STATE OF MAINE
DEPARTMENT OF ADMINISTRATIVE & FINANCIAL SERVICES
BUREAU OF GENERAL SERVICES
BURTON M. CROSS BUILDING
4TH FLOOR, 77 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0077

PAUL R. LEPAGE
GOVERNOR

H. SAWIN MILLETT, JR
COMMISSIONER

DONALD L. McCORMACK
DIRECTOR

December 20, 2012

Michael T. Parker
Division of Solid Waste Management
Dept. of Environmental Protection
17 State House Station
Augusta, ME 04333-0017

RE: Juniper Ridge Landfill
Revision to Application #S-20700-WD-BC-A

Dear Mike:

The Maine Bureau of General Services (BGS) and NEWSME Landfill Operations, LLC (NEWSME) filed the above-referenced license amendment application September 12, 2012 to accept Municipal Solid Waste (MSW) at Juniper Ridge Landfill (JRL) from customers using the Maine Energy waste-to-energy incinerator in Biddeford when Maine Energy closes. The Department accepted the application as complete for processing on October 3, 2012. Since the filing of the application and the Department's completeness determination, Casella Waste Systems (CWS), NEWSME's ultimate parent company, and the Penobscot Energy Recovery Company (PERC) have entered into an agreement, executed on October 29, 2012 (Agreement), which resolves multiple issues between them. A key aspect of the CWS-PERC Agreement is that no less than 30,000 tons annually of in-state MSW from customers of Maine Energy that otherwise would be sent to JRL under the pending application, will be supplied by CWS to PERC, provided BGS/NEWSME receive a final, non-appealable permit to accept MSW at JRL. Because of the CWS-PERC Agreement, we are filing this revision to the pending application to reflect the positive impact of the Agreement, as well as make other minor changes to the application (e.g., correct typos, minor clarifications and the like). It is noteworthy that the revisions included in the attached updated application will result in fewer impacts at JRL.

Among the beneficial aspects of the CWS-PERC Agreement are the following:

- The diversion of MSW from Maine Energy customers to PERC will reduce the tonnage of MSW sent to JRL by at least 30,000 tons per year as compared to the original application.
- This diversion will mean a reduction in truck traffic by approximately 1100 truck trips per year.
- A slight extension in JRL life, by approximately three months.
- PERC has stated that this additional 30,000 tons of in-state MSW will generate approximately $450,000 of additional revenue for PERC and its partners annually because it will displace out-of-state sources that pay significantly lower disposal fees to PERC.

PHONE: (207) 624-7314 E-mail Donald.McCormack@Maine.gov FAX: (207) 287-4039

- A recycling section in the Agreement provides for a robust recycling opportunity for PERC charter municipalities. If a PERC charter municipality increases its MSW recycling above an historical baseline and delivers those recycling tons to a CWS facility, CWS will backfill the MSW shortfall tonnage to PERC. This would be over and above the 30,000 tons of in-state MSW tons referred to above that will be diverted to PERC once a final permit is issued to JRL for this application. This provision keeps PERC full and allows the PERC charter municipalities to aggressively pursue recycling without suffering any Guaranteed Annual Tonnage (GAT) penalties, thereby removing an impediment to increased recycling rates for these communities.
- BGS and NEWSME have reduced the amount of in-state MSW to be disposed at JRL in this application by 30,000 tons, from 123,000 tons (the original application) to 93,000 tons per year (revised application).

In summary, with the inclusion of the benefits from the PERC Agreement, the revised application further demonstrates JRL's compliance with Maine's solid waste standards and consistency with Maine's solid waste management hierarchy.

As Staff have requested, we are providing a copy of this letter to all persons who have submitted comments on the application thus far or have requested intervenor status (i.e., the Department's Interested Persons list). In addition, we are sending a clean copy of this revised application and a redlined version (showing all the changes from the original version) to all parties who received a copy of the original application. We understand that the Department will be posting copies of both the clean and the redlined versions on the Department's website for the Juniper Ridge Landfill where interested persons may view it.

Please feel free to contact us if you have any questions. My point of contact on this is Michael Barden at 624-7436

Respectfully,

Donald J. McCormack, Director
Bureau of General Services

Brian Oliver, Vice President
NEWSME Landfill Operations, LLC

cc: Interested persons list

Enclosures

JUNIPER RIDGE LANDFILL

AMENDMENT APPLICATION TO ACCEPT MUNICIPAL SOLID WASTE FROM MAINE SOURCES

Submitted by:

STATE OF MAINE BUREAU OF GENERAL SERVICES
as Owner

and

NEWSME LANDFILL OPERATIONS, LLC,
as Operator

September 2012
Updated December 2012

SME
Sevee & Maher Engineers, Inc.

ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE

4 Blanchard Road, PO Box 85A, Cumberland Center, ME 04021 • Phone 207.829.5016 • Fax 207.829.5692 • www.smemaine.com

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1.0 INTRODUCTION

Maine Bureau of General Services (BGS),[1] as the owner of Juniper Ridge Landfill (JRL), and NEWSME Landfill Operations, LLC (NEWSME), as operator of the JRL in Old Town, Maine, have prepared this amendment application (Application) for submission to the Maine Department of Environmental Protection (MEDEP) to remove the restriction and limitations placed on in-state municipal solid waste (MSW) disposal at the JRL. These restrictions and limitations are: (1) the source of MSW can only be by-passed material as set forth in Conditions 16.A and 16.C of MEDEP Order #S-020700-WD-N-A, or (2) the use of MSW, (i.e., in the soft layer) as approved by MEDEP Order #S-020700-WD-W-M.

This request for an amendment is occasioned by the August 1, 2012 execution of a landmark agreement between Maine Energy Recovery Company, LP (Maine Energy), the owner of the Maine Energy Incinerator (MEI), and the City of Biddeford (Biddeford) to sell, shut down and decommission the MEI facility. The Agreement is the culmination of years of controversy, strategic discussions, and negotiations over the location and operation of MEI within Biddeford, and the City expects a significant increase in economic opportunities and job creation to result from this conveyance and facility closure.

The closure of MEI is also aligned with a number of other waste management objectives for the State of Maine. First, it decreases the amount of out-of–state waste imported into the State since about 66 percent of the material handled by MEI originates from beyond Maine borders. In 2011, this represented approximately 170,000 tons of solid waste which will be pushed back to the out-of-state market. Second, this change further allows NEWSME's ultimate parent company, Casella Waste Systems, Inc. (CWS), to promote recycling programs which help the

[1] Pursuant to P.L. 2011, Chapter 655, Sec. GG-69, on July 1, 2012 the Bureau of General Services in the Department of Administrative and Financial Services became the owner and licensee of JRL. Prior to July 1, the State Planning Office owned JRL and held its licenses. The State Planning Office was abolished on July 1, 2012.

State achieve its recycling goals. For example, as part of the agreement to close MEI, CWS will be providing the City of Biddeford with curb-side recycling services. CWS is also in the preliminary stages of developing a Zero-Sort® recycling facility in Lewiston Maine. This facility will provide an outlet for recycled materials, further reducing the amount of MSW requiring disposal. Finally, **CWS has reached an agreement with the Penobscot Energy Recovery Corporation (PERC) which requires CWS to divert at least 30,000 tons of in-state MSW that was previously taken to MEI to the PERC facility in Orrington. The supply of this MSW to PERC is contingent on JRL receiving a final, non-appealable permit to accept in-state MSW pursuant to this application. As a result, BGS and NEWSME are revising the pending Application to reduce the amount of in-state MSW that may be disposed of at JRL by 30,000 tons, from 123,000 to 93,000 tons**. These initiatives are in addition to the significant role CWS and its subsidiary companies already play in recycling MSW and other waste streams in Maine and the rest of the Northeast. These and other CWS recycling activities are discussed in greater detail in this application.

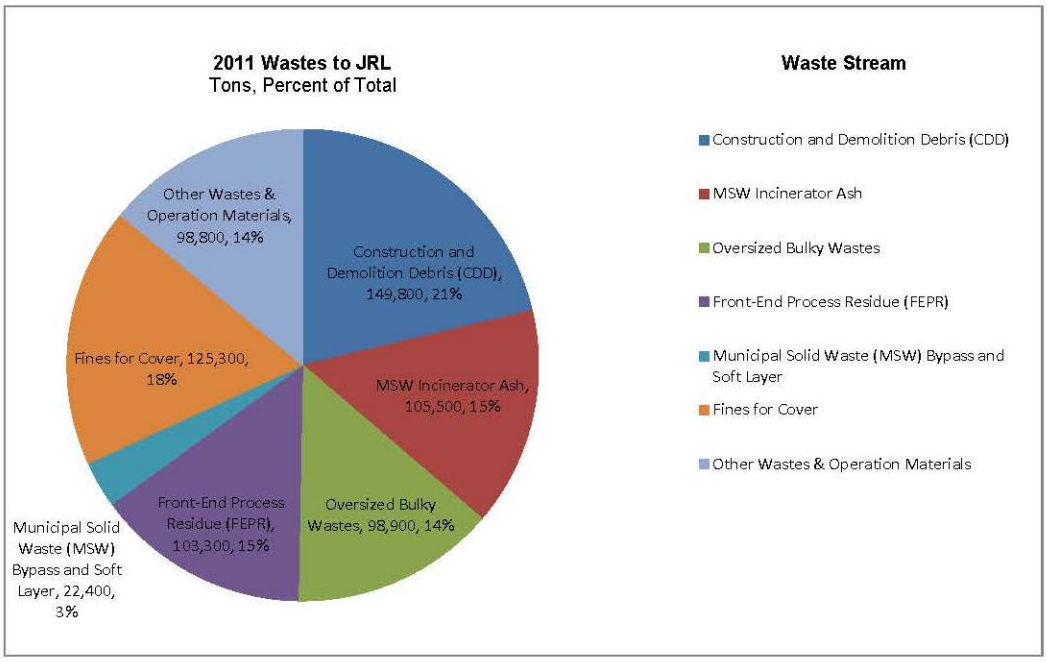
This proposed amendment will not materially change the types and overall quantity of wastes accepted at JRL, nor its operations or projected life. MSW disposed at JRL will be offset by a decrease in the amount of residuals (ash and front-end processing residue, or FEPR, and over-sized bulky waste)~~, and~~ by-pass generated by MEI that are currently disposed at JRL**, and the in-state MSW that will now be shipped to PERC instead of JRL**. Figure 1-1 shows the amount and relative percentages of the various waste types taken to JRL before and after the proposed change.

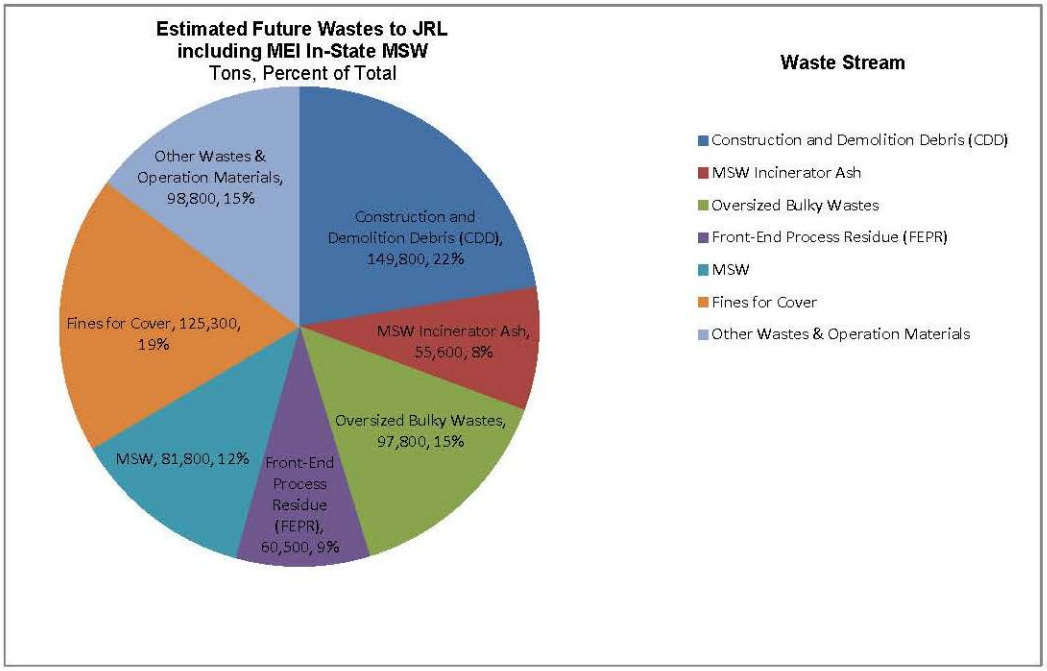
The amendment requested herein to JRL's license will allow uninterrupted waste disposal services to the State of Maine communities and businesses which currently utilize MEI. The in-State MSW that is currently accepted at MEI will be re-directed to the Pine Tree Waste transfer station in Westbrook where it will be consolidated into larger trailers and sent to JRL **or PERC.**[2]

[2] CWS has restructured its routing in southern Maine to deliver only in-state waste to the Westbrook facility at this time. Should CWS accept out-of -state waste at the Westbrook facility in the future as permitted, procedures will be put in place to segregate out-of-state MSW to ensure that it will not be delivered to JRL.

FIGURE 1-1(revised December 2012)

SUMMARY OF CURRENT AND FUTURE WASTE COMPOSITION





1.1 Background

This section provides a brief overview of JRL's permitting history and how the disposal of MSW has factored into that history.

CWS, through its subsidiary NEWSME, operates JRL under an Operating Services Agreement (OSA) that was entered into between the State of Maine and CWS as a result of the following chronology of events:

June 13, 2003: As provided for in the Legislative Resolve that authorized the acquisition of the Georgia-Pacific landfill, the Maine State Planning Office issued a Request for Proposals (RFP) for the selection of the operator of the West Old Town landfill (today called JRL).

July 9, 2003: CWS submitted a bid submittal in response to SPO's RFP.

August 18, 2003: SPO selects CWS as facility operator of the landfill.

October 21, 2003: MEDEP issued conditional approval for the transfer of licenses for the WOTL from Fort James to the SPO (MEDEP licenses #S-020700-WR-M-T and #L-019015-TH-C-T); the transfer became effective when the sale of the WOTL to SPO occurred on February 5, 2004.

October 30, 2003: NEWSME applied for an amendment to the existing Board Order for the West Old Town Landfill. That application contained the following table which identified the acceptance of at least the following wastes: front end process residue, oversized bulky waste, municipal solid waste, construction and demolition debris, ash related wastes, and water/treatment sludge.

TABLE 1-1

WASTE TYPES PROPOSED IN THE 2003 AMENDMENT APPLICATION

Type of Waste	Anticipated Tonnage
Front End process Residue (FEPR)	120,000
Oversized Bulky Wastes (OBW)	20,000
Municipal Solid Wastes (MSW)	40,000
Construct and Demolition Debris (CDD)	190,000
Ash Related Wastes	70,000
Water/Wastewater Treatment Sludge	50,000
Miscellaneous Wastes	50,000
Anticipated Annual Tons:	**540,000**
Anticipated Annual Cubic Yards	**640,000**

February 5, 2004: SPO, the State of Maine, and NEWSME executed the OSA for the operation of the WOTL.

April 9, 2004: MEDEP approved the amendment application (MEDEP license #S-020700-N-A) for a vertical increase in the final elevation of landfill and the disposal of additional waste streams (the "amendment license"). The amendment license was appealed to and upheld by both the BEP in 2004 and the Penobscot County Superior Court in 2006.[3]

Condition 16 of the amendment license addresses the acceptance of MSW for disposal at JRL, and is the subject of this Application.

Condition 16.A states that the operator of JRL "shall not dispose of unprocessed MSW from any source other than bypass from the following sources: PERC incinerator in Orrington and the Maine Energy incinerator in Biddeford; waste delivered under an interruptible contract with PERC; or waste delivered in excess of processing capacity at other MSW incinerators in Maine." The amount of MSW bypass that can be accepted at JRL is not specified in Condition 16.A; however, Condition 16.C limits the total amount of "(a) unprocessed MSW incinerated at Maine Energy, and (b) MSW bypassed from Maine Energy for disposal at the JRL

[3] In 2005, WOTL became known as the Juniper Ridge Landfill. The OSA states, in part, that NEWSME is responsible for all costs associated with operating JRL, and for obtaining any permits needed. As explained in Finding of Fact #3 of the amendment license, references to the applicant in licenses for construction or operation of JRL often refer to both SPO and CWS or NEWSME (or a subsequent operator).

and at Pine Tree Landfill's Secure III Landfill Expansion to no more than 310,000 tons in any calendar year, unless changes in conditions and circumstances occur that cause the Department to revise this cap."

The origin of the "bypass only" limitation at JRL was a nearly identical condition in the license of the Pine Tree Landfill (PTL). In March of 2001, PTL applied for a license modification to accept MSW in response to a request from the Penobscot Energy Recovery Company to contract with PTL for disposal of by-passed MSW from PERC. PERC was required as a condition of its operating license to provide for alternate disposal of bypass but at the time had no such provision. At the time of PERC's request to PTL, MSW was not provided for in PTL's license, bypass or otherwise.

Despite the application having been prompted by PERC's request, PERC and the Municipal Review Committee objected to the PTL application. Regional Waste Systems (now **e**comaine) also objected to the application. In order to accommodate these objections, and in the interest of expediting the provision for a necessary site for incinerators needing alternate disposal of bypass, PTL voluntarily agreed to limit disposal of MSW at PTL to MSW bypass from Maine incinerators. PTL in fact provided this MSW bypass service for three of Maine's four MSW incinerators. Prior to JRL, PTL was the only Maine landfill licensed to accept MSW that was limited in this fashion.

During the review of the Amendment Application for the West Old Town Landfill, the MEDEP staff asked NEWSME to agree to the same "bypass only" and numerical limitations regarding MEI since that was in the PTL license and NEWSME had proposed to accept the same Maine waste streams that were currently being disposed at PTL at the time of the Amendment Application. NEWSME agreed to that request since there were no discussions at the time regarding permanent closure of MEI. Those discussions did not occur until the first Task Force convened in 2005 by State Government.

On September 10, 2010, MEDEP approved Minor Revision, #S-020700-WD-W-M that allowed MSW to be used as the "soft layer" of JRL. The minor revision specifically addressed Condition 16.C of the amendment license and allowed a change in the annual limit of the

amount of unprocessed MSW bypass that could be accepted at JRL so that MSW bypass could be used in the "soft layer required to be placed within four to five feet of the landfill liner." Per that license revision, this four to five feet of MSW bypass placed in the soft layer is not counted toward the 310,000-ton limit in Condition 16.C of the 2004 amendment license.

As demonstrated by this summary, the acceptance of MSW at JRL was included in the original amendment application. As shown on Table 1-1, MSW and FEPR made up approximately 30 percent of the anticipated total waste stream proposed for disposal at the JRL in the amendment application. Under this amendment proposal, MSW and FEPR will be approximately ~~25~~ **21** percent of the anticipated total waste stream proposed for disposal at the JRL. The limitation placed on the acceptance of MSW per Conditions 16A and 16C of the amendment license related to the MEI facility. NEWSME agreed to that request since there were no discussions at the time regarding closure of MEI. Now, of course there is an agreement to sell and close MEI.

1.2 Description of Proposed Amendment and Application Content

The proposed amendment (the Proposed Amendment) consists of JRL accepting MSW, generated only within the State of Maine, without requiring that the MSW be (1) "bypassed" material[4] or (2) used as the soft layer during cell construction.[5] This amendment will not significantly change the site operations or landfill life because the amount of residuals generated by MEI is approximately the same as the amount of Maine MSW anticipated to be placed in JRL once MEI closes.[6] As part of this application, BGS and NEWSME agree to accept no more MSW at JRL than ~~123,000~~**93,000** tons annually~~,~~. **This is** the annual average of in-state MSW accepted at MEI combined with bypass and soft layer MSW from MEI sent to JRL over the past 3 years **minus the 30,000 tons of MSW that will be sent to PERC**. This three year average will allow for the historical tonnage fluctuations at MEI due to the economy, tourism, waste generation, etc.

[4] Condition 16.A, MEDEP Order #S-020700-WD-N-A
[5] Order #S-020700-WD-W-M
[6] This is demonstrated in this application by comparing the impact on landfill activities associated with the amount of MSW handled by MEI, and residual and by-pass from MEI that were disposed at JRL in 2011 with the hypothetical scenario of all the in-state MSW associated with MEI in 2011 being disposed at JRL.

In 2011, about 704,000 tons of waste and alternate daily cover (ADC) were placed or recycled in JRL, including approximately 93,900 tons of residuals (front end process residue (FEPR), and ash and bulky waste) and 22,400 tons of bypass and soft layer MSW from communities which use the MEI facility, totaling approximately 116,300 tons. The annual average of these combined materials over the last three years is 131,000 tons with 106,600 tons being residuals and 24,400 tons being bypass and soft layer MSW. NEWSME is proposing to replace this bypass, soft layer MSW and residuals with in-state MSW that is currently being disposed at MEI **less the 30,000 tons of MSW that will instead be shipped to PERC**. The total number of tons of in-state MSW delivered to MEI in 2011 was 89,400. Add to that the total number of bypass and soft layer MSW tons delivered to JRL in 2011, and the total MSW tons that would have been delivered to JRL, had MEI been closed, would have been 111,800. **If for comparison purposes these tons are adjusted to reflect the 30,000 tons of in-state MSW which CWS will redirect to the PERC facility, the 2011 tonnage taken to JRL had MEI been closed would have been 81,800.** The annual average of in-state MSW going to MEI combined with bypass and soft layer MSW from MEI sent to JRL over the past 3 years has been 123,000 tons. **If this figure is revised to reflect the 30,000 tons of in-state MSW which CWS will redirect to the PERC facility, the annual three year average would be 93,000 tons.** Therefore, if one compares the 2011 residuals and bypass/soft layer MSW tons of 116,300 from MEI (above) with the in-state MEI and bypass/soft layer MSW tons of ~~111,800~~**81,800**~~,~~ JRL would have accepted **34,500**~~4,500 less~~ **fewer** tons of in-state ~~MSW~~ **waste** from MEI in 2011. If one uses the 3-year averages for residuals and bypass/fluff layer MSW tons of 131,000 compared to the in-state MEI and bypass/fluff layer MSW tons of ~~123,000~~**93,000 tons** , then JRL would have accepted approximately **38,000** ~~8,000~~ fewer tons per year of ~~MSW~~ **wastes** from MEI communities. A portion of this in-state MSW will still be used for the soft layer of base cells, as needed.

Table 1-2 presents the various types and percentages of waste handled by JRL in 2011 and shows how these percentages ~~will~~ **would have** change**d** as a result of eliminating the MEI wastes and accepting in-state MSW. The MSW will be commingled with the other waste types received by JRL as is currently the disposal practice for MSW bypass waste.

TABLE 1-2

COMPARISON OF WASTE TYPES AND PERCENTAGE BEFORE AND AFTER PROPOSED AMENDMENT

Waste Stream Disposed or Recycled at JRL	2011 Wastes to JRL		Estimated Future Wastes to JRL including MEI In-State MSW	
	Tons[1]	Percent of Total	Tons[1]	Percent of Total
Construction and Demolition Debris (CDD)	149,800	21	149,800	~~21~~22
Front-End Process Residue (FEPR)	103,300	15	60,500	9
MSW Incinerator Ash	105,500	15	55,600	8
Oversized Bulky Wastes	98,900	14	97,800	~~14~~15
Municipal Solid Waste (MSW) Bypass and Soft Layer	22,400	3	22,400	3
MSW[2]			~~89,400~~59,400	~~13~~9
Fines for Cover	125,300	18	125,300	~~18~~19
Other Wastes & Operation Materials	98,800	14	98,800	~~14~~15
TOTAL	**704,000**		~~699~~669,600	

Note:
1. All tonnages have been rounded to the nearest 100 tons and, **in the case of estimated future wastes,** represent estimates based on 2011 tonnages.
2. MSW will continue to be utilized as a soft-layer application so the estimated net increase in MSW accepted at the site will be about ~~89~~59,400 tons.
3. Operation materials include tire chips and gravel.

As illustrated, the total tonnage of material deposited and recycled at JRL is anticipated to ~~change~~ **decrease** by ~~a *de minimis* amount~~**about five percent[7] as compared to what was actually disposed or recycled in 2011**. Therefore, the design for JRL containment and collection systems, **and** landfill configurations, ~~and anticipated landfill life~~ will not change. **The landfill life under the current permit will be extended by approximately three months.** Section 3.0 of this application discusses the bases for these conclusions regarding design.

For the same reason, site operation will not change in any material manner. However, NEWSME recognizes that the relative increase in MSW has the potential to generate more odors, vectors, and windblown litter than the current mix of materials. Section 4.0 of this application presents the current and additional site operational controls that will be used to minimize/control these potential issues.

[7] **For comparison purposes included in Attachment 11, at Table 1-2.1 is a similar analysis using the three year averages of from 2009, 2010, and 2011 for the various MEI related wastes, including the FEPR, ash and by-pass and soft layer MSW. The results are similar to those presented in Table 1-2**

Finally, based on previous concerns about traffic related to site operation, an evaluation of the impact of the proposed amendment on site traffic has also been completed and is contained in Section 2.4 of the application. The proposed amendment will ~~not change~~**decrease** the truck traffic to ~~or~~ **and** from the site**.** ~~(i.e., no significant increase or decrease in the number of trucks to and from the site)~~.

2.0 CHAPTER 400 AND CHAPTER 2 GENERAL LICENSING CRITERIA

2.1 Title, Right & Interest

JRL is located on an approximate 780-acre parcel owned by the State of Maine (State), located east of Route 43 and west of Route 16 in Old Town, Maine. The SPO deed for JRL is recorded in Book 9188, Page 152 at the Penobscot County Registry of Deeds. A copy of the deed is included in Attachment 1.

2.1.1 Public Notice of Intent to File. On August 29, 2012, the Public Notice of Intent to File an Application was sent by certified mail to the JRL abutters, the Old Town City Manager, the Old Town Planning Board Chairman, the Town of Alton Selectmen, and the Penobscot Nation. This notice was also sent by certified mail to the members of the Juniper Ridge Landfill Advisory Board. A copy of the Public Notice, the JRL abutters, and Juniper Ridge Landfill Advisory Board members who received the public notice, and the certified mail receipts for the public notices are provided in Attachment 2.

The Notice of Intent to File an Application was published in the *Bangor Daily News* on August 30, 2012. A copy of the published notice is provided in Attachment 2.

2.1.2 Pre-Application Meeting. A pre-application meeting was held on August 22, 2012 with the MEDEP. At this meeting, the project concept and Application contents were discussed and the required contents of the Application were confirmed between BGS, NEWSME, and the MEDEP.

2.1.3 Pre-Submission Meetings. A pre-submission meeting was held with the MEDEP on September 6, 2012 to review the contents of the Application.

2.1.4 Certificate of Good Corporate Standing. A copy of information obtained from the Secretary of State's CEC database demonstrating NEWSME's good corporate standing is included in Attachment 3.

2.2 Financial Ability

NEWSME is responsible for all costs associated with design, construction, operation, and closure of the JRL. NEWSME (whose sole member is a wholly-owned subsidiary of CWS) has the financial ability to carry out these activities in a manner consistent with all applicable regulatory requirements. Ongoing activities at the JRL are financed by revenues generated from the operation of JRL. CWS maintains a secure credit facility administered by the Bank of America N.A. which is available to support NEWSME with operation of JRL if necessary. Included in Attachment 4 is a letter from Bank of America N.A. attesting to the satisfactory relationship it has maintained with CWS since 1995, and indicating the status of CWS' current credit facility.

2.3 Technical Ability

NEWSME has management and staff available who are well qualified to operate and care for the JRL. NEWSME engages qualified consultants as necessary to undertake design and construction of the JRL and provide operational guidance in a manner consistent with State environmental requirements. NEWSME and/or other related companies also owned by CWS have managed the JRL facility since April 2004. NEWSME has met all of its obligations under the current JRL license and continues to operate the JRL in conformance with the MEDEP's regulations and the JRL license.

CWS is a vertically-integrated solid waste, recycling, and resource management services company. It provides resource management expertise and services to residential, commercial, municipal, and industrial customers, primarily in the areas of solid waste collection, transfer, disposal, recycling, and organics services. CWS operates in six states - Vermont, New Hampshire, New York, Massachusetts, Maine, and Pennsylvania, with headquarters located in Rutland, Vermont.

As of May 31, 2012, CWS owned and/or operated 32 solid waste collection operations, 31 transfer stations, 17 recycling facilities, nine Subtitle D landfills, four landfill gas-to-energy facilities, one landfill permitted to accept construction and demolition, or C&D materials, and one waste-to-energy facility **(which it has since sold to the City of Biddeford to be shut down and decommissioned)**.

CWS is also a leader in reduction of greenhouse gas emissions. Between 2005 and 2010, CWS slashed its company-wide greenhouse gas emissions by 45 percent. This reduction is equivalent to taking approximately 182,000 cars off the road. In January 2012, CWS' achievement was recognized by Environmental Protection Agency (U.S.EPA), the Association of Climate Change Officers (ACCO), the Center for Climate and Energy Solutions (C2ES), and The Climate Registry (TCR) with a Climate Leadership Award for Excellence in GHG Management. CWS was recognized alongside such sustainability leaders as SC Johnson, Cummins, and Campbell Soup Company.

CWS' commitment to fighting climate change goes back to 2003, when the company became the first solid waste and recycling services company in the nation to become a member of the U.S.EPA Climate Leaders Program. The Climate Leaders Program was an industry-government partnership that worked to develop long-term comprehensive climate change strategies.

In 2010, CWS began reporting through the Carbon Disclosure Project, a globally-recognized non-profit initiative to promote transparency and consistency in greenhouse gas reporting. In the report, CWS discloses our greenhouse gas emissions, as well as our strategy for responding to carbon-related risks and opportunities. CWS' report can be found at www.carbondisclosureproject.net.

CWS achieved its reduction by installing landfill gas collection systems where previously there were none, beginning to convert its vehicle fleet to run on compressed natural gas, and implementing various energy efficiency measures. In the coming years, CWS will pursue

additional low emission landfill practices, continue its clean vehicle fleet conversion program, and commit to company-wide energy efficiency improvements and practices.

NEWSME retains Sevee & Maher Engineers, Inc. (SME) of Cumberland, Maine, to complete engineering designs for JRL, evaluate on-going water quality monitoring, and prepare applications for the facility. SME is a professional engineering and hydrogeologic consulting firm with a staff of approximately 40 people, including 18 professional engineers. In addition to SME, NEWSME retains Sanborn and Head Associates (SHA) of Concord, New Hampshire to assist with the JRL gas design and air permitting for the JRL facility.

2.4 Traffic Movement

The primary waste haul route to JRL for the MSW will be along I-95 to the Route 16 (Bennoch Road) interchange; then, Route 16 west to the JRL Access Road, similar to the current waste haul routes from MEI. The JRL access road from Route 16 is located approximately 0.1 mile west of the I-95 interchange. The primary waste haul routes for the waste generated in the vicinity of JRL will not change as a result of this revision. The existing primary access roads allow for continuous uninterrupted traffic movement without posing a danger to pedestrians or other vehicles. The existing on-site traffic patterns are clearly defined. All site internal access roads are maintained, including plowing in the winter and dust control in the summer.

2.4.1 Estimate of Number, Weight, and Types of Vehicles. Trucks using JRL are primarily tractor-trailer units with gross vehicle weights of less than 100,000 pounds. A comparison of 2011 truck trips to JRL to the future site truck trips with the change in the waste composition is provided in Table 2-1. The future trips were calculated based on ~~the~~ **actual** ~~projected~~ **2011** waste tonnages **adjusted for the decrease in the residuals from MEI and the increase in MSW as shown in Table 1-**2~~by waste types~~, and average truck weights for the individual waste types obtained from the 2011 JRL scale data. The future truck trips **figure** assume**s** the elimination of the waste currently delivered from MEI; and the proposed MSW delivered to the site annually

using 2011 data[8]. Note that current MEI waste streams (ash and FEPR) are denser materials and therefore truck trailers are not filled to capacity in order to ~~not~~ **avoid** exceed**ing** weight limitations. MSW is a less dense material and therefore more trailer capacity is used during transportation. The truck count calculations indicate that, based on a 6-day work week, JRL currently receives on average, 91 tractor-trailer units per day. As shown on Table 2-1, the proposed change will decrease the overall annual truck trips to the site.

TABLE 2-1

TRUCK TRAFFIC
CURRENT VERSUS ESTIMATED TRUCK COUNTS

	2011 Truck Count	Future Truck Count
Construction and Demolition Debris (CDD)	6,908	6,908
Front End Process Residue MEI[1]	1,552	0
Front End Process Residue PERC[1]	2,166	2,166
MSW Incinerator Ash[1]	3,535	1,843
Oversized Bulk Waste[1]	3,899	3,856
Municipal Solid Waste[1]	813	~~4,066~~**2,975**
Fines for Cover	4,571	4,571
Other Wastes and Operations Material	5,083	5,083
Total Loads per Year	**28,527**	~~**28,493**~~**27,402**
Total Loads per Day[2]	**91**	~~**91**~~**88**

Notes:
1. Average waste loads used in the analysis (tons/load) FEPR MEI=27.6 FEPR PERC=27.9, MSW=27.5, Ash MEI=29.5 Ash PERC 30.2, OBW 25.4.
2. Number of trailer loads per day based on a six-day week. **The daily truck count is rounded to the nearest truck.**

2.4.2 Haul Routes. The primary access road into JRL is located approximately 0.1 miles west of Interstate 95 Exit 199 off Route 16. The access road is a 30-foot-wide paved road entering the JRL property from Route 16. The road provides access to all portions of the existing JRL (active and closed) site monitoring wells, leachate storage tank, and stormwater ponds. A portion of the facility access road is on a right-of-way through University of Maine land.

[8] **For comparison purposes included in Attachment, 11 at Table 2-1.1 is a similar analysis using the three year averages from 2009, 2010, and 2011 for the various MEI related wastes, including the FEPR, ash, by-pass, and soft layer MSW and the projected waste trips using the 3 year average of the MSW handled by MEI (i.e.,123,000 minus the 30,000 tons that will be diverted to PERC). The results are similar to those presented in Table 2-1.**

2.4.3 Congested Locations/Weight Limitations. There are no congested locations along the primary waste haul route to JRL that would be affected by the proposed increase in MSW volume. Essentially all truck traffic accesses JRL by way of Interstate 95 thereby minimizing congestion to state highways and secondary roads leading to the site. The Interstate 95 vehicle weight limit is 100,000 pounds. The distance traveled on Route 16 to the JRL access turnoff is 0.1 miles and is not subject to load limits during spring thaw periods.

2.4.4 MEDOT Accident Inventory. Accident records for the most recent available three-year period (i.e., 2008 through 2010) were obtained from the Crash Records Section of the Maine Department of Transportation (MEDOT) Traffic Engineering Division. A review of the accident summaries, outlined in Table 2-2, indicate that there were nine accidents during the study period. There are no locations in the study area (Route 16 and the I-95 interchange) classified as "High Crash" locations (HCLs) using MEDOT criteria. MEDOT defines a HCL as an intersection or roadway link that *both* experiences more than eight accidents over a three-year period and exhibits a critical rate factor (CRF) of 1.0 or more over a three-year period. The CRF is a statistical measure of an intersection or link's accident experience as compared to locations with similar geographic, traffic, and geometric characteristics. A copy of the MEDOT accident data is presented in Attachment 5.

TABLE 2-2

ACCIDENT RATE SUMMARY

Location		Number of Collisions	CRF	HCL
Link				
41324-39199	Route 16 (I-95 to 1.20 miles west)	3	0.00	No
65215-64506	Route 16 (I-95 Overpass)	3	1.41	No
41214-65214	I-95 NB Off Ramp	2	5.78	No
64502-41323	I-95 SB On Ramp	1	1.39	No

2.4.5 Sight Distances. Available sight distance from the JRL access drive at Route 16 to the west exceeds 1,000 feet and the available site distance to the east exceeds 1,000 feet. The posted speed limit on Route 16 is 40 miles per hour. The minimum desired sight distance is 360 feet, measured 10 feet from the existing edge of pavement utilizing a height of eye of 42

inches and a height of the approaching object of 51 inches. Normal practice for driveways serving a significant amount of truck traffic is to increase the minimum sight distance by approximately 50 percent, thereby resulting in a minimum desirable sight distance of 540 feet. On previous site development projects (e.g., the 2003-4 vertical increase amendment), the MEDOT has determined that an entrance permit is not required for the JRL roadway entrance on to Route 16. Since there are no changes in the use nor are any physical changes to the entrance proposed, a MEDOT entrance permit should not be required.

2.5 No Unreasonable Adverse Effect on Air Quality

The proposed MSW change is not expected to have an adverse effect on air quality. NEWSME has active measures in place to control gas and odor at the JRL. The proposed disposal of increased volume of MSW at JRL will not result in emissions greater than what was projected as part of the 2003-4 Amendment application. Section 4.9 of this Application addresses the anticipated changes in landfill gas generation due to the proposed change. Currently the landfill gas emissions are collected and controlled using candle stick flares. The site and the flares are approved by the MEDEP Air Bureau.

JRL's air license ~~is currently being~~**has been** amended to ~~permanently~~ license existing Flare #4 at a new location on site and the existing two backup flares (Flares #2 and #3) at their current locations. These flares minimize odors by combusting the landfill gas which contains total reduced sulfur compounds (TRS). The combustion process converts TRS to sulfur dioxide, which is significantly less odorous than TRS. The air license amendment will require JRL to install and operate additional TRS emissions control equipment to reduce SO2 emission rates from the existing Flares. As part of the air license amendment application process, JRL submitted modeling results using U.S.EPA-approved models demonstrating that SO2 emissions from the flares at the proposed licensed rates will not cause or contribute to ambient air quality impacts above health-based ambient air quality standards, including U.S.EPA's new NO2 and SO2 standards promulgated in 2010 and U.S.EPA's new CO standard promulgated in 2011.

The flares also oxidize the methane present in the landfill gas resulting in reduced GHG emissions from the facility. A comparison of the emission rates between MEI and low emission

landfills such as JRL indicates that overall emissions from the landfill are lower than from the waste to energy facility. The analysis that supports this conclusion is contained in Attachment 9.

CWS and its subsidiary Ecogas LLC are currently in the process of developing an approximately seven mile pipeline to transport the gas to the University of Maine Orono campus where it will be used as a heating fuel, displacing fossil fuel use on campus. This will further reduce emissions at the facility.

2.6 Recycling and Source Reduction

Although 38 M.R.S. § 1310-N(5-A) (recycling and source reduction determination) is not applicable to this application (since this application is not for a new landfill or expansion of an existing landfill), during the original amendment application review to address public comments on the need for additional recycling rather than additional disposal capacity, NEWSME submitted a summary of the recycling initiatives included in the RFP and OSA. Additional information on both the recycling efforts for both CWS/NEWSME and the SPO was included in the recent applications for public benefit determination for the proposed expansion of the JRL (SPO 2011). This information is incorporated by reference.

An update on CWS' and NEWSME's recycling and source reduction programs and initiatives are discussed here. The 2004 MEDEP amendment license (p. 50) found that JRL would accept only solid waste that is subject to recycling and source reduction programs at least as effective as those imposed by State law. This proposed amendment is consistent with this finding, and the commitment made by CWS in the OSA to use its best efforts to operate JRL consistent with the recycling and source reduction provisions of State law, and in accordance with the State's solid waste management hierarchy.[9]

[9] The Applicants note that in its March 3, 2011 decision denying the PERC/MRC appeal of the Commissioner's decision allowing MSW bypass for the JRL soft layer, the Board of Environmental Protection found that "the hierarchy is a policy that guides decisions on waste management planning and implementation; the hierarchy is not a regulatory standard that is applied to individual waste facility licensing decisions of a technical nature." Id at p. 18.

First and foremost, the closure of MEI will mean that approximately 170,000 tons of out-of-state MSW will remain out-of-state because it will no longer be brought to MEI to be processed. This is a significant waste source reduction benefit for Maine.

Second, the 14 Tri-County municipalities which have contracts with MEI for waste disposal all currently have in-place recycling programs that handle various materials contained in MSW. Each community addresses recycling in its waste handling ordinance. A description of the material each community recycles is contained in Attachment 6. These programs reduce the amount of MSW currently incinerated at MEI and, once MEI is closed, that will be disposed at JRL. The acceptance of these communities' residual MSW at the JRL will not affect these programs and there is no contract language in their agreements with CWS that limit their ability to continue to expand their recycling programs. In fact, CWS is expanding some of their programs, and its recycling assets to promote additional recycling in the State as described below.

Third, consistent with the commitment made by CWS in the OSA, CWS has developed and continues to implement state-of-the-art-recycling, source separation, and beneficial re-use programs in the State to address both the recycling and source reduction goals of the State. In 2011, CWS facilities and programs recycled, beneficially reused, or composted, a total of 490,400 tons of waste materials over a broad spectrum of waste types and at numerous geographic locations in Maine. This recycling and re-use includes: 145,300 tons of recyclables related to processing construction and demolition debris at its KTI facility in Lewiston Maine; 235,400 tons from programs managed by New England Organics including its Hawk Ridge Compost Facility in Unity, Maine, and 109,500 tons of MSW recyclables from Maine businesses and communities. CWS subsidiary Pine Tree Waste, Inc. (PTW) was the first Maine-based business approved by the MEDEP as an electronic waste consolidator, and continues consolidation activities and residential drop-off services at nine owned and/or operated locations throughout the State. These efforts ensure that waste accepted at JRL has been subject to recycling and reuse efforts to the maximum practical extent.

Fourth, in its agreement with Biddeford relating to the sale of MEI, CWS or its subsidiary will be initiating its Zero Sort® recycling program in Biddeford to increase the MSW recycling rate in

that City. The Biddeford program will be similar to other programs CWS has implemented in 37 communities within the State. Casella's Zero-Sort™ system allows residents and businesses to commingle all recyclable materials such as glass, paper, plastic, and metal, requiring no source separation. All sorting and baling is conducted at the materials recovery facilities by automated equipment. CWS has found the benefits of Zero Sort ® recycling include: increased ease and convenience to residents due to lack of sorting; reductions in disposal costs; increases in the range of materials (particularly grades of plastic) that can be recycled; and faster collection of materials, resulting in collection and transportation savings. All of these advantages encourage more people to participate in recycling, and ultimately give communities the opportunity to recycle larger amounts and more items, reducing the amount of MSW which must be managed by alternate means, such as incineration or land-filling. For example in the Town of Brunswick, where CWS subsidiary Pine Tree Waste, Inc. operates a Zero Sort ® collection program, the Town has seen a 30+ percent reduction in the MSW disposal volumes taken to its landfill because of the Zero Sort ® program. Examples of the amount of MSW diverted by the Zero Sort ® recycling programs in a number of Maine and New England communities is shown on the graph contained in Attachment 6. They typically are in the range of 40 percent.

Fifth, CWS is currently working to expand its Zero-Sort ® program and is in direct negotiations with several Maine communities in this regard. At this time, CWS has constructed and operates single stream recycling and consolidation operations at its West Bath and Waterville transfer stations, at the Old Town transfer station, which CWS operates for the City of Old Town, and at its Casella Recycling (formerly FCR Goodman) facility in Scarborough (which will ultimately be relocated to the Westbrook Transfer Station). CWS also owns and operates fully automated collection vehicles in South Portland, Scarborough, and Westbrook to handle single stream recycling in the communities served by ecomaine. In 2011, CWS handled about 13,300 tons of single-stream recyclables through those four facilities, and collected about 9,600 tons of single-stream recyclables for ecomaine's operations. The materials collected at the CWS facilities are shipped to its Casella Recycling processing facility in Charlestown, Massachusetts.

Sixth, CWS is currently negotiating with the City of Lewiston to construct a Zero Sort® processing facility in the City. This facility would handle the recycled materials currently sent to Charlestown, and be the catalyst to further expand the recycling effort in the State of Maine and

assist the State in achieving its recycling goals. The project represents a capital investment of approximately $4million, would create 25 new jobs with an annual payroll of about $1 million.

~~Finally~~**Seventh**, in addition to the Zero-Sort ® recycling programs, CWS also collects and handles source-separated recyclables for a number of communities and over 1,100 commercial customers in the State. The communities for which CWS is currently providing recycling services are included in Table 2-3.

TABLE 2-3

COMMUNITIES WHERE CASELLA PROVIDES RECYCLING SERVICES

Communities	Communities
Abbott	Lisbon
Albany	Long Island
Alfred	Mechanic Falls
Alna	Milford
Arundel	Mount Desert Area
Andover	Newfield
Auburn	North Yarmouth
Bath	Northport
Bethel/Newry/Hanover	Orrington
Bingham	Otisfield
Bowdoin	Phippsburg
Bowdoinham	Pownal
Brewer	Raymond
Brunswick	Richmond
Casco/Naples	Sabattus
Chebeague Island	Scarborough
Cumberland	Sebago
Demark	South Portland
Dresden	Stoneham
Durham	Thomaston Area
Falmouth	Topsham
Frye Island	Waterford
Gray	West Bath
Greenwood/Woodstock	West Paris
Holden	Westbrook
Hermon	Westport Island
Hampden	Windham
Islesboro	Wiscasset
Lamoine	Woolwich
Lewiston	

-

CWS also provides Zero-sort recycling services at the University of Maine Orono campus.

CWS handled a total of about 109,500 tons of recyclables from these communities, businesses and institutions in 2011. These programs and activities all result in a reduction in the amount of MSW wastes taken to JRL and other disposal facilities in Maine.

With these programs, NEWSME has kept its commitment to the State to operate JRL to be consistent with local, regional, and State waste collection, storage, and transportation.

Finally, the agreement CWS recently reached with PERC is yet another commitment to align the JRL operations with the State's solid waste hierarchy. The agreement requires CWS to supply the PERC incinerator in Orrington with specified tonnages of MSW to fuel its operations, including at least 30,000 tons per year of in-state MSW from customers that formerly delivered their MSW to MEI.[10] Absent this agreement this additional tonnage would otherwise be delivered to JRL. We understand from PERC that this latter MSW tonnage commitment alone is estimated to generate approximately $450,000 of additional revenue annually for PERC and its partners because it will displace out-of state sources at PERC that pay significantly lower disposal fees.

The agreement with PERC also authorizes CWS to market its ZeroSort® Recycling System to PERC's Charter Municipalities on an ongoing basis. If a PERC Charter Municipality increases its recycling above an historical baseline and delivers these recycling tons to CWS, then CWS will backfill that MSW shortfall tonnage to PERC. This would be over and above the 30,000 tons of in-state MSW tons referred to above that would be diverted to PERC once a final permit is issued to JRL for this application. By maintaining the guaranteed tonnages PERC counts on from its charter members, this recycling provision ensures that increased recycling through CWS will not negatively impact the operations of PERC. It also protects the charter members from incurring a financial penalty as a result of an MSW shortfall, due to additional recycling with CWS, and encourages a more robust recycling climate.

[10] This commitment to deliver no less than 30,000 tons of in-state MSW from sources that formerly delivered MSW to MEI is subject to and conditioned on a final, non-appealable permit from DEP to dispose of MSW at JRL in accordance with the terms of this application.

The new agreement replaces prior agreements between CWS and PERC, but still includes a requirement that CWS or any affiliate of CWS must deliver any MSW that it collects from within any PERC Charter Municipality to PERC and not to any other facility (including JRL) without the prior written request from PERC to do so. CWS is not aware of any other solid waste company in the PERC service area that operates under that limitation.

~~The acceptance of this additional MSW at JRL will not interfere with the existing agreements CWS and its affiliates have with PERC. In these agreements, CWS has agreed that neither it nor its affiliates shall deliver to or accept at any CWS landfill any commercial or residential MSW from any PERC Equity Charter Municipality, or any other municipality represented by the Municipal Review Committee, except in the event of a bypass event. In addition, the Agreement prohibits CWS from directly or indirectly diverting or causing to be diverted any MSW from any Charter Municipality anywhere other than PERC. CWS is also obligated to supply PERC with additional guaranteed annual tonnages of MSW. None of these obligations will be altered by approval of this amendment.~~

With **all of** these programs, ~~NEWSME~~ **CWS** has ~~kept~~ **expanded and increased** its commitment to the State to manage JRL consistent with the recycling and source reduction provisions of State law and **are a clear demonstration of CWS' continuing commitment to supporting Maine's solid waste management hierarchy**. ~~in accordance with the State's solid waste management hierarchy.~~

2.7 Hazardous and Special Waste Exclusion Plan

Only non-hazardous solid waste permitted by MEDEP is accepted for handling at JRL. In order to assure that only non-hazardous waste is delivered to the facility, NEWSME complies with applicable federal and state laws regarding the detection and identification of special waste, biomedical waste, and hazardous waste. NEWSME maintains a Waste Characterization and Acceptance Plan (Plan) for the detection, identification, handling, storage, transportation, and

disposal of any and all wastes that may be delivered to the facility. The Plan identifies the types of wastes that have a blanket permit approved for disposal at JRL, the testing requirements and frequency of testing. MSW is an approved waste category contained in the Plan. The Plan is contained in Appendix E of the JRL's Operation Manual.

2.8 Criminal and Civil Disclosure

Pursuant to Chapter 400, Section 12, a Criminal and Civil Disclosure Statement has been prepared for NEWSME, and BGS, and are included as Attachment 7.

3.0 DESIGN CONSIDERATIONS

Sevee & Maher Engineers, Inc. (SME), and Sanborn Head and Associates (SHA) have evaluated the applicable technical components of the proposed amendment and conclude that implementing the proposed reallocation of waste type percentage to allow MSW to replace existing MEI waste streams will not compromise the physical integrity and/or function of the JRL and its systems, as described in amendment license #S-020700-WD-N-A. The liner, leachate, and gas containment and control systems were all designed in conformance with the criteria contained in the MEDEP's Regulations for landfills that accept MSW, or co-mingle MSW with other special wastes such as MSW incinerator ash. Considered as part of this evaluation was the: waste geotechnical behavior as it relates to landfill cell development, waste slope configuration, landfill capacity consumption, leachate generation, and gas management. Other aspects of JRL siting and development, such as landfill base and final grades, and site monitoring, will not change as a result of the acceptance of additional MSW.

3.1 Liner Design and Configuration

The JRL liner system consists of the following components:

- an 80-mil HDPE textured geomembrane;
- a geosynthetic clay liner (GCL); and
- one foot of compacted clay with a maximum hydraulic conductivity of $1x10^{-7}$ cm/sec.

This liner system meets the liner design standard specified in Chapter 401.2.D.1.a of the Regulations for landfills accepting both MSW and special wastes. Beneath this liner system is an additional foot of compacted clay with a hydraulic conductivity of $1x10^{-7}$ cm/sec. The additional foot of clay is included in the design, as an extra layer of conservatism to meet and exceed the time of travel performance standard specified in Chapter 401.1.C.1.c of the Regulations. This proposed amendment changes none of the criteria used to establish the current liner system. As identified in Chapter 401.4.C.1.a.i since the JRL liner system complies with the design requirements specified by the Regulations, and JRL has a Waste

Characterization Plan, the facility meets the requirements for co-disposing MSW ash and MSW within the landfill.

3.2 Waste Geotechnical Property Assessment

Replacing the currently accepted MEI-related wastes with additional MSW at JRL will not affect the landfill cell development plans, slope configurations, final waste grades, or closure design for JRL as currently licensed. The original amendment application for JRL included an evaluation of slope stability for the approved landfill final waste grades (Wardwell 2003). Updated stability evaluations have also been included with each detailed cell design report submitted to MEDEP since 2003 to comply with Condition 15.A of the amendment license. The most recent evaluation was submitted to support the Cell 8 design (SME 2012).

The landfill and individual cell configurations will not change as result of the proposed revision. The 2003 slope stability evaluation included initial landfill operations that involved mixing sludge previously disposed in JRL by its prior owner, Fort James. That analysis assumed a mixed waste density of 74 pounds per cubic foot (pcf) and shear strength of 30 degrees. That analysis supported the overall amended landfill final grading plan. The subsequent stability evaluations completed for each detailed cell design report uses a waste density of 74 pcf and shear strength of 32 degrees. The results of these stability evaluations showed that MEDEP required minimum slope stability regulatory safety factors were met or exceeded for the waste deposit. No signs of slope instability have been detected at JRL since SPO/NEWSME received the amendment license to operate in 2004. Since MSW has typical strength and density properties which are consistent with the values that have been used to support both the original license amendment and the individual cell development plans, this proposed minor change in the overall waste percentages, as shown on Table 1-2, will not require changes in the landfill configuration to maintain landfill stability in conformance with the requirements of Chapter 401.2.F.(1). Consistent with the current practice, the Design Report that is submitted with the detailed design of each cell will contain an updated stability analysis using shear strengths and densities reflective of the waste placed in the landfill.

3.3 Landfill Capacity Consumption

The proposed change in the overall waste percentages will not have a significant change on the inplace waste density and hence the landfill capacity consumption. Table 3-1 compares the weighted-average waste density for the current waste percentages **(using 2011 figures)** to the **2011 waste tonnages adjusted for the decrease in the residuals from MEI and an increase in MSW as shown on Table 1-2**[11] ~~proposed waste percentages~~ using individual waste types**, tonnages** and **in-place** unit weights. This analysis is conservative since it doesn't account for the commingling of wastes, waste consolidation associated with load, and secondary **de**composition of the wastes, all which result in higher in-place waste densities than shown on this table and discussed below.

[11] **For comparison purposes included in Attachment 11, at Table 3-1.1 is a similar analysis using the three year averages from 2009, 2010, and 2011 for the various MEI related wastes, including the FEPR, ash and by-pass and soft layer MSW in place of the values presented under the heading of 2011 waste to JRL, and the estimated future waste to JRL using the 3 year average of the MSW handled by MEI (i.e. 123,000 minus the 30,000 tons which will be diverted to PERC). The results are similar to those presented in Table 3-1.**

TABLE 3-1

COMPARISON OF WEIGHTED-AVERAGE WASTE DENSITY

Waste Stream Disposed or Recycled at JRL	2011 Wastes to JRL			Estimated Future Wastes to JRL including MEI In-State MSW		
	Tons	In-place Waste Density (lbs/cu yd)	Calculated Cubic Yard Consumed	Tons	In-place Waste Density (lbs/cu yd)	Calculated Cubic Yard Consumed
Construction and Demolition Debris (CDD)	149,800	1,000	299,600	149,800	1,000	299,600
Front-End Process Residue (FEPR)	103,300	1,500	137,733	60,500	1,500	80,667
MSW Incinerator Ash	105,500	1,200	175,833	55,600	1,200	92,667
Oversized Bulky Wastes	98,900	800	247,250	97,800	800	244,500
Municipal Solid Waste (MSW) Bypass and Soft Layer	22,400	1,500	29,867	22,400	1,500	29,867
MSW				~~89,400~~ **59,400**	1500	~~119,200~~ **79,200**
Fines for Cover	125,300	1000	250,600	125,300	1000	250,600
Other Wastes & Operation Materials	98,800	1000	197,600	98,800	1000	197,600
TOTAL	**704,000**		1,338,483	~~**699,600**~~ **669,600**		~~1,314,701~~ **1,274,700**
Weighted-Average Waste Density (Tons/cu yd)	**0.53**			**0.53**		

The actual 3-year running average in-place waste density at JRL in the active fill area is about 0.91 tons per cubic yard, which is ~~above of~~**greater than the** 0.86 tons per cubic yard **figure** that SPO ~~has~~ used in its evaluation of remaining JRL capacity. As the above analysis demonstrates, the proposed change in the overall waste composition from this amendment application would result in similar weighted average waste densities. Hence, no appreciable changes would be anticipated in the current in-place waste density. Given that the remaining permitted capacity at the site at the end of 2011 was approximately 5,867,000 cubic yards, the remaining landfill life at the end of 2011 would be 7.~~6~~ **9** years or until the ~~middle~~ **fall** of 2019. This would require new expansion capacity **at JRL** to be built by **the end of** 2018 to be available for disposal by ~~mid-year~~**fall** 2019[12].

[12] This is ~~6~~ **about 8 or 9** months later than estimated in the recent public benefit determination for the Expansion, which has existing JRL running out of capacity in approximately 2017-18. This slight change in when the additional capacity will be needed can be attributed to the better than anticipated inplace densities achieved by NEWSME operational techniques, ~~and~~ capacity gained due to settlement**, and the assumed diversion from JRL of an additional 30,000 tons of in-state MSW to PERC from former MEI sources**.

3.4 Leachate Management

In 2011, the total amount of leachate generated at the facility was 10,916,259 gallons. This amount of leachate was collected from approximately 42 acres of landfill cells. The leachate generated at the facility is collected using four separate leachate sumps inside the operational cells. From the sumps, the leachate is pumped to an on-site leachate storage tank. From the tank, the leachate is hauled to the Old Town Fuel and Fiber treatment plant in Old Town, Maine for treatment. The Brewer, Maine wastewater treatment plant is a back-up facility to treat the leachate. The proposed change in the waste percentages is not anticipated to change the leachate generation rates, or quality. It will also not change the leachate management system piping or layout since the system is currently designed based on the properties of MSW.

3.4.1 Leachate Generation Estimates and Leachate Collection Systems Design. Leachate generation rates used to design the existing leachate piping layout have been based on leachate generation estimates developed using the U.S.EPA's Hydrologic Evaluation of Landfill Performance (HELP) Model Version 3. This model requires a number of input parameters such as the waste thickness and composition. For JRL, the models are completed assuming MSW waste properties. This provides a conservative assumption of the precipitation impingement rates for seepage through the waste and into the leachate collection layer located above the primary liner. This impingement rate is used to establish the leachate pipe spacing, and the hydraulic properties of the leachate collection layer. Since the waste properties of MSW have been used in this modeling, the proposed change in the tonnage of MSW accepted will not change the design or function of the landfill's leachate collection system for the existing cells or any cell that will be constructed in the future.[13]

3.4.2 Leachate Quality. The additional MSW is not expected to change the leachate quality currently generated at JRL. Included in Table 3-2 is a comparison of the leachate quality of a typical MSW landfill with the leachate quality taken from Cell 4 pump station at JRL.

[13] These calculations are contained in the detailed design packages submitted to MEDEP to comply with Condition 15.A of the amendment license. The last package was submitted in March of 2012 for Cell 8.

3.4.3 Leachate Disposal Location. Leachate generated at JRL is treated at the Old Town Fuel and Fiber, (OTFF) wastewater treatment plant with back up wastewater treatment capacity supplied by the Brewer, Maine wastewater treatment plant. Included in Attachment 8 are the Agreements inplace that allow JRL to dispose of leachate at the OTFF facility, and JRL's Industrial Discharge Permit for the Brewer, Maine wastewater treatment plant. The leachate disposal and treatment will not be affected by the proposed change in the amount of MSW accepted at the facility.

TABLE 3-2

SUMMARY OF JRL LEACHATE TEST RESULTS

Parameter	Typical Concentration of MSW Landfill Leachate[1]	JRL Cell 4 (LT-C4L) Mean Value[4]
Ammonia (as N)	50 - 2,200	620
Arsenic	0.01 - 1	0.1
Barium	NR[3]	1.6
BOD	20 - 57,000	1,400
Cadmium	0.0001 - 0.4	0.0024
Calcium	10 - 7,200	930
Chloride	150 - 4,500	18,000
Chromium (total)	0.02 - 1.5	0.069
COD	140 - 152,000	3,500
Copper	0.005 - 10	0.015
Cyanide	NR[3]	0.008
DO	NR[3]	4
Iron	3 - 5,500	27
Lead	0.001 - 5	0.046
Magnesium	30 - 15,000	410
Manganese	0.03 - 1,400	3.7
Mercury	0.00005 - 0.16	0.0002
Nickel	0.015 - 1.3	0.11
Nitrate (as N)	0.1 - 10	18
pH	4.5-9.0	7.2
Phosphorus	0.1 - 23	0.99
Potassium	50 - 3,700	1,800
Selenium	NR[3]	0.016
Silver	NR[3]	0.028
Sodium	70 - 7,700	2,400
Vanadium	NR[3]	0.023
Specific conductance (mhos/cm)	2,500-35,000	25,000
Sulfate	8 - 7,750	150
TOC	30 - 29,000	880
Total Kjeldahl Nitrogen (as N)	2.6 - 945	790
Bicarb (CaCO3)	NR[3]	3,000
Total alkalinity (as CaCO3)	730 - 15,500	3,300
Total hardness (as CaCO3)	500 - 10,000[2]	4,500
TDS	3,000 - 50,000[2,]	17,000
TSS	3,000 - 50,000[2,]	95
Zinc	0.03 - 1,000	0.33
Temperature	NR[3]	66.2
Eh (mv)	NR[3]	120

Notes
1. Source: Kjeldsen, et. al.; "Present and Long-Term Composition of MSW Landfill Leachate: A Review; Critical Reviews in Environmental Science and Technology, 32(4): 297-336 (2002); unless otherwise noted. Units ppm unless noted.
2. Values are those reported for "Total Solids," no TDS or TSS values were identified.
3. NR indicates that No "Typical Range" was reported in reference document.
4. Mean values incorporate available data through 2011. Units ppm unless noted.

3.5 Gas Management

JRL has an active gas management system that collects and flares landfill gas generated by the landfilled waste. In 2011, a total of 1,019 million standard cubic feet at an average methane concentration of 41.6 percent of landfill gas was collected and treated. Projections and the basis for the design of the active gas collection system were included in the amendment license application. That analysis, performed by SHA, included an estimate of the maximum design landfill gas flow rate developed by way of using of the U.S.EPA's LandGem model (SHA 2003). This estimate has been used to size the landfill gas collection and transport systems. With the development of each detailed cell design, as required by Condition 15.A of the amendment license, SHA uses this design to prepare detailed gas management plans for each cell. The amendment license application identified a maximum design gas flow rate of 3,980 ~~million~~ scfm assuming a methane content of the gas of 50 percent.

Since that analysis was made, SHA has completed several additional landfill gas generation modeling efforts and has been able to compare actual gas flow rates at the facility to the original projections. Included in Attachment 9 is an updated evaluation of projected landfill gas generation rates for the landfill. This evaluation includes a projection of proposed maximum gas generation with the additional tonnage of MSW anticipated as a result of this amendment. The updated evaluation indicates the change in the waste composition is estimated to cause the maximum landfill gas generation rate to occur in 2018 at a rate of approximately ~~3,560~~ **3,420** ~~million~~ scfm assuming a methane content of 50 percent.[14] Therefore, the percentage change in the composition of the waste mass will not affect the approach and procedures currently used to install the active gas collection system within the waste mass. The system will continue to consist of horizontal collection trenches followed by installation of vertical gas extraction wells.

[14] The ~~3560~~**3,420** scfm value represents the median value SHA calculated based on a number of assumptions for gas generation constants used in the modeling effort. SHA has determined from the comparison of actual flow rates to projected that the median value is the best approximation for estimating future generation rates. The ~~3560~~ **3,420** projection is about ~~250~~ **140** scfm higher than a projection without the proposed revision of the waste composition (see SHA report in Attachment 3).

The spacing of the horizontal trenches and vertical wells will continue to be included in the detailed design packages submitted to MEDEP to comply with Condition 15.A of the amendment license. The last gas design package for JRL was submitted in March of 2012 for Cell 8.

4.0 LANDFILL OPERATIONS

This section describes the various components of the landfill operations and an evaluation of the effect of the amendment on the various aspects of site operations. Where changes will be required to the Site's Operation Manual these changes will be made as part of the annual update to the manual, which are included with the JRL's Annual Report.

4.1 Acceptable Solid Waste and Waste Characterization

Wastes accepted at JRL are covered under several broad categories, for which blanket permits or approvals have been granted by MEDEP. These materials include MSW, with current limitations placed on the source of the material (i.e., by-pass). There are also a number of individual permits issued for specific special wastes. A list of the generator, type of waste, and JRL permit number may be found in Appendix D of the Operations Manual.

4.2 Facility Access/Hours of Operations

Access to the facility is achieved through a gated primary access road that enters the site from Route 16 in Alton, Maine. The paved access road is approximately 2 miles in length between Route 16 and the entrance into the permitted boundary of the Landfill. NEWSME has located a scale and attendant facilities at the entrance to the Landfill that is currently occupied seven days a week.

The gate at the entrance to the Landfill is closed and locked during extended periods when wastes are not being delivered to the facility. The access road is maintained by NEWSME personnel or its contractor and will remain passable at all times. Only authorized employees of NEWSME and certain contractors have unrestricted access to the Landfill facility. All others are required to receive clearance through NEWSME Administration or the Scale House Attendant. All required signs are posted at the entrance to the facility near the scale house. The normal hours of operation at the facility are:

- Monday through Friday 6:00 AM - 8:00 PM
- Saturday & Sunday 7:00 AM – 4:00 PM

Some waste streams (e.g., PERC ash) may require 24-hour per day disposal service. Delivery of these wastes, and minimum Landfill operations to place these wastes, may occur outside of the standard hours of operations.

NEWSME maintains the site's internal access roads to prevent the accumulation of dust, mud, and waste on public roads. Maintenance activities include applying water and/or calcium chloride to the internal gravel roadways to prevent dust generation and maintaining gravel roadway surfaces to prevent mud accumulation on public roads.

With the exception of trucks carrying C&D debris and MSW, only waste hauling vehicles with pre-approved manifests from the Environmental Compliance Manger will be allowed access to the Landfill. Waste hauling vehicles carrying C&D debris and MSW will be monitored by the scale house and Landfill operators upon entry to the Landfill and during off-loading in order to assure that no unacceptable wastes are in the C&D or MSW loads. Any unacceptable materials will be segregated and the EMC contacted on how to address the materials.

4.3 Hot Loads

In the event that a hot load is delivered to the JRL, the waste will be managed in accordance with Chapter 401, Section 4 (C) (4) of the Maine Solid Waste Rules. A separate gravel or ash pad area will be sited within the confines of the operating Cell in order to properly manage hot loads. The material will be offloaded onto the pad then spread into a thin layer for cooling purposes. Burning material will be extinguished immediately by applying a water spray as necessary or covering with soil-based material to smother the flames. Once the material has cooled, it will be transferred to the active disposal area of the Cell to be co-mingled with the other wastes.

4.4 Landfill Cell Development Plans

With the construction of Cell 8 during the 2012 construction season, all but 12 acres of the permitted JRL footprint will have been utilized. Cell 8 has capacity for 1,390,000 cubic yards. The proposed change in waste percentages is not expected to significantly alter the landfill capacity utilization rate since the overall tonnage accepted will remain similar to the amount currently accepted, and the wastes will be commingled. The other operational characteristics of the cells, such as waste lift height, temporary cover placement and sequence, and the installation of the gas management system will remain the same. The individual landfill cell development plans will continue to be prepared in the manner that has been the facility's practice of preparing them at the time the detail design drawings are completed for the cells. These plans will to be included in the detailed design packages submitted to MEDEP to comply with Condition 15.A of the amendment license. The most recent submittal occurred in March of 2012 for Cell 8.

4.5 Waste Placement and Compaction

The MSW placement for the soft layer at JRL will be done in a manner similar to the current bypass MSW with the waste unloaded directly into JRL as directed by the landfill operator. Truck travel over the base of JRL is allowed only in areas where more than five feet of soft layer waste has been placed. As the active waste cell is filled, waste is placed in JRL in a manner that enables the operator to commingle the waste. Waste loads are evenly distributed throughout the working landfilling area. Wastes are placed and spread in layers one to two feet thick using solid waste compactors, bulldozers, and/or wheeled loaders to optimize waste density and compaction effort.

A minimum of three successive compactor passes are made over each waste lift. Additional passes are made if necessary to acquire the proper compaction. As waste is placed and compacted, the landfill sideslopes are created using appropriate stable waste. Outer sideslopes of the waste are graded at 2.5 feet horizontal to 1 foot vertical (2.5H:1V) using ash, fines or other approved material. Temporary interior waste sideslopes can be graded at 2 feet horizontal to 1 foot vertical (2H:1V) with ash and fines, or other fine grain materials placed on

the waste to minimize litter and odors. The operating procedures for placing the waste follow the outline in Section 7.7 of the JRL Operations Manual (JRL 2010). The proposed change in the waste composition will not change these procedures.

Upon delivery at JRL, the MSW will have a slightly lower truck density than the existing MEI residues that will be displaced. However, this lower truck density will not have a significant effect on overall capacity utilization rates as described above because: 1) the compaction by landfill equipment will increase the density of the MSW; 2) comingling of MSW with other waste streams (e.g., treatment sludge) fills the voids of the MSW, further increasing in-place density; and 3) decomposition of the MSW over time (which does not occur with ash and to only a limited extent with FEPR) will further reduce the volume of the MSW. The organic fraction of the MSW, initially in solid form (food waste, paper, wood) will decompose to methane and water, both of which will be collected from the landfill and not occupy capacity volume.

4.6 Cover

Two types of cover are utilized at JRL as part of landfill operations, daily and intermediate. Prior to placement of any cover, the waste surface is inspected by the operator for proper compaction, grade, and ability to shed water. Waste surfaces not properly graded or compacted are corrected through additional compaction and re-grading and/or by reinforcing soft areas by addition/mixing with drier, more stable waste. Prior to placement of intermediate cover**,** the final waste grade is sloped to promote runoff to the landfill's stormwater controls in order that the runoff is collected and conveyed from the waste area as quickly and efficiently as practical. JRL is constructed with stormwater diversion berms, diversion ditches, riprap down spouts, and lined ditches to control runoff and minimize erosion.

Daily Cover. Cover is placed daily over all areas receiving MSW, front-end process residue (FEPR), and other wastes with odor generating potential. The purpose of the daily cover is to control and minimize odors, windblown litter, and discourage attraction of birds. Daily cover used at JRL predominately consists of certain waste materials typically referred to as Alternate Daily Cover (ADC). ADC used at JRL includes, but is not limited to, ash, biomass fines, processed construction demolition debris (CDD), wood fines, wood chips, short-paper-fiber,

contaminated soil, or other approved soil-like materials. The amount of daily cover material needed in site operations has typically ranged between 30 and 35 percent of material placed in the landfill on a weight basis. With the proposed change in the waste percentages, assuming a total of approximately ~~203,000~~**173,000** tons of MSW, FEPR, and sludges needing daily cover applications, the amount of ADC required is between ~~61,000~~ **52,000** to ~~72,000~~**61,000** tons annually. As shown on Table 1-2 adequate quantities of ADC exist to meet this demand. If on a short-term basis adequate ADCs are not available to cover the wastes, on-site soil materials, such as soil, can also be used as daily cover. NEWSME is also evaluating the effectiveness of using temporary tarps as an alternate daily cover if adequate quantities of ADC are not available. The daily covering will not be affected by the proposed change in waste percentages.

Intermediate Cover. Intermediate cover is placed on areas that have reached interim grades where no additional waste will be placed for a period of six months or longer. The intermediate cover used at JRL is geosynthetic membrane (typically 40-mil thickness). NEWSME has found this material to be very effective in controlling odors and minimizing air intrusion into the active gas collection system. Prior to placing this intermediate cover, NEWSME places a layer of fines over the outer waste surface as a bedding layer for the geomembrane. Typically, the membrane is booted to the gas extraction wells. Eighteen inches of soil-based material having a minimum of 35 percent fines and no rocks greater than four inches in diameter can also be used as intermediate cover. If soil is used, it is be placed, compacted, seeded, and mulched in accordance with MEDEP BMPs. Intermediate cover will not be affected by the proposed change in waste percentages.

4.7 Leachate Management

As described in Section 3.3 the additional MSW will have no impact on the site's leachate management systems since the systems are designed based on the characteristics of MSW. There no changes are proposed to these systems.

4.8 Landfill Gas and Odor Control

Waste types received at JRL with the highest potential for gas generation and odor production are MSW, FEPR, organic wastewater sludge, and CDD. The increase in MSW volume will add to the volume of odor producing wastes. To manage odor at JRL, NEWSME employs a number of methods which have shown to be effective. These include operating the active gas collection system which collects and treats the gas by combustion with an on-site flare, and daily covering practices. In addition, the frequent placement of intermediate cover has proven to be very effective in conjunction with the gas collection system at controlling odors at the site. NEWSME also operates a fogging system to control odors around the active filling areas of JRL. The fogging system uses a fine mist of water mixed with a chemical odor control agent to mitigate odors that may be generated during active operations.

The active operating area will undergo little, if any, change as result of the additional MSW and thus will not diminish the effect of the in-place odor control procedures. Odor from FEPR, MSW, and sludge is also controlled through covering those materials with soil and soil-like material such as ash and wood fines. At the end of each operating day, any active filling surface not having received cover as part of the daily filling process is covered in order to further reduce odor potential. NEWSME works diligently to minimize the amount of open operational area at JRL in order to reduce the potential for odor production. The practice is given increased emphasis in the warm summer months when the potential for odor generation is typically at its highest. JRL maintains an odor complaint hotline and odor monitors around the site. These activities will remain in place to detect any site odor that may be generated during operations and aid in response to any odor complaints. Odor management practices have been highly effective as evidenced by a total of two odor complaints as of July 1st in calendar year 2012.

4.9 Litter Control

NEWSME acknowledges that additional MSW has the potential to become an increased source of windblown litter at JRL. To minimize windblown litter, the MSW will be compacted as it is placed in JRL and then covered with either daily cover or other non-litter producing waste

shortly thereafter. Litter control fencing is also placed at the perimeter of each cell. To date, windblown litter at JRL has been a minor issue and has been effectively controlled with the procedures described. NEWSME is prepared to address the potential for increase in windblown litter associated with the additional MSW by using either portable or fixed litter control fencing directly in the vicinity of the working landfill face, if necessary. The fencing would be placed on the prevailing downwind side of the waste placement operations. NEWSME is also prepared to clean litter from the area surrounding the landfill on a regular basis.

4.10 Environmental Monitoring

Included in Attachment H of the Operations Manual is the Environmental Monitoring Plan. The plan includes the sampling of 23 monitoring wells, 10 underdrains, 5 surface water locations and one leachate location. These locations are described in Attachment 10.The purposes of the Landfill monitoring program are as follows:

- to routinely characterize and evaluate groundwater and surface water, in the vicinity of the Landfill;
- to evaluate the performance of the primary liner systems including routine characterization of the landfill cell's and leachate pond's underdrain water and the leachate pond's leak detection fluid (if present); and
- to routinely characterize and evaluate the quality and quantity of leachate generated at the site.

Leachate samples are collected three times a year (tri-annually) during the spring, summer, and fall seasons and tested for a suite of parameters as identified in Chapter 405 of the Regulations. The specific parameters included in the monitoring program as included in Attachment 10. The acceptance of additional MSW will not change the proposed environmental monitoring program.

4.11 Vector Control

The acceptance of additional MSW increases the potential for vectors. The principal technique that will be used at the site to control vectors will be the diligent placement of daily and intermediate cover. If this isn't adequate to control vectors such as seagulls, the site maintains a depredation permit and this technique will be used to control the birds. If necessary, JRL will also implement other techniques to control birds at the landfill such as installation of fencing and stringing overhead wires in the active operating areas. This technique deters birds from landing in the active filling areas. JRL also maintains a contract with Modern Pest Control to control the potential for rodents at the facility.

5.0 CONCLUSION

This proposed increase in MSW tonnage at JRL results from the sale and closure of MEI pursuant to a landmark agreement reached between Maine Energy and the City of Biddeford whereby Maine Energy will sell the controversial facility to the City and decommission it. Approval of this proposed amendment to JRL's license will result in approximately **93,000 tons per year of MSW being taken to JRL.** ~~89,400 tons of MSW that is currently taken to MEI being redirected to JRL for disposal. Add to that the total number of bypass and soft layer MSW tons delivered to JRL in 2011 and the total MSW disposed of at the JRL will be approximately 111,800 tons.~~

Fortunately, the redirection of MSW from MEI to JRL will have *de minimis*, if any, measurable impacts, and it remains consistent with the State's solid waste management hierarchy **for the following reasons**.

First, the closure of MEI will leave approximately 170,000 tons of out-of-state MSW currently processed and combusted at MEI beyond Maine's borders, thereby resulting in significant source reduction for Maine's waste management system.

Second, the in-state MSW volume from the MEI communities is currently and will continue to be reduced to the maximum extent practicable by the aggressive recycling activities described in Section 2.6 of the application**. The recently executed CWS agreement with PERC authorizes CWS to market its ZeroSort® Recycling System to PERC's Charter Municipalities on an ongoing basis**.

If a PERC Charter Municipality increases its recycling above an historical baseline and delivers these recycling tons to CWS, then CWS will backfill that MSW shortfall tonnage to PERC. This is over and above the additional 30,000 tons of in-state MSW from former MEI sources diverted from JRL to PERC discussed elsewhere in this application. By maintaining the guaranteed tonnages PERC counts on from its charter members, this recycling provision ensures that increased recycling through CWS will not impact the operations of PERC. It also protects the charter members from incurring a financial

penalty as a result of an MSW shortfall, due to additional recycling with CWS, and encourages a more robust recycling climate.

Third, **CWS has agreed to divert for incineration at PERC at least 30,000 tons of in-state MSW from former MEI sources that it would otherwise seek to dispose of at JRL. As a result of this commitment, BGS and NEWSME have revised this application by reducing the total amount of MSW to be disposed of at JRL from 123,000 tons to 93,000 tons. PERC has stated that this 30,000 tons of in-state MSW diverted to it will replace current out-of-state sources taken to the PERC facility. PERC also states that this latter commitment alone is estimated to generate approximately $450,000 of additional revenue annually for PERC and its partners because it will displace out-of-state sources that pay significantly lower disposal fees at PERC**. ~~the acceptance of this additional in-state MSW at JRL will not interfere with current agreements~~ ~~CWS has with~~ ~~PERC relating to MSW from Equity Charter Municipalities as described in Section 2.6.~~

~~Fourth~~**Finally**, the proposed change in the quantity of MSW accepted at JRL will not result in a change in the design or operations of JRL. The additional MSW percentage will be **more than** offset by the reduction in the residuals generated by MEI, which are currently taken to JRL. The site truck traffic will slightly decrease as a result of this amendment**, and the life of the landfill is expected to be slightly longer**. Although NEWSME recognizes that additional MSW has potential to generate odor, windblown litter, and to attract vectors, JRL effectively controls all three issues for the current landfill operation and the same odor, litter and vector controls, with the modifications described in this application, are expected to mitigate and address any potential issues.

REFERENCES

JRL 2010. Juniper Ridge Landfill Operations Manual, Revised May 2010.

REW, 2003. Evaluation of Waste Stability & Settlement West Old Town Landfill License Amendment Application Vertical Increase & Change in Operations, report prepared by Richard E. Wardwell, P.E., Ph.D., October 2003.

SHA, 2003. Design Report Active Landfill Gas Collection System West Old Town Landfill, Old Town, Maine, report prepared by Sanborn, Head & Associates, Inc., October 2003.

SME, 2003. West Old Town Landfill License Amendment Application Vertical Increase and Change in Landfill Operations, prepared by Sevee & Maher Engineers, Inc., October 2003.

SME, 2012. Design Report Juniper Ridge Landfill Cell 8 Construction and Landfill Operations Infrastructure Modifications, report prepared by Sevee & Maher Engineers, Inc.

SPO, 2011. Application for Public Benefit Determination for the Proposed Expansion of the Juniper Ridge Landfill in Old Town, Maine, submitted by State Planning Office, September 2011.

ATTACHMENT 1

SITE DEEDS

ATTACHMENT 2

PUBLIC NOTICE AND LIST OF JRL ABUTTERS

ATTACHMENT 3

DOCUMENTATION OF GOOD CORPORATE STANDING

ATTACHMENT 4

NEWSME FINANCIAL CAPACITY

ATTACHMENT 5

MDOT ACCIDENT DATA

ATTACHMENT 6

SUMMARY OF TRI-COUNTY RECYCLING PROGRAMS AND CWS SUMMARY OF WASTE DIVERSION RATES FOR COMMUNITIES THAT HAVE ZERO-SORT® RECYCLING PROGRAMS

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CIVIL AND CRIMINAL DISCLOSURE

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PRETREATMENT STANDARDS FOR THE CITY OF BREWER, MAINE

ATTACHMENT 9

LANDFILL GAS COLLECTION RATE SENSITIVITY ANALYSIS AND COMPARISON OF WTI EMISSIONS TO LANDFILL EMISSIONS

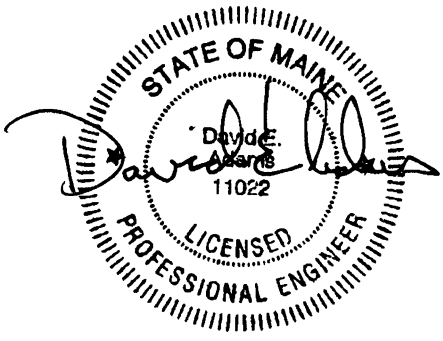
SANBORN HEAD

Building Trust. Engineering Success.

LANDFILL GAS COLLECTION RATE SENSITIVITY ANALYSIS

JUNIPER RIDGE LANDFILL

Old Town, Maine



Prepared for NEWSME Landfill Operations, LLC
File No. 3151.00
December 2012

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EXECUTIVE SUMMARY

Sanborn, Head & Associates, Inc. performed a landfill gas (LFG) collection rate sensitivity analysis on behalf of NEWSME Landfill Operations, LLC for the Juniper Ridge Landfill (JRL) in Old Town, Maine. LFG generation rate estimates were developed using the USEPA's *Landfill Gas Emissions Model, Version 3.02* (LandGEM).

Modeling was based on the currently-permitted landfill capacity (approximately 10 million cubic yards or 8.6 million tons) and waste acceptance through 2018, assuming a change in the waste stream resulting from waste diverted to JRL from Maine Energy Recovery Company (Maine Energy) in Biddeford, Maine.

Based on data provided by Sevee & Maher Engineers (SME), we modeled an increase in the proportion of municipal solid waste (MSW) in the waste stream at JRL beginning in 2013. In this scenario, JRL would accept approximately 93,000 tons per year (tpy) of MSW, while the total waste accepted would decrease from the current waste acceptance rate of approximately 710,000 tpy to a projected waste acceptance rate of approximately 681,000 tpy.

The median landfill gas projections indicate a maximum landfill gas collection rate of approximately 3,420 scfm of LFG with 50 percent methane during 2018. The results of the modeling are presented in Figure 1 and Table 1. Figure 2 shows a comparison of the modeling results with the projected LFG collection rates without the diverted Maine Energy waste.

Given the uncertainty associated with projecting LFG collection rates, Figure 1 presents a range of collection rates based on various modeling runs. Our analysis evaluated the sensitivity of the estimated landfill gas collection rates to changes in degradable waste composition; and to changes in the LandGEM input parameters: methane generation rate, k, and methane generation potential, L_0.

The high and low LFG collection rate estimates are useful for presenting a range of possible LFG collection rates, while the median estimates are typically considered the best set of projections for planning purposes. The sensitivity analysis demonstrates good correlation between the median modeled LFG collection rates and measured values at JRL from 2006 to 2011. The correlation between modeled and measured values strengthens the argument for using the median estimates for planning purposes, such as beneficial energy use options, permitting, or gas collection system pipe sizing.

This LFG collection rate sensitivity analysis is subject to change if there are changes to the waste acceptance projections or if leachate recirculation is implemented.

1.0 INTRODUCTION

On behalf of NEWSME Landfill Operations, LLC (NEWSME), Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this landfill gas (LFG) collection rate sensitivity analysis for the Juniper Ridge Landfill (JRL) in Old Town, Maine. LFG generation rate estimates were based on modeling using the U.S. Environmental Protection Agency's (USEPA's) *Landfill Gas Emissions Model, Version 3.02* (LandGEM). These LFG generation rate estimates were combined with the estimated LFG collection efficiency to estimate LFG collection rates.

LandGEM uses the first order decay equation identified in 40 Code of Federal Regulations (CFR) Part 60.754 to estimate uncontrolled gas emissions from landfills. The equation is a function of waste acceptance rates, methane generation rate (k), and methane generation potential (L_0). For this analysis, Sanborn Head performed a limited sensitivity analysis of the LandGEM results to changes in degradable waste composition and to changes in the parameters k and L_0.

Waste acceptance rate records and projections for the JRL, presented in Table A-1, were provided by NEWSME and Sevee & Maher Engineers (SME). For this analysis, we considered some waste accepted at the JRL, such as ash, to be nondegradable. We input waste acceptance rates, both the waste in place and projected waste acceptance, to LandGEM for two waste acceptance scenarios: (1) Total waste accepted, and (2) Degradable waste accepted.

Sanborn Head reviewed various sets of LandGEM modeling parameters (k and L_0) from different sources, as discussed below. These parameters were input to LandGEM for each waste acceptance scenario, resulting in multiple sets of LandGEM modeling results.

LFG generation rates were multiplied by the estimated LFG collection efficiency to estimate LFG collection rates. The landfill gas collection efficiency was estimated as discussed below.

2.0 FACILITY DESCRIPTION

The JRL is owned by the State of Maine and operated by NEWSME. The licensed footprint of the landfill, including accessory structures, is approximately 68 acres on a 780-acre parcel of land. The JRL is located on the western side of Interstate 95 in Old Town, Maine and is accessible from State Route 16 in Alton, Maine.

The Maine Department of Environmental Protection (Maine DEP) originally licensed JRL on July 28, 1993. At that time, the landfill was owned by the Fort James Operating Company, and was licensed as a 15-cell landfill for the disposal of pulp and papermaking residuals generated from a paper mill in Old Town, Maine. Under the current permit, JRL accepts approximately 2,000 tons per day of construction and demolition debris; residues and a limited quantity of municipal solid waste bypass from municipal solid waste incinerators located in the State of Maine; water and wastewater treatment plant sludge; and lesser amounts of miscellaneous non-hazardous wastes. Active filling in the 68-acre, 15-cell landfill area has been ongoing since November 1993, with current landfill operations

occurring in Cell 7. Intermediate and intermediate-final cover has been placed in Cells 1 through 6. The permitted capacity of JRL is approximately 10,000,000 cubic yards.

Although not yet required to do so by the New Source Performance Standard (NSPS) for municipal solid waste (MSW) landfills in 40 CFR Part 60, Subpart WWW, which has been adopted by the Maine DEP in Chapter 143 of its regulations, NEWSME has installed an active gas collection and control system (GCCS) at the JRL. The objectives of the GCCS are to reduce emissions of air toxics and to limit the potential for odors. The GCCS is designed to actively collect LFG while maintaining anaerobic conditions within the landfill by limiting air intrusion into the waste. The GCCS is monitored using equipment that measures and records the LFG volumetric extraction rate; and the concentration of methane, oxygen, carbon dioxide, and balance gases (primarily nitrogen) contained in the LFG.

The JRL GCCS is regularly expanded by adding gas extraction points and related infrastructure. LFG is currently managed in Cells 1 through 6 using horizontal gas collection trenches (GCTs) constructed in the waste. Gas flow through the GCTs is controlled by wellhead assemblies mounted on condensate traps located at the low points of each trench. Vertical extraction wells have also been installed, and the design intent is for additional vertical extraction wells to be installed as the outer slopes of the cells are filled to final grades. The vacuum applied at each extraction location may be adjusted with a manually controlled valve on the extraction location wellhead.

LFG in the GCCS is delivered to a 106.5 million British thermal units per hour (MMBtu/hr) utility flare (Flare No. 4). Flare No. 4 was approved by the Maine DEP in November 2008 to replace previously installed flares. Flares No. 2 and No. 3 operate as backup LFG control devices and do not operate simultaneously with Flare No. 4.

3.0 MODEL INPUTS

Inputs to the LandGEM model include waste acceptance rates (described above) and values for k and L_0. The various k and L_0 values considered include the following:

- NEWSVT Landfill: k of 0.06 $year^{-1}$ and L_0 of 130 cubic meters per megagram (m^3/Mg);
- NCES Landfill: k of 0.08 $year^{-1}$ and L_0 of 135 m^3/Mg;
- SCS: k of 0.12 $year^{-1}$ and L_0 of 110 m^3/Mg;
- NSPS: k of 0.05 $year^{-1}$ and L_0 of 170 m^3/Mg;
- EMCON/OWT: k of 0.13 $year^{-1}$ and L_0 of 100 m^3/Mg;
- Crossroads: k of 0.10 $year^{-1}$ and L_0 of 110 m^3/Mg; and
- AP-42: k of 0.04 $year^{-1}$ and L_0 of 100 m^3/Mg.

Appendix B includes a narrative that summarizes the various sets of k and L_0 values used for the two models, and provides references for where the values originated.

4.0 GAS COLLECTION RATE ESTIMATES

LFG collection rate estimates are obtained through a two step process. The first step is to incorporate the waste acceptance rates, degradable waste fractions, and k and L_0 values into LandGEM to obtain estimates of LFG generation. The second step is to apply an efficiency factor for LFG extraction.

LFG generation rate estimates and LandGEM model results are presented in Appendix B. Table B-1 presents the LFG generation rate estimates based on the total-waste-accepted scenario. Table B-2 presents the LFG generation rate estimates based on the degradable-waste-accepted scenario.

LFG collection rate estimates are presented in Appendix C. Appendix C also includes a brief review of typical collection efficiencies and the assumptions associated with the LFG collection efficiency estimate for the JRL. Tables C-1 and C-2 and Figures C-1 and C-2 present results of the individual modeling scenarios. Table C-1 presents the LFG collection rate estimates based on the total-waste-accepted scenario. Table C-2 presents the LFG collection rate estimates based on the degradable-waste-accepted scenario.

Figures C-1 and C-2 are graphical representations of the results presented in Tables C-1 and C-2, respectively.

Table 1 and Figure 1 present summaries of the results of the various modeling scenarios by presenting the yearly high, median, and low estimates for LFG collection rates. When applied to the total mass of waste accepted, values for k of 0.07 $year^{-1}$ and L_0 of 85 m^3/Mg appear to provide a good curve fit for the median estimates.

Figure 2 shows a comparison of the modeling results with the projected LFG collection rates without the diverted Maine Energy waste. Modeling based on diverting waste from Maine Energy increased the peak median estimate from 3,306 to 3,418 scfm of LFG with 50 percent methane.

5.0 LIMITATIONS

Factors contributing to the uncertainty of LFG collection rate projections include:

- LandGEM modeling being a simplification of the waste degradation process (e.g., assuming a uniform waste stream [L_0] and uniform rate of waste degradation [k]);
- Potential changes to the estimated rate of future waste acceptance, and the types of waste to be accepted [L_0]);
- Potential changes to landfill operations (e.g., changes that could affect the moisture content of the waste, and therefore the rate of waste degradation [k]); and

- Other factors that affect the rate of gas generation (e.g., microbial activity, weather).

Although the median estimates are typically considered the best set of projections for planning purposes, because of the uncertainty associated with projecting LFG collection rates, the high and low estimates are also generally considered useful for presenting a range of possible LFG collection rates.

This LFG collection rate analysis is subject to change should there be changes to the waste acceptance rate projections or the projected waste composition at the JRL. An alteration in the design capacity at the JRL, for example, would change the results of this analysis.

Also, if leachate recirculation were to be implemented at the JRL, we expect that there would be a significant increase in the methane generation rate, and our projections would be correspondingly affected. Studies performed at landfills that have added moisture to the waste, including leachate recirculation, could be used to perform an LFG collection rate analysis for a leachate-recirculation scenario at the JRL.

TABLES

Table 1.
Landfill Gas Collection Rate Sensitivity Analysis
High, Median & Low Estimates from Multiple Sets of Modeling Results
With Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

Year	High Estimate for LFG Collection Rate (scfm)	Median Estimate for LFG Collection Rate (scfm)	Low Estimate for LFG Collection Rate (scfm)
2006	592	376	143
2007	1,206	712	258
2008	1,683	958	352
2009	2,293	1,275	475
2010	2,719	1,494	573
2011	3,330	1,823	710
2012	3,869	2,099	838
2013	4,349	2,350	963
2014	4,740	2,599	1,092
2015	5,087	2,829	1,215
2016	5,394	3,045	1,334
2017	5,667	3,241	1,448
2018	5,909	3,418	1,558
2019	5,797	3,346	1,583
2020	5,351	3,059	1,521
2021	4,940	2,866	1,462
2022	4,692	2,686	1,404
2023	4,464	2,518	1,349
2024	4,246	2,361	1,296
2025	4,039	2,246	1,246
2026	3,842	2,106	1,197
2027	3,654	1,934	1,100
2028	3,476	1,780	966
2029	3,307	1,615	848
2030	3,145	1,467	745
2031	2,992	1,340	654
2032	2,846	1,225	574
2033	2,707	1,139	504
2034	2,575	1,063	443
2035	2,450	991	389

Notes:

1. Unless otherwise noted, gas generation rate estimates are based on the assumption that waste accepted at the JRL is degradable. It should also be noted that NEWSME considers some waste accepted at the site to be nondegradable. Gas generation rate estimates based both on including and excluding waste considered nondegradable were used to estimate gas collection rates presented in this table.

2. Yearly high, median, and low values are from multiple sets of modeling results based on various sets of LandGEM input paramters (i.e., sets of k & Lo) and two waste acceptance scenarios (total waste accepted and degradable waste accepted).

3. We assumed that with a properly designed and operated LFG extraction system, and adequate intermediate and/or final cover, 85 percent of the LFG generated at the JRL is collected.

FIGURES

Figure 1.
Landfill Gas Collection Rate Sensitivity Analysis
High, Median & Low Estimates from Multiple Sets of Modeling Results
With Waste Diverted from Maine Energy

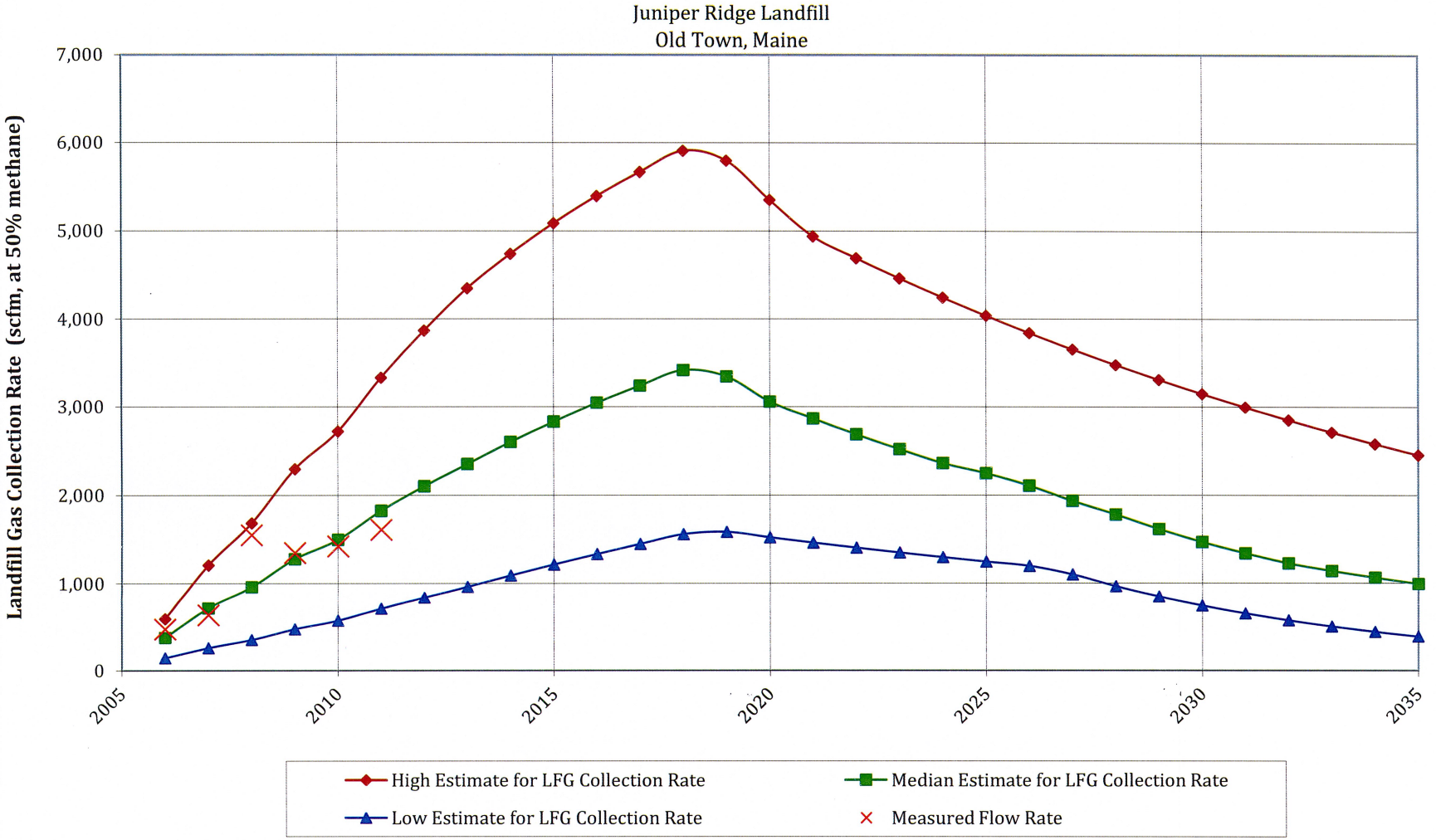
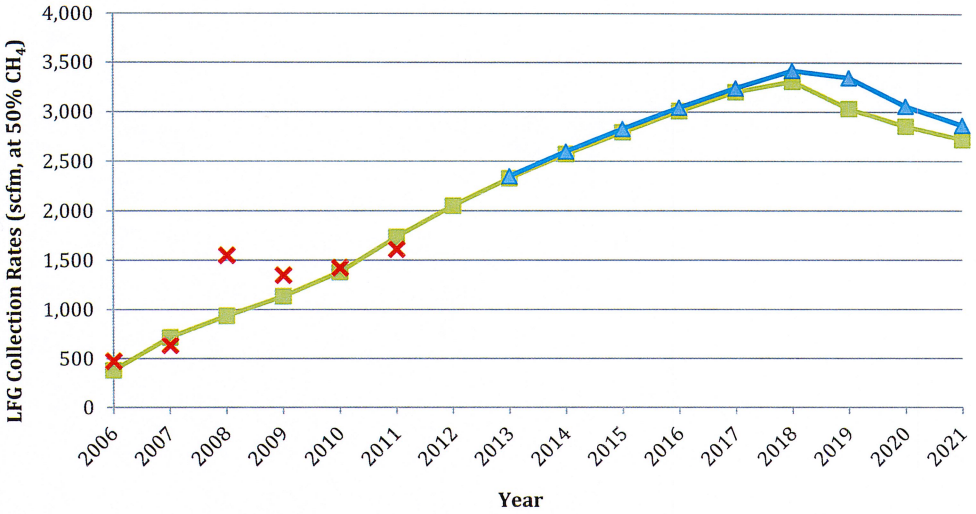


Figure 2.
Median Estimates for LFG Collection Rates
With and Without Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

Year	Median Estimates for LFG Collection Rate Without Diverted Maine Energy Waste (scfm, at 50% CH_4)	Median Estimates for LFG Collection Rate With Diverted Maine Energy Waste (scfm, at 50% CH_4)
2006	376	
2007	712	
2008	931	
2009	1,129	
2010	1,376	
2011	1,733	
2012	2,048	
2013	2,326	2,350
2014	2,572	2,599
2015	2,793	2,829
2016	3,007	3,045
2017	3,200	3,241
2018	3,306	3,418
2019	3,032	3,346
2020	2,855	3,059
2021	2,720	2,866



Notes:

1. LFG collection rate estimates without diverted Maine Energy Waste are from a study performed by Sanborn Head in 2007, and were included in the JRL Air License Application submitted in August 2011.

2. LFG collection rate estimates with diverted Maine Energy waste assume that JRL would accept 93,000 tons per year of MSW (diverted from Maine Energy), while the total waste accepted would decrease from the current waste acceptance rate of approximately 710,000 tons per year (tpy) to a projected waste acceptance rate of approximately 681,000 tpy.

APPENDIX A

WASTE ACCEPTANCE RATE SUMMARY

APPENDIX A
WASTE ACCEPTANCE RATES SUMMARY

Disposal records indicate that degradable and nondegradable wastes have been placed in the Juniper Ridge Landfill (JRL). There is a provision in the NSPS for subtracting nondegradable solid waste from the total mass of waste in a landfill when estimating emissions.[1] Therefore, to consider a range of scenarios that may represent the site conditions, waste acceptance scenarios that include and exclude nondegradable waste were considered. The mass of waste received at the JRL through 2011 and projected waste receipts from 2012 through 2018 were considered.

Table A-1 provides a summary of the estimated actual and projected annual waste acceptance rates for the JRL. Table A-1 presents two waste acceptance scenarios:

- Total Waste Accepted; and
- Degradable Waste Accepted.

Both waste acceptance scenarios are used in LandGEM[2] to model landfill gas (LFG) generation rates. LandGEM estimates are greater when the total-waste-accepted scenario is used. Excluding the nondegradable waste reduces the estimate for LFG generation.

Annual waste acceptance data is maintained by NEWSME. For 1997 through 2002, Sanborn Head and Sevee & Maher Engineers, Inc. (SME) used waste acceptance records provided by NEWSME to estimate gas production potential. For 2003 through 2011, NEWSME provided waste acceptance records. Future annual waste acceptance projections were provided by SME.[3]

Table A-1 includes a column that indicates the yearly estimated percentage of degradable waste.

---

1 Section 60.754 (a)(1) of the NSPS states, "The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for mass of solid waste in that section if documentation of the nature and amount of such waste is maintained."

2 LandGEM - U.S. Environmental Protection Agency's (USEPA's) *Landfill Gas Emissions Model, Version 3.02.*

3 Waste acceptance projections were provided by SME on December 19, 2012.

Table A-1.
Annual Waste Acceptance Rates Summary
With Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

Year	Waste Accepted (tons)	Waste Accepted (Megagrams)	Degadable Waste (%)	Degradable Waste (tons)	Degradable Waste (Megagrams)
1997	26,369	23,917	84.6	22,299	20,226
1998	32,525	29,500	81.0	26,339	23,890
1999	34,486	31,279	84.6	29,168	26,455
2000	41,549	37,685	77.7	32,286	29,283
2001	41,569	37,703	73.4	30,532	27,692
2002	47,690	43,255	81.5	38,846	35,233
2003	46,906	42,544	81.5	38,240	34,684
2004	53,905	48,892	55.5	29,917	27,135
2005	248,974	225,819	56.8	141,433	128,279
2006	525,758	476,863	56.4	296,271	268,718
2007	472,645	428,689	54.3	256,597	232,734
2008	617,782	560,329	54.2	334,726	303,597
2009	528,622	479,460	54.3	287,026	260,332
2010	708,303	642,431	55.4	392,579	356,069
2011	706,506	640,801	54.1	382,140	346,601
2012	707,405	641,616	54.8	387,360	351,336
2013	681,000	617,667	60.1	409,056	371,014
2014	681,000	617,667	60.1	409,056	371,014
2015	681,000	617,667	60.1	409,056	371,014
2016	681,000	617,667	60.1	409,056	371,014
2017	681,000	617,667	60.1	409,056	371,014
2018	354,005	321,083	60.1	212,640	192,864
Total	**8,600,000**	**7,800,200**	--	**4,983,678**	**4,520,196**

Notes:

1. Megagrams = 0.907 x tons.
2. JRL's permitted capacity is approximately 10,000,000 cubic yards. Based on estimated compaction density of 0.86 tons/cubic yard, the total waste that may be accepted in the JRL is 8,600,000 tons.
3. The 1997 through 2002 waste acceptance rates and percent of each waste type accepted were provided to Sanborn Head by SME.
4. The 2003 through 2011 waste acceptance rates and percent of each waste type accepted were provided to Sanborn Head by NEWSME.
5. The projected waste acceptance rate for 2012 was estimated using the average of the waste acceptance rate from 2010 and 2011.
6. The projected waste acceptance rates for 2013 and beyond were provided to Sanborn Head by SME based on a scenario with waste diverted to JRL from the Maine Energy Recovery Company in Biddeford, Maine beginning in 2013.
7. The estimated percent of waste types accepted were used to estimate degradable waste portions at the JRL.

APPENDIX B

LANDFILL GAS GENERATION RATE ESTIMATES

APPENDIX B
LANDFILL GAS GENERATION ESTIMATES

Sanborn Head estimated potential landfill gas (LFG) generation rates for the Juniper Ridge Landfill (JRL) using LandGEM 3.02. LandGEM uses the first order decay equation identified in 40 Code of Federal Regulations (CFR) Part 60.754. Model inputs include:

- default or user-defined values for landfill gas concentrations (i.e., percent methane, etc.) and for model parameters (i.e., methane generation rate [k] and potential methane generation capacity [L_0]); and
- site-specific information related to the type and amount of in-place waste and projected acceptance rates.

Default values and parameters are published in the New Source Performance Standard (NSPS) for MSW landfills (40 CFR 60, Subpart WWW) and in the USEPA's *Compilation of Air Pollutant Emission Factors, AP-42*. The USEPA developed two sets of available defaults (NSPS and AP-42) based on testing at landfills throughout the United States. Based on information included in the LandGEM User's Manual, the NSPS default values generally overestimate the volume of landfill gas generated during biodegradation of putrescible wastes. The LandGEM User's Manual also indicates that AP-42 default values more closely reflect actual expected emissions from a landfill. The LandGEM User's Manual states:

> *The (NSPS) default values in the model provide emission estimates that would reflect the expected maximum emissions and generally would be used only for determining the applicability of the regulations to a landfill. To estimate actual emissions in the absence of site-specific data, a second set of default values (the AP-42 defaults) is provided in the model. ...The AP-42 default values provide emission estimates that should reflect typical landfill emissions and are the values suggested for use in developing estimates for state inventories.*

Sanborn Head used user-defined model values for k and L_0 from several sources including calibration projects performed by Sanborn Head; a memorandum written by David Burns of the Maine Department of Environmental Protection (Maine DEP) to Steve Farrar of the Maine DEP entitled "West Old Town Landfill (WOTL), Gas Management System Design," dated December 19, 2003; and a paper by OWT/Emcon entitled "Landfill Gas Generation Modeling, A Reality Check," from the Solid Waste Association of North America's (SWANA's) 26th Annual Landfill Gas Symposium Proceedings, March 2003.

Two sets of user-defined model parameters were provided by Sanborn Head. Sanborn Head performed limited calibrations of LFG generation rates at the New England Waste Services of Vermont, Inc. (NEWSVT) Landfill in Coventry, Vermont (NEWSVT: k=0.06 yr^{-1} and L_0 =130 m^3/Mg) and the North Country Environmental Services, Inc. (NCES) Landfill in Bethlehem, New Hampshire (NCES: k=0.08 yr^{-1} and L_0 =135 m^3/Mg).

Two sets of user-defined model parameters derived from studies performed by SCS Engineers, Inc. (SCS) were reported in the memorandum from Mr. Burns. One set of parameters was derived from studies of landfills throughout New England (SCS, Northeastern U.S. Landfills: k=0.12 yr^{-1} and L_0 = 110 m^3/Mg) and the second set was derived from a study of the Crossroads Landfill in Norridgewock, Maine (Crossroads-Phase 11: k=0.10 yr^{-1} and L_0 =110 m^3/Mg).

One set of model parameters was obtained from an OWT/Emcon technical paper. The paper reviewed data collected at three landfills in the U.S. The model parameters were developed to fit actual gas production at the landfill with the highest gas production rate of the three landfills (EMCON/OWT: k= 0.13 yr^{-1} and L_0 =100 m^3/Mg).

The following table summarizes the various sets of LandGEM model parameters used in this collection rate analysis.

Source	k (yr^{-1})	L_0 (m^3/Mg)
NEWSVT Landfill[2a]	0.06	130
NCES Landfil[2a]	0.08	135
SCS, Northeastern U.S. Landfills[2b]	0.12	110
NSPS[2c]	0.05	170
EMCON/OWT[2d]	0.13	100
Crossroads - Phase 11[2b]	0.10	110
AP-42[2c]	0.04	100

Notes:

1. The landfill gas generation rates were estimated with the USEPA's LandGEM Version 3.02 using waste acceptance records provided by NEWSME for the JRL and the values shown for methane generation rate, k ($year^{-1}$) and potential methane generation capacity, L_o (m^3/Mg).
2. Model parameters used in LandGEM were obtained as follows:
   a. NEWSVT Landfill and NCES Landfill values are from calibration projects performed by Sanborn Head.
   b. SCS, Northeastern U.S. Landfills and Crossroads-Phase 11 values for k and L_o were included in information obtained from a memo written by David Burns of the Maine DEP to Steve Farrar of the Maine DEP entitled "West Old Town Landfill (WOTL), Gas Management System Design," dated December 19, 2003.
   c. NSPS and AP-42 values for k and L_o are provided as default values in LandGEM.
   d. EMCON/OWT values for k and L_o were obtained from "Landfill Gas Generation Modeling, A Reality Check," from SWANA's 26th Annual Landfill Gas Symposium Proceedings, March 2003.

NEWSME provided Sanborn Head with the waste acceptance rate data that was input to the LandGEM model for waste accepted at the JRL through 2011. Future annual waste acceptance projections were provided by SME. Waste acceptance rates can be found in Appendix A.

LandGEM estimates were prepared for the JRL facility based on two waste acceptance scenarios:

- Total Waste Accepted; and
- Degradable Waste Accepted.

The LFG generation rate estimates based on total waste accepted are presented in Table B-1. The LFG generation rate estimates based on degradable waste accepted are presented in Table B-2.

Table B-1.
Landfill Gas Generation Rate Estimates
Modeling based on Total Waste Accepted
With Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

	Various sources for modeling parameters k and L_o						
year	NEWSVT Landfill[2a] scfm	NCES Landfill[2a] scfm	SCS, Northeastern U.S. Landfills[2b] scfm	NSPS[2c] scfm	EMCON/OWT[2d] scfm	Crossroads - Phase 11[2b] scfm	AP-42[2c] scfm
1997	0	0	0	0	0	0	0
1998	24	33	40	27	39	34	13
1999	53	72	85	58	83	72	28
2000	82	110	128	90	125	110	43
2001	116	155	177	128	172	152	61
2002	147	196	220	164	213	191	79
2003	183	241	268	204	258	234	99
2004	216	282	309	242	297	272	117
2005	253	329	357	285	341	315	138
2006	469	620	696	523	672	605	252
2007	928	1,240	1,419	1,030	1,376	1,221	494
2008	1,311	1,745	1,980	1,459	1,915	1,711	701
2009	1,807	2,396	2,698	2,013	2,606	2,340	969
2010	2,191	2,883	3,199	2,451	3,079	2,795	1,185
2011	2,719	3,561	3,918	3,049	3,763	3,438	1,477
2012	3,214	4,184	4,552	3,616	4,361	4,016	1,758
2013	3,682	4,761	5,116	4,156	4,887	4,541	2,027
2014	4,098	5,260	5,576	4,643	5,310	4,982	2,274
2015	4,489	5,721	5,985	5,107	5,681	5,381	2,511
2016	4,858	6,146	6,346	5,548	6,007	5,742	2,739
2017	5,205	6,538	6,667	5,967	6,293	6,069	2,957
2018	5,533	6,900	6,952	6,366	6,544	6,365	3,168
2019	5,538	6,820	6,706	6,414	6,276	6,213	3,213
2020	5,215	6,295	5,948	6,101	5,511	5,622	3,087
2021	4,912	5,811	5,275	5,804	4,839	5,087	2,966
2022	4,626	5,364	4,679	5,521	4,249	4,603	2,850
2023	4,356	4,952	4,150	5,251	3,731	4,165	2,738
2024	4,103	4,571	3,680	4,995	3,276	3,768	2,630
2025	3,864	4,220	3,264	4,752	2,877	3,410	2,527
2026	3,639	3,895	2,895	4,520	2,526	3,085	2,428
2027	3,427	3,596	2,568	4,299	2,218	2,792	2,333
2028	3,227	3,319	2,277	4,090	1,948	2,526	2,242
2029	3,039	3,064	2,020	3,890	1,710	2,286	2,154
2030	2,862	2,829	1,791	3,701	1,502	2,068	2,069
2031	2,696	2,611	1,589	3,520	1,319	1,871	1,988
2032	2,539	2,410	1,409	3,348	1,158	1,693	1,910
2033	2,391	2,225	1,250	3,185	1,017	1,532	1,835
2034	2,252	2,054	1,108	3,030	893	1,386	1,763
2035	2,120	1,896	983	2,882	784	1,254	1,694

Notes:

1. Unless otherwise noted, gas generation rate estimates are based on the assumption that waste accepted at the JRL is degradable. The gas generation modeling results presented in this table were based on the total-waste-accepted scenario (i.e., the tonnages modeled included waste that may be considered nondegradable).

2. The landfill gas generation rates were estimated with the USEPA's LandGEM Version 3.02 using waste acceptance records and projections for the JRL and the following values for methane generation rate, k ($year^{-1}$) and potential methane generation capacity, Lo (m^3/Mg):

   a. NEWSVT Landfill: k=0.06 yr^{-1} and Lo=130 m^3/Mg and NCES Landfill: k=0.08 yr^{-1} and Lo=135 m^3/Mg. These values are from calibration projects performed by Sanborn Head.

   b. SCS, Northeastern U.S. Landfills: k=0.12 yr^{-1} and Lo = 110 m^3/Mg and Crossroads - Phase 11: k=0.10 $yr^{-1}$and Lo=110 m^3/Mg. These values were included in information obtained from a memo written by David Burns of the Maine DEP to Steve Farrar of the Maine DEP entitled "West Old Town Landfill (WOTL), Gas Management System Design," dated December 19, 2003.

   c. NSPS: k=0.05 yr^{-1} and Lo=170 m^3/Mg and AP-42: k=0.04 yr^{-1} and Lo=100 m^3/Mg. These values are provided as default values in LandGEM.

   d. EMCON/OWT: k= 0.13 yr^{-1} and Lo=100 m^3/Mg. These values were obtained from "Landfill Gas Generation Modeling, A Reality Check," from SWANA's 26th Annual Landfill Gas Symposium Proceedings, March 2003.

Table B-2.
Landfill Gas Generation Rate Estimates
Modeling based on Degradable Waste Accepted
With Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

	Various sources for modeling parameters k and L_o						
year	NEWSVT Landfill[2a]	NCES Landfill[2a]	SCS, Northeastern U.S. Landfills[2b]	NSPS[2c]	EMCON/OWT[2d]	Crossroads - Phase 11[2b]	AP-42[2c]
	scfm	scfm	scfm	scfm	scfm	scfm	scfm
1997	0	0	0	0	0	0	0
1998	21	28	34	23	33	29	11
1999	44	60	70	48	69	60	23
2000	68	92	107	75	104	91	36
2001	94	126	144	104	140	124	50
2002	117	155	174	130	168	151	63
2003	146	192	214	163	206	187	79
2004	173	226	248	194	238	218	94
2005	191	247	266	215	254	236	105
2006	310	408	451	348	434	395	168
2007	566	752	852	631	824	737	304
2008	771	1,021	1,147	860	1,108	996	415
2009	1,036	1,367	1,528	1,157	1,473	1,330	559
2010	1,241	1,627	1,793	1,392	1,723	1,572	674
2011	1,532	2,000	2,189	1,721	2,100	1,926	836
2012	1,797	2,332	2,524	2,025	2,415	2,232	986
2013	2,051	2,645	2,830	2,318	2,700	2,517	1,133
2014	2,310	2,961	3,133	2,620	2,983	2,802	1,284
2015	2,554	3,253	3,403	2,906	3,231	3,059	1,430
2016	2,784	3,522	3,642	3,179	3,449	3,293	1,570
2017	3,000	3,771	3,854	3,438	3,640	3,504	1,704
2018	3,204	4,001	4,042	3,685	3,808	3,695	1,833
2019	3,214	3,963	3,909	3,721	3,662	3,616	1,863
2020	3,027	3,658	3,467	3,539	3,215	3,272	1,790
2021	2,851	3,377	3,075	3,367	2,823	2,961	1,720
2022	2,685	3,117	2,728	3,202	2,479	2,679	1,652
2023	2,528	2,878	2,419	3,046	2,177	2,424	1,587
2024	2,381	2,656	2,146	2,898	1,912	2,193	1,525
2025	2,242	2,452	1,903	2,756	1,679	1,985	1,465
2026	2,112	2,264	1,688	2,622	1,474	1,796	1,408
2027	1,989	2,090	1,497	2,494	1,294	1,625	1,353
2028	1,873	1,929	1,328	2,372	1,137	1,470	1,300
2029	1,764	1,781	1,177	2,257	998	1,330	1,249
2030	1,661	1,644	1,044	2,147	876	1,204	1,200
2031	1,565	1,517	926	2,042	769	1,089	1,153
2032	1,473	1,401	822	1,942	676	985	1,108
2033	1,388	1,293	729	1,848	593	892	1,064
2034	1,307	1,194	646	1,757	521	807	1,022
2035	1,231	1,102	573	1,672	457	730	982

Notes:

1. Unless otherwise noted, gas generation rate estimates are based on the assumption that waste accepted at the JRL is degradable. The gas generation modeling results presented in this table were based on waste accepted at the landfill that is considered degradable (i.e., an estimated percentage of nondegradable waste was removed).

2. The landfill gas generation rates were estimated with the USEPA's LandGEM Version 3.02 using waste acceptance records and projections for the JRL and the following values for methane generation rate, k ($year^{-1}$) and potential methane generation capacity, Lo (m^3/Mg):

   a. NEWSVT Landfill: k=0.06 yr^{-1} and Lo=130 m^3/Mg and NCES Landfill: k=0.08 yr^{-1} and Lo=135 m^3/Mg. These values are from calibration projects performed by Sanborn Head.

   b. SCS, Northeastern U.S. Landfills: k=0.12 yr^{-1} and Lo = 110 m^3/Mg and Crossroads - Phase 11: k=0.10 $yr^{-1}$and Lo=110 m^3/Mg. These values were included in information obtained from a memo written by David Burns of the Maine DEP to Steve Farrar of the Maine DEP entitled "West Old Town Landfill (WOTL), Gas Management System Design," dated December 19, 2003.

   c. NSPS: k=0.05 yr^{-1} and Lo=170 m^3/Mg and AP-42: k=0.04 yr^{-1} and Lo=100 m^3/Mg. These values are provided as default values in LandGEM.

   d. EMCON/OWT: k= 0.13 yr^{-1} and Lo=100 m^3/Mg. These values were obtained from "Landfill Gas Generation Modeling, A Reality Check," from SWANA's 26th Annual Landfill Gas Symposium Proceedings, March 2003.

APPENDIX C

LANDFILL GAS COLLECTION RATE ESTIMATES

APPENDIX C
LANDFILL GAS COLLECTION RATE ESTIMATES

Landfill gas (LFG) collection rates are estimated for the Juniper Ridge Landfill based on the yearly estimates for LFG generation presented in Appendix B and on estimated LFG collection efficiency. The U.S. Environmental Protection Agency's (USEPA's) Compilation of Air Pollutant Emission Factors (AP-42) states that 75 percent is a commonly assumed LFG collection efficiency, and that higher collection efficiencies (e.g., 85 percent) may be achieved at sites designed to control gas emissions.

The USEPA's Federal Register for Mandatory Reporting of Greenhouse Gases, Volume 74, No. 209, Subpart HH indicates that for landfills with an active gas collection system, 75 percent collection efficiency may be used for areas with an intermediate soil cover and 95 percent may be used for areas with a final cover.

We have assumed that with a properly designed and operated LFG extraction system and adequate intermediate and/or final cover, 85 percent of the LFG generated at the JRL may be collected.

LFG collection rate estimates are calculated by multiplying the LFG generation rate estimates from the LandGEM model with the estimated 85 percent collection efficiency. The LFG collection rate estimates are presented in Table C-1 (Modeling based on Total Waste Accepted) and Table C-2 (Modeling based on Degradable Waste Accepted).

Table C-1.
Landfill Gas Collection Rate Estimates
Modeling based on Total Waste Accepted
With Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

		Various sources for modeling parameters k and L_o						
Year	Gas Collection & Control System Capture Efficiency (%)	NEWSVT Landfill[2a] (scfm)	NCES Landfill[2a] (scfm)	SCS, Northeastern U.S. Landfills[2b] (scfm)	NSPS[2c] (scfm)	EMCON/OWT[2d] (scfm)	Crossroads - Phase 11[2b] (scfm)	AP-42[2c] (scfm)
2006	85	398	527	592	445	571	514	214
2007	85	789	1,054	1,206	876	1,170	1,038	420
2008	85	1,115	1,483	1,683	1,240	1,628	1,454	596
2009	85	1,536	2,036	2,293	1,711	2,215	1,989	824
2010	85	1,862	2,450	2,719	2,083	2,617	2,376	1,007
2011	85	2,311	3,027	3,330	2,591	3,198	2,922	1,256
2012	85	2,732	3,557	3,869	3,073	3,706	3,414	1,494
2013	85	3,130	4,047	4,349	3,533	4,154	3,860	1,723
2014	85	3,483	4,471	4,740	3,947	4,513	4,235	1,933
2015	85	3,816	4,862	5,087	4,341	4,829	4,574	2,134
2016	85	4,129	5,224	5,394	4,715	5,106	4,881	2,328
2017	85	4,425	5,557	5,667	5,072	5,349	5,159	2,514
2018	85	4,703	5,865	5,909	5,411	5,563	5,410	2,692
2019	85	4,707	5,797	5,700	5,452	5,334	5,281	2,731
2020	85	4,433	5,351	5,055	5,186	4,684	4,779	2,624
2021	85	4,175	4,940	4,484	4,933	4,113	4,324	2,521
2022	85	3,932	4,560	3,977	4,692	3,612	3,912	2,422
2023	85	3,703	4,209	3,527	4,464	3,171	3,540	2,327
2024	85	3,487	3,886	3,128	4,246	2,785	3,203	2,236
2025	85	3,284	3,587	2,775	4,039	2,445	2,898	2,148
2026	85	3,093	3,311	2,461	3,842	2,147	2,623	2,064
2027	85	2,913	3,056	2,183	3,654	1,885	2,373	1,983
2028	85	2,743	2,822	1,936	3,476	1,656	2,147	1,905
2029	85	2,583	2,605	1,717	3,307	1,454	1,943	1,831
2030	85	2,433	2,404	1,523	3,145	1,277	1,758	1,759
2031	85	2,291	2,219	1,350	2,992	1,121	1,591	1,690
2032	85	2,158	2,049	1,198	2,846	984	1,439	1,624
2033	85	2,032	1,891	1,062	2,707	864	1,302	1,560
2034	85	1,914	1,746	942	2,575	759	1,178	1,499
2035	85	1,802	1,612	836	2,450	666	1,066	1,440

Notes:

1. Unless otherwise noted, gas generation rate estimates are based on the assumption that waste accepted at the JRL is degradable. The gas generation modeling results presented in this table were based on the total-waste-accepted scenario (i.e., the tonnages modeled included waste that may be considered nondegradable).

2. The landfill gas generation rates were estimated with the USEPA's LandGEM Version 3.02 using waste acceptance records and projections for the JRL and the following values for methane generation rate, k (year^{-1}) and potential methane generation capacity, Lo (m^3/Mg):

   a. NEWSVT Landfill: k=0.06 yr^{-1} and Lo=130 m^3/Mg and NCES Landfill: k=0.08 yr^{-1} and Lo=135 m^3/Mg. These values are from calibration projects performed by Sanborn Head.

   b. SCS, Northeastern U.S. Landfills: k=0.12 yr^{-1} and Lo = 110 m^3/Mg and Crossroads - Phase 11: k=0.10 $yr^{-1}$and Lo=110 m^3/Mg . These values were included in information obtained from a memo written by David Burns of the Maine DEP to Steve Farrar of the Maine DEP entitled "West Old Town Landfill (WOTL), Gas Management System Design," dated December 19, 2003.

   c. NSPS: k=0.05 yr^{-1} and Lo=170 m^3/Mg and AP-42: k=0.04 yr^{-1} and Lo=100 m^3/Mg. These values are provided as default values in LandGEM.

   d. EMCON/OWT: k= 0.13 yr^{-1} and Lo=100 m^3/Mg. These values were obtained from "Landfill Gas Generation Modeling, A Reality Check," from SWANA's 26th Annual Landfill Gas Symposium Proceedings, March 2003.

3. We assumed that with a properly designed and operated LFG extraction system and adequate intermediate and/or final cover, 85 percent of the LFG generated at the JRL is collected.

Figure C-1.
Landfill Gas Collection Rate Estimates
Modeling based on Total Waste Accepted
With Waste Diverted from Maine Energy

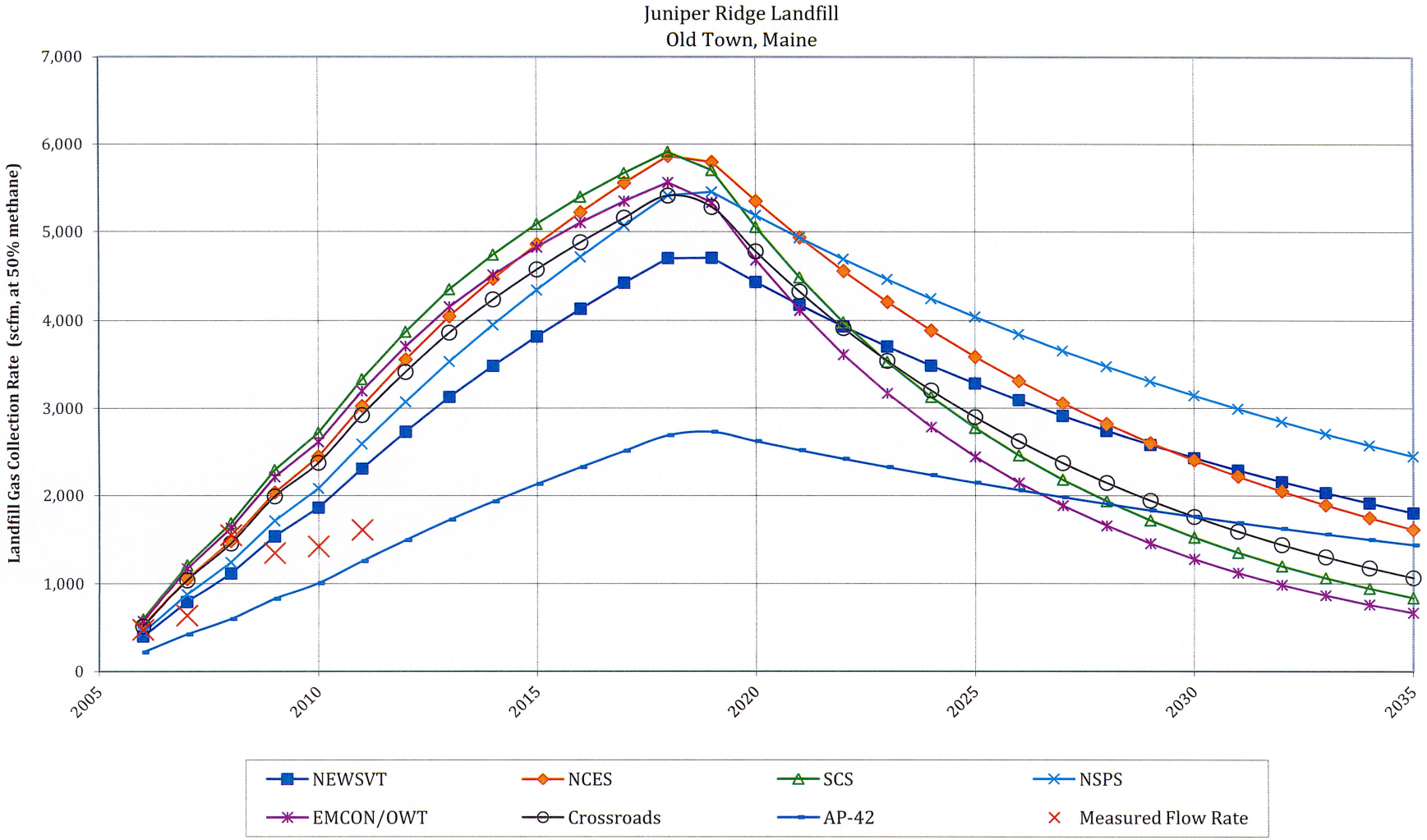


Table C-2.
Landfill Gas Collection Rate Estimates
Modeling based on Degradable Waste Accepted
With Waste Diverted from Maine Energy

Juniper Ridge Landfill
Old Town, Maine

		Various sources for modeling parameters k and L_o						
Year	Gas Collection & Control System Capture Efficiency (%)	NEWSVT Landfill[2a] (scfm)	NCES Landfill[2a] (scfm)	SCS, Northeastern U.S. Landfills[2b] (scfm)	NSPS[2c] (scfm)	EMCON/OWT[2d] (scfm)	Crossroads - Phase 11[2b] (scfm)	AP-42[2c] (scfm)
2006	85	264	346	384	296	369	335	143
2007	85	482	640	724	536	701	626	258
2008	85	655	867	975	731	941	846	352
2009	85	880	1,162	1,299	984	1,252	1,131	475
2010	85	1,055	1,383	1,524	1,183	1,464	1,336	573
2011	85	1,302	1,700	1,861	1,463	1,785	1,637	710
2012	85	1,527	1,982	2,146	1,721	2,053	1,897	838
2013	85	1,743	2,248	2,405	1,970	2,295	2,139	963
2014	85	1,963	2,517	2,663	2,227	2,535	2,381	1,092
2015	85	2,171	2,765	2,893	2,470	2,746	2,601	1,215
2016	85	2,366	2,994	3,096	2,702	2,931	2,799	1,334
2017	85	2,550	3,205	3,276	2,922	3,094	2,978	1,448
2018	85	2,723	3,400	3,436	3,132	3,237	3,141	1,558
2019	85	2,732	3,369	3,323	3,163	3,113	3,074	1,583
2020	85	2,573	3,110	2,947	3,008	2,733	2,781	1,521
2021	85	2,423	2,871	2,614	2,862	2,400	2,517	1,462
2022	85	2,282	2,650	2,318	2,722	2,107	2,277	1,404
2023	85	2,149	2,446	2,056	2,589	1,850	2,060	1,349
2024	85	2,024	2,258	1,824	2,463	1,625	1,864	1,296
2025	85	1,906	2,084	1,617	2,343	1,427	1,687	1,246
2026	85	1,795	1,924	1,435	2,229	1,253	1,526	1,197
2027	85	1,691	1,776	1,272	2,120	1,100	1,381	1,150
2028	85	1,592	1,640	1,128	2,017	966	1,250	1,105
2029	85	1,499	1,514	1,001	1,918	848	1,131	1,061
2030	85	1,412	1,397	888	1,825	745	1,023	1,020
2031	85	1,330	1,290	787	1,736	654	926	980
2032	85	1,252	1,191	698	1,651	574	838	941
2033	85	1,179	1,099	619	1,570	504	758	904
2034	85	1,111	1,015	549	1,494	443	686	869
2035	85	1,046	937	487	1,421	389	621	835

Notes:

1. Unless otherwise noted, gas generation rate estimates are based on the assumption that waste accepted at the JRL is degradable. The gas generation modeling results presented in this table were based on waste accepted at the landfill that is considered degradable (i.e., an estimated percentage of nondegradable waste was removed).

2. The landfill gas generation rates were estimated with the USEPA's LandGEM Version 3.02 using waste acceptance records and projections for the JRL and the following values for methane generation rate, k ($year^{-1}$) and potential methane generation capacity, Lo (m^3/Mg):

   a. NEWSVT Landfill: k=0.06 yr^{-1} and Lo=130 m^3/Mg and NCES Landfill: k=0.08 yr^{-1} and Lo=135 m^3/Mg. These values are from calibration projects performed by Sanborn Head.

   b. SCS, Northeastern U.S. Landfills: k=0.12 yr^{-1} and Lo = 110 m^3/Mg and Crossroads - Phase 11: k=0.10 $yr^{-1}$and Lo=110 m^3/Mg. These values were included in information obtained from a memo written by David Burns of the Maine DEP to Steve Farrar of the Maine DEP entitled "West Old Town Landfill (WOTL), Gas Management System Design," dated December 19, 2003.

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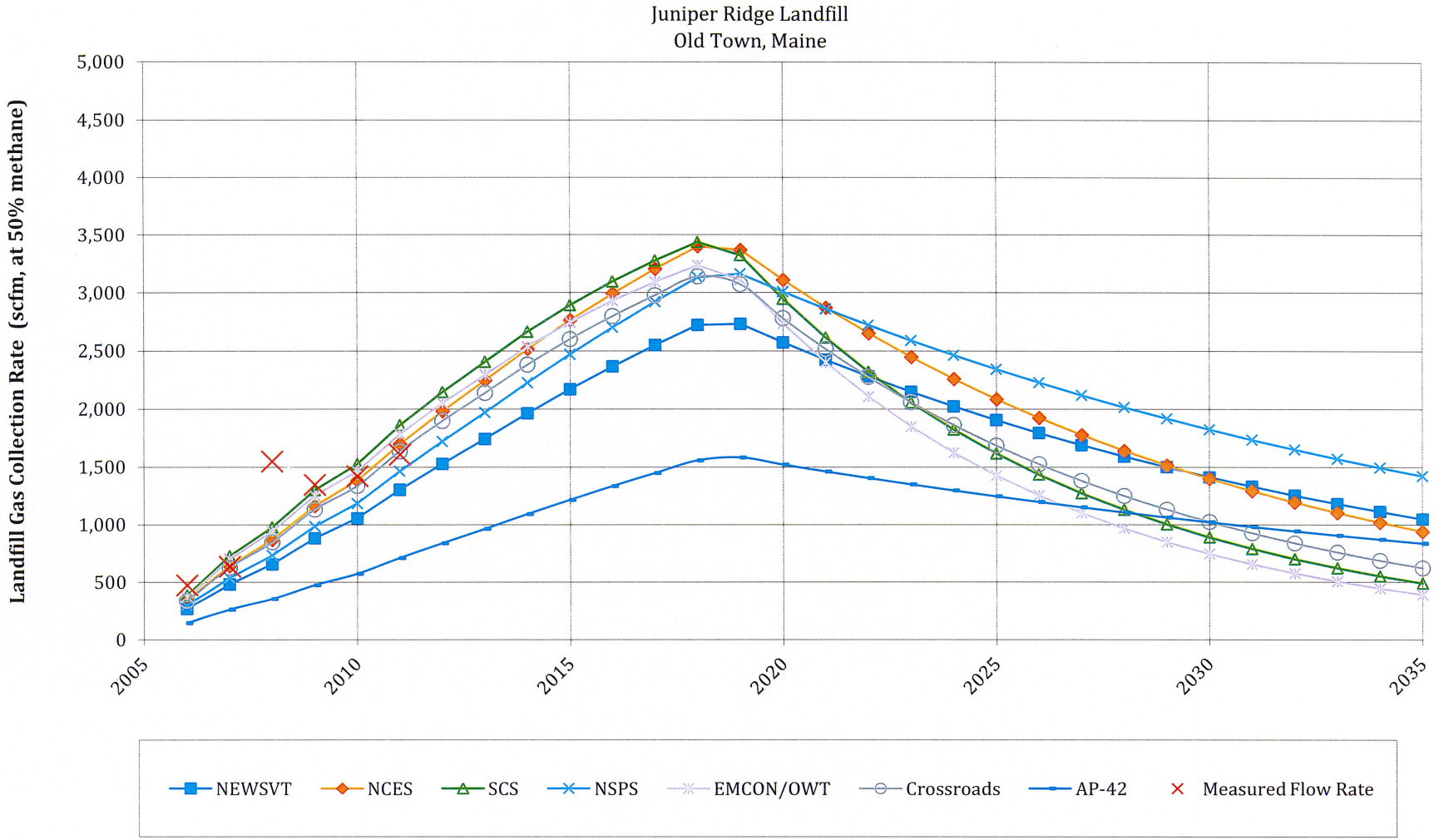
3. We assumed that with a properly designed and operated LFG extraction system and adequate intermediate and/or final cover, 85 percent of the LFG generated at the JRL is collected.

Figure C-2.
Landfill Gas Collection Rate Estimates
Modeling based on Degradable Waste Accepted
With Waste Diverted from Maine Energy



ATTACHMENT 10

SUMMARY OF ENVIRONMENTAL MONITORING PROGRAM

ATTACHMENT 11

SUMMARY TABLES 1-2.1,2-1.1, AND 3-1.1 USING AVERAGES OF THREE-YEAR WASTE TONNAGE

Table 1-2.1
Comparison of Waste Types and Percentages Before and After Proposed Amendment

	Analysis Using 3 Year Averages			
Waste Stream Disposed or Recycled at JRL	**With MEI Operating @ 3 Year Averages of MEI Related Wastes[4]**		**Estimated Future Wastes to JRL including @ 3 Year Average Minus 30,000 MSW to PERC**	
	Tons[1]	**Percent of Total**	**Tons[1]**	**Percent of Total**
Construction and Demolition Debris (CDD)	149,800	21%	149,800	22%
Front-End Process Residue (FEPR)	115,700	16%	60,500	9%
MSW Incinerator Ash	105,300	14%	55,600	8%
Oversized Bulky Wastes	99,000	14%	97,800	14%
Municipal Solid Waste (MSW) Bypass and Soft Layer	27,800	4%	24,500	4%
MSW[2]			68,500	10%
Fines for Cover	125,300	17%	125,300	18%
Other Wastes & Operation Materials[3]	98,800	14%	98,800	15%
TOTAL	721,700		680,800	

Note:

1. All tonnages have been rounded to the nearest 100 tons
2. MSW will continue to be utilized as a soft-layer application so the estimated net increase in MSW accepted at the site will be about 89,400 tons.
3. Operation materials include tire chips and gravel.
4. FEPR, MSW Incinerator ash, and MSW by-pass include 3 year average from MEI.

Table 2-1.1
Truck Traffic
Current Versus Estimated Truck Counts using Three Year Average Waste Volumes from Maine Energy

Waste Stream Disposed or Recycled at JRL	**With MEI Operating @ 3 Year Averages for MEI Related Wastes[3]**	**Estimated Future Wastes to JRL including @ 3 Year Average Minus 30,000 MSW to PERC**
Construction and Demolition Debris (CDD)	6,908	6,908
Front End Process Residue MEI[1]	1,999	0
Front End Process Residue PERC[1]	2,166	2,166
MSW Incinerator Ash[1]	3,527	1,843
Oversized Bulk Waste[1]	3,903	3,856
Municipal Solid Waste[1]	1,011	3,382
Fines for Cover	4,571	4,571
Other Wastes and Operations Material[3]	5,083	5,083
Total Loads per Year	**29,168**	**27,809**
Total Loads per Day[2]	**93**	**89**

Notes:

1. Average waste loads used in the analysis (tons/load) FEPR MEI=27.6 FEPR PERC=27.9, MSW=27.5, Ash MEI=29.5 Ash PERC 30.2, OBW 25.4.
2. Number of trailer loads per day based on a six-day week. Total loads rounded to the nearest whole truck
3. FEPR, MSW Incinerator ash, and MSW by-pass include 3 year average from MEI.

Table 3-1.1
Comparison of Weighted -Average Waste Density Using Three Year Average Volumes from Maine Energy

Waste Stream Disposed or Recycled at JRL	With MEI Operating @ 3 Year Averages for MEI Related Wastes[2]			With MEI Shut Down & 30,000 MSW going to PERC @ 3 Year Averages		
	Tons[1]	In-place Waste Density (lbs/cu yd)	Calculated Cubic Yard Consumed	Tons[1]	In-place Waste Density (lbs/cu yd)	Calculated Cubic Yard Consumed
Construction and Demolition Debris (CDD)	149,800	1,000	299,600	149,800	1,000	299,600
Front-End Process Residue (FEPR)	115,700	1,500	154,267	60,500	1,500	80,667
MSW Incinerator Ash	105,300	1,200	175,500	55,600	1,200	92,667
Oversized Bulky Wastes	99,000	800	247,500	97,800	800	244,500
Municipal Solid Waste (MSW) Bypass and Soft Layer	27,800	1,500	37,067	24,500	1,500	32,667
MSW				68,500	1,500	91,333
Fines for Cover	125,300	1,000	250,600	125,300	1,000	250,600
Other Wastes & Operation Materials[3]	98,800	1,000	197,600	98,800	1,000	197,600
TOTAL	721,700		1,362,134	680,800		1,289,634
Weighted-Average Waste Density (Tons/cu yd)		**0.53**			**0.53**	

Note: 1. All tonnages have been rounded to the nearest 100 tons.

2. FEPR, MSW, incinerator ash, and MSW by-pass waste include 3 year averages for MEI.

3. Operation materials include tire chips and gravel.