APPENDIX D: RESOLUTIONS, DOCUMENTS

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\(^1\) A copy of the full report is located in the Lyon County Environmental Office
\(^2\) A copy of the full study is located in the Lyon County Environmental Office
\(^3\) A copy of the full study is located in the Lyon County Environmental Office
RESOLUTION #
In Support of Lyon County Landfill Expansion
Joint Review of Certificate of Need
Support of 50% Regional Recycling Rate

Whereas, The Southwest Regional Solid Waste Commission is a twelve county Joint Powers Board, with its member counties located in the Southwest Minnesota.

Whereas, The Southwest Regional Solid Waste Commission provide the greatest public service benefit possible for the entire contiguous twelve (12) county area encompassed by the Counties in planning, management, and implementation of methods to deal with solid waste in Southwest Minnesota.

Whereas, Seven of the Twelve County membership of the Southwest Regional Solid Waste Commission waste goes to the Lyon County Regional Landfill.

Whereas, The Southwest Regional Solid Waste Commission at its regularly scheduled meeting held March 26, 2007 passed to jointly review with the Minnesota Pollution Control Agency Lyon County’s Certificate of Need, following requirements of Minnesota Statutes 115A.917, 116D.04, Subd.2b, and Minnesota Rule 9215.890 to 9215.940.

Whereas, The Southwest Solid Waste Administrators and the Southwest Regional Solid Waste Commission met, reviewed and discussed alternatives available to its members at their regularly scheduled meetings held in the months of May, July, September and November of 2007.

Whereas, it was found there were no feasible and prudent alternatives available during this joint review to the counties located in the Southwest Region of Minnesota other than to increase recycling.

Therefore, The Southwest Regional Solid Waste Commission supports and encourages Regional Recycling of 50% Recycling Rate (Base Rate) by 2014.

Therefore, The Southwest Regional Solid Waste Commission will organize a Leadership Group on Recycling Initiatives to meet with the Southwest Solid Waste Administrators to develop a plan to conduct regional and individual county recycling activities, programs and improvements to meet 50% Regional Recycling Rate by 2014.

Therefore, The Southwest Solid Waste Administrators will report to the newly established Leadership Group and to the Commission at their regularly scheduled meetings for their review, support and implementation.

Therefore be it Resolved, The Southwest Regional Solid Waste Commission hereby supports the expansion of the Lyon County Regional Landfill and Regional Recycling Rate of 50% by 2014.

Motion was made by Commissioner, ______________________________ and 2nd by Commissioner ______________________________ to adopt the resolution on this 28th day of January, 2008.

_________________________________________    ______________________________
Chairman,   Vice, Chairman

[Type text]
South West Region - 50 Percent Recycling Goal

Based upon the calendar year 2007 data, provided by Arlene Vee of the Minnesota Pollution Control Agency, the counties involved in the Southwest Regional Solid Waste Commission, have obtained a combined average recycling rate of 47.6 percent. The member counties’ 2008 base recycling rates range from 23.6 percent to 72.1 percent. Yard waste and source reduction credits taken by the respective counties are 7 to 8 percent.

From the survey results obtained from the southwest regional counties, there are many commonalities, but also a fair degree of differences. The following statements are based upon the returned surveys from the member counties.

Commonalities pertinent to this report include the following:

1. All counties report data from residential recycling.
2. Most counties report documented data from commercial recycling, and nearly as many report some estimated commercial recycling data.
3. Most counties have all of their incorporated communities participating in curbside residential recycling pickup.
4. All counties provide some level of recycling drop off services for their rural residents through recycling sheds, roll-off containers, or drop sites.
5. All counties provide educational programs and promotions through various venues to maintain/increase public awareness of solid waste management and recycling programs.
6. Counties who have changed to single stream recycling have seen their recycling tonnages increase. The examples cited by member counties, or other local units of government statewide, suggest increases of 30 to 50 percent, with some seeing increases of 100 percent.
7. Counties who have larger population centers with big box retailers, or businesses with their own aggressive recycling programs, appear to be able to provide larger numbers in terms of recycling levels for corrugated cardboard and other fibers.
8. Generally, high recycling rate counties also have higher reported tonnages that are generated by the commercial sector. Oftentimes, these tonnages are difficult to quantify and document because these generators are processing and marketing their own materials, without sending them through the county operated or contracted facility. Reporting by some of these businesses is sketchy at best.

