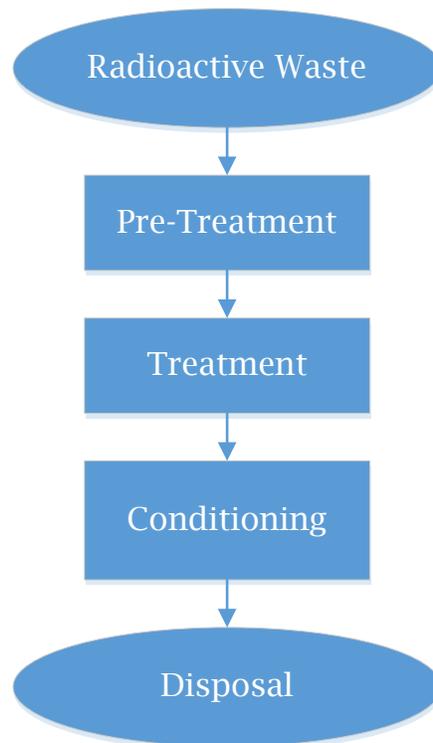
Several factors, both technical and regulatory, cause delays in shipments and keep a steady stream of waste from being shipped for disposal. Whether the

waste is nonparty or party state waste it will go through the same technical processes at the generator's facility, or at a processing facility, to be made ready for disposal. Regulatory impediments also exist for disposal for nonparty waste.

3.4.1 Generators

Depending on who generated the waste, its handling and disposal will be regulated differently, but the overall goal of radioactive waste management is to dispose of waste in a manner that protects both human health and the environment without imposing an undue burden to future generations. Waste management includes the handling, pre-treatment, treatment, conditioning, storage, transportation and disposal of radioactive waste. The processing of the waste is primarily intended to produce a waste form that is compatible with the anticipated disposal option. Where appropriate, waste material resulting from processing may be reused, recycled, or exempt from certain regulations by being below exempt quantities of activity, radionuclide concentrations, or fitting a certain use criteria (e.g. smoke detectors, exit signs). All waste streams generate unique issues for disposal which means that not all processing steps are necessary for particular types of radioactive waste. Figure 3.4 shows a typical processing flow for radioactive waste.

Figure 3.4. Processing Flow for Radioactive Waste



Generators may prolong the period waste is kept in storage. At the request of the National Nuclear Security Administration/Global Threat Reduction Initiative (NNSA/GTRI), the Low-Level Radioactive Waste Forum (LLRWF) formed the Disused Sources Working Group (DSWG) in 2011 to address issues that users of these sources are encountering. Disused sources are radioactive materials that have passed their period of usefulness but have not been recycled or disposed. In some instances, this waste may pose a threat to national security as the waste could potentially be used in Radiological Dispersal Devices (RDD), creating all the more reason for a more readily option for disposal. The DSWG found that users were indefinitely storing their waste rather than disposing for several reasons including disposal costs and the relative ease of long-term storage. According to the DSWG, the current regulatory environment needs to increase promoting the disposal of waste rather than the long-term buildup of waste.

Often, storage of waste will last years until the generator can find a suitable method, funding, and timing for disposal. Prolonged storage can also occur when a generator is waiting for the waste to decay to an appropriate level for handling and shipping. When a generator allows the waste to decay in storage, it can minimize disposal costs by allowing the generator to dispose of waste later under a lower waste classification category.

3.4.2 Disposal Facility

At disposal, there are no technical impediments to the Texas CWF accepting waste. Facility upgrades such as the Low Specific Activity pad allow the facility to accept waste and stage it prior to being moved to permanent disposal. This allows waste to be received with minimal delay.

The processing of the waste can vary depending on the waste being received. Containerized waste (i.e. waste in drums, metal boxes and soft side packaging) and cask waste are processed differently. Containerized waste accounts for less than 10% of the waste shipments.

The Texas CWF Waste Acceptance Criteria, incorporated into their radioactive materials license, requires 10% of all containerized shipments to be visually inspected. This can take some time depending on the amount of containers received per shipment. Although uncommon, any issues such as insufficient void filling can trigger further processing to ready containers for disposal. Void space within the waste and between the waste must be reduced to the extent practicable in accordance with 30 TAC §336.362(b)(2)(C).

There are two types of casks used for transporting waste, Type A and Type B. The type of cask can affect the processing time, with Type A casks being easier to unload and are typically unloaded within 2 hours. Type B casks require more operators and have more pieces to remove prior to unloading, such as impact

limiters, which can double the unloading time to roughly four hours. Additionally, Type B casks pose a greater potential dose to the operator resulting in special handling thereby increasing unloading times. Each cask requires specific training and procedures for handling the waste by the operator. Additionally, there are a limited number of cask producers in the U.S., which results in a higher demand for casks than cask supplies. This, in turn, may lead to delays in shipping waste to the Texas CWF.

Aside from the examples of technical impediments, which are common to all generators of waste, there also exists one additional regulatory requirement for nonparty waste. All waste must meet the same waste acceptance criteria regardless of generator status but nonparty waste must also be approved for disposal by the TLLRWDC.

A nonparty state generator must complete an import application which is either approved or denied by the TLLRWDC. The commission meets several times a year to either approve or deny import applications. If there is an error on the application, such as the characterization of the waste is inaccurate or all constituent radionuclides are not accounted for, then the application will be returned for correction and asked to be resubmitted for review at the next meeting. Any delay in shipping for a generator can mean the funds get reallocated and the waste may go back into storage for a more convenient period.

3.5 Determining Data Points

The “marketplace” for LLRW disposal is narrow and tightly regulated. There are four suppliers of disposal capacity, two of which, Barnwell, SC and Richland, WA, are restricted to accept waste only from their respective compact members, and a third, Clive, UT, which is restricted to accept only Class A waste. The Texas CWF is thus the only disposal option for Class B and C wastes from LLRW generators not located in party states to the Atlantic or Northwest Compacts. Because disposal records and pricing structure of the three disposal sites outside of Texas are not publically available and could, at best, only be estimated, precise data about LLRW disposal costs or pricing are not possible to obtain, therefore, that analysis is beyond the scope of this report.

3.6 Cost Based Pricing Dependent on Rate Rule

Although the Rate Rule acknowledges some degree of increased costs for the disposal of certain waste streams, anecdotal reports from the site operator indicate that disposal costs are largely relatively fixed. The primary cost drivers, to date, have been reported to result from the volume of disposal in individual shipments, more than factors tied to other surcharges or the base disposal charge category. Cost based pricing in the Rate Rule seems dependent on the overall volume of waste disposed, rather than radioactivity, waste form, or particular waste stream.

3.7 Price Elasticity of Demand

Establishment of the relationship between price and demand to develop a reliable predictive model of total revenue generation is impeded by several factors:

- As discussed previously, the public availability of historical price data related to LLRW is virtually nonexistent, and the Texas CWF is functionally the only Class B and C LLRW disposal option for much of the U.S. market.
- Some generators may have the option to store waste on-site pending decommissioning and subject to permit requirements. The cost to store such waste is unique to each generator and is the relevant “competitor” to disposal pricing. This cost data is typically proprietary and not available in the public domain.
- The Texas CWF has been receiving commercial waste for four years under a consistent rate rule. There is thus no time-series pricing/demand data from which to extrapolate an elasticity relationship.
- The conditions for accepting nonparty Class A waste at the Texas CWF compared to the Clive facility are significantly more restrictive and result in the disposal offerings being substantively different and not directly price comparable. For example, volume reduction and containerization of the waste at the Clive facility is different than at the Texas CWF.
- Factors other than price may drive generators’ disposal decisions, such as permit conditions, regulatory requirements, on-site storage limitations, and/or facility decommissioning.

With no concrete data available from which to draw definitive price-volume relationships, predicting revenue changes based on pricing and/or surcharge adjustments becomes a speculative exercise. While it is reasonable to assume that lower pricing may increase volumes, the highly-regulated nature of this “marketplace” may indeed render pricing as nearly irrelevant in many disposal decisions.

4. Conclusion

4.1 Source of State Revenue

Revenues to the State since the Texas CWF operations began have totaled \$37 million collected from disposal fees. Of this total, over \$26 million, or ~70%, have been collected from nonparty generators subject to the surcharge provision.

4.2 Increased Waste Importation Increases Revenue

Although waste disposal at the Texas CWF has clearly generated a positive source of revenue for the state, the financial benefits for Texas would certainly have been greater if annual disposal levels had reached the limits established in statute. Given this historical record and lacking any specific data to calculate market-specific price points with which to inform the rate setting process, the most conservative course of action is to leave the surcharge at its current level unchanged.

4.3 Adjust the Surcharge or Rates?

There may be some validity to arguments that marginal reduction in the overall cost of disposal at the Texas CWF would lead to increased disposal and, therefore, overall increased revenues to the state, but the most appropriate mechanism to verify this trend would be discrete adjustments to individual components of the rate, apart from the state surcharge. Line item fees, for example, which, based on operational data since opening the site, have been determined not to impose significant increases to disposal costs, may be reviewed by the TCEQ. If the TCEQ determines it would be appropriate to adjust or remove the fees that may result in an overall reduction in disposal price. Such a revision in the rate, itself, could produce the necessary data from which an accurate measure of price sensitivity could be calculated.

4.4 Future

Considering the ongoing needs of generators of radioactive waste, both in the Texas Compact and those in the over thirty states without access to their own compact disposal site, the Texas CWF, and subsequently the State of Texas, should see significant financial benefit. Far more than ongoing generation, however, a significant source of revenue from waste disposal in the future will come from the decommissioning needs of the three nuclear power plants within the Texas Compact and of the 86 nuclear power plants currently operating in nonparty states without a current disposal site. Given such a very large quantity of waste that could be brought for disposal at the Texas CWF in the future, it may presently be premature to alter the surcharge for nonparty disposal.

5. Definitions

By product - any radioactive material (except enriched uranium or plutonium) produced by a nuclear reactor. It also includes the tailings or wastes produced by the extraction or concentration of uranium or thorium or the fabrication of fuel for nuclear reactors. Additionally, it is any material that has been made radioactive through the use of a particle accelerator or any discrete source of radium-226 used for a commercial, medical, or research activity.

Curie - a unit or measure of radioactivity from a certain element or radionuclide.

(One Curie equals the amount of radioactivity from one gram of ^{226}Ra . One curie equals 3.7×10^{10} Becquerel or undergoes 3.7×10^{10} disintegrations per second.)

Decommissioning - the act of removing from service any facilities that were used to store, process, dispose, or stage radioactive materials.

High-level radioactive waste - High-level radioactive wastes are the highly radioactive materials produced as a byproduct of the reactions that occur inside nuclear reactors. High-level wastes take one of two forms: Spent (used) reactor fuel when it is accepted for disposal or waste materials remaining after spent fuel is reprocessed.

Radionuclide - an element from the periodic table that is capable of spontaneously emitting its constitutive particles and thereby changing into another element. Such an element is termed radioactive and the emitted particle is called radiation.

Rem - a unit of radiation dose.

Spent nuclear fuel - used fuel from a reactor that is no longer efficient in creating electricity, because its fission process has slowed. However, it is still thermally hot, highly radioactive, and potentially harmful.

Volume Reduction - the process of reducing the volume of LLRW by methods such as compaction, incineration, or pyrolysis.

6. Abbreviations and Acronyms

AEA - Atomic Energy Act

AEC - Atomic Energy Commission

CFR - Code of Federal Regulations

CWF - Compact Waste Disposal Facility

DCE - Decommissioning Cost Estimate

DSWG - Disused Sources Working Group

FA - Financial Assurance

FWF - Federal Waste Disposal Facility

GTCC - Greater than Class C

HB - House Bill

LLRW - Low-Level Radioactive Waste

LLRWPA - Low-Level Radioactive Waste Policy Act of 1980

NORM - Naturally Occurring Radioactive Material

NRC - Nuclear Regulatory Commission

RCRA - Resource Conservation and Recovery Act

RDD - Radiological Dispersal Devices

SB - Senate Bill

TAC - Texas Administrative Code

TCEQ - Texas Commission on Environmental Quality

TDSHS - Texas Department of State Health Services

TH&SC - Texas Health and Safety Code

TLLRWDA - Texas Low-Level Radioactive Waste Disposal Authority

TLLRWDC - Texas Low-Level Radioactive Waste Disposal Compact Commission

WCS - Waste Control Specialists, LLC