Variances pertinent to this report would include the following:

1. Collection method for curbside recycling:
a. Three counties – single stream (all recyclables collected in one container)
b. Three counties – dual stream (all recyclables collected into fibers and rigid containers)
c. Six counties – multi sort (recyclables collected into numerous categories)

In general, there is no direct correlation between the member counties recycling rates and the method of collection used in the counties. Where Counties have provided recycling carts (35-96 gal.) for single stream programs, an increase in participation rates have been experienced. Those counties who have changed to single stream have experienced an increase in recyclable tonnages.

2. There is a fairly substantial difference in what materials are accepted for recycling in the various member counties. These differences may be attributed to several factors, such as who the contract haulers is, and where the materials are designated to be processed. As a rule, member counties that have their own processing facilities are often able to be more flexible as to what materials they are willing to accept. Key differences include:

   a. Types of plastic containers accepted (#1, #2, #3, #4, and #5). Some counties accept only #1 and #2 narrow necked containers, while others accept all five grades of plastic and films.
   b. Types of cardboard and paper products accepted (paperboard/boxboard, junk mail, catalogs, phone books)
   c. Glass acceptable (by various colors specifically)
   d. Non-typical materials such as light copper wire, plastic bags, pesticide containers, etc.

3. There is additional variation between the member counties as to rules and requirements involving the management of solid waste and recyclables relating to ordinances, licensing, and promotion of recycling. The following information is based upon information provided by MPCA.

   a. Seven of the twelve counties currently have ordinances requiring residents to recycle, and six also require businesses to recycle through their solid waste ordinance. In comparison to the statewide statistics, 21 of the 87 counties require residential recycling, and 20 of the 87 require business recycling.
   b. Ten of the twelve counties require licensing for MSW haulers and nine of the twelve require recyclers to be licensed. This compares to just over half of the counties in the state having these requirements in place.
   c. Six of the twelve counties have banned specific recyclables from landfills or the waste disposal system.

Relevant assessment factors that need to be considered to accomplish the goal of 50 percent recycling rate by reporting year 2011 include the following:

1. Seek out more thorough and additional information from the commercial sector in our counties – simply gathering data from those commercial entities the counties may not have reached in the past. This would likely include a commercial sector audit, as most counties have indicated this has not been performed, and those who have performed
this, have indicated it has not been totally effective. Options counties could implement which may affect recycling total could include:

a. Consider developing a waste audit program with a goal to meet with all commercial, institutional, and governmental entities along with programs to include waste haulers providing recycling services.
b. Consider ban on the disposal of recyclable materials.

2. Enhancing our residential recycling programs through activities and procedures that have been the most effective in our own member counties. This may include increased information and education, along with the possibility of adding an incentive to recycle (volume base, etc.) Options counties could implement which may affect recycling totals could include:

a. Consider development of a region wide, common recycling message that all counties could use. This would provide a consistent message no matter where residents live, but individual county programs would still need to be promoted.
b. Consider developing region wide specific material recycling program for materials such as mattresses, carpets, etc.
c. Consider a ban on the disposal of recyclable materials

3. Monitor and evaluate the effectiveness of commercial recycling in our member counties. Research the possibility of adding commercial recycling collection into our contracts for hauling of recyclables. Work with contracted haulers to include this potential source for additional recycling tonnages.

4. Obtain information from those higher percentage recycling counties on what is included in their reporting, in order to obtain more uniformity in the numbers reported. Enhancements to the annual reports could include recycling initiatives that are not being utilized in every county. Examples of this include the following:

a. Shoe recycling
b. Mattress recycling
c. An accounting of garage/yard sales
d. An accounting of Goodwill and similar collection programs
e. More accuracy in the accounting of on site waste disposal. More rural dwellers are not active farmers and may be taking advantage of professional waste collection
f. Recycle away from home initiatives
g. Education and enhancement of recycling benefits and programs in public schools and post secondary education institutions
h. Work with MPCA to refine some of the differences between “recycling” and “beneficial use.” Continue to provide dialogue as to the source of additional tonnages that are not currently “reportable.” (tree debris ground into landscape mulch, tires for fuel, etc.)

5. Continue to make progress in our county and regional recycling rates, which have generally been increasing from year to year. Attempt to determine if this is through
more recycling accomplishments, more complete reporting of recyclable tonnages, or combination of both. Envision what else can be done to continue this increase.

6. Explore educational or other mechanisms to decrease the amount of waste being generated.

Challenges looking forward:

1. Cities, who have organized collection of MSW and recyclables, have a “captive” audience. The service is provided, and their customers have a convenient way to participate. Rural residents do not have curbside, or home pickup service of recyclables. They can obtain MSW collection services from private waste haulers, but recyclable collection is through drop off sites. The breakdown of rural versus urban residents in the counties in the southwest region ranges from about 25 percent to nearly 45 percent being rural residents.

2. The value of recyclables, as can be validated by those counties who collect and market their own recyclables, is much less than it was at the peak values from the recent past. The revenue derived from the sale of some recyclable products does not cover the costs associated with the collection, processing, storage, and transporting of goods.

3. Whether we live in communities, or in rural areas, we are all facing less stability in our population base. Our population base is always changing, and more often than not, shrinking in the numbers of residents. We are seeing our collection costs continue to increase, and our population is decreasing. When we factor in the cost of collection only, we face a total recycling cost that is quite high.

4. The mix of people living in our communities and in our rural landscapes is changing more rapidly than we had seen historically. People have moved off farms into town as the farms are sold off, or become part of a larger agricultural operation. Some people move to the country for what they perceive as peace, quiet, and the freedom to do anything they want. We are also facing some various degrees and types of diversity, which can prove to be challenging in obtaining cooperation in our environmental initiatives. The barriers we face may be language, political, cultural, or educational. Some of the key challenges appear to be some individuals lack of knowledge and/or lack of concern. The issues that we in the environmental field view as significant, may not even register with some members of the general public. It is our responsibility to find a way to reach these individuals. It is possible that we are going to have to rely less on traditional education and information practices, and look at other ways to educate our residents and our businesses. It is also possible that we are going to have to do this on a more frequent basis, simply because of the changing population.

5. Some member counties feel that additional enforcement efforts may be necessary to boost recycling rates. As an example, if the burn barrel ban was initiated in the State of Minnesota, it would be necessary for member counties to assist with the enforcement of this ban. This ban would potentially add additional materials to the current recycling stream.
6. As time has passed, our society has evolved to be more consumer driven, and this society has been willing to pay for convenience. A drawback to that convenience has proven detrimental to the environment. Fast food is convenient, but we are inundated with the leftover packaging of that food. There is excessive packaging in nearly everything that we purchase, from food products to other consumer goods. More often than not, these packages are not recyclable. Until such a time as the consumer becomes aware of these problem packages, and other disposable items, the waste stream will continue to increase.

7. As a consumer driven society, we are prone to believe that we must have all the same things as our peers. This trend is obvious by the number of television sets, DVD players and VCR’s, cell phones, I-pods, and other electronic devices that we all own. The average life span of many of these consumer electronics is three to five years. The modern electronic devices are made to be replaced, not repaired, which leaves the product disposal options limited. In our rural region, there are relatively few permanent facilities which will accept consumer electronics for recycling. Without more effective product stewardship laws in place, there seems to be no end in sight for this situation.

8. The current economic downturn, and the “cost” to the consumer to dispose of some waste materials has prompted improper disposal of many of these products. Illegal dumping, on site burying, or burning of waste products is the result. It is unclear if the improper disposal of waste is an end result of a lack of education, reduced community involvement, or simply an apathetic portion of the population. For whatever reason, it is not likely that voluntary compliance will be effective if all the other educational, promotional, and incentive based plans are not implemented.

9. Misconceptions and misunderstandings prevail throughout the general public about “recycling.” There are some individuals who believe that those persons involved in “getting rich” off the value of the recyclable commodities while the others view the same materials as “garbage.” The individuals who view recycling as a “waste of time” must be better informed as to the collection, processing, and marketing of these same materials. This is no easy task, as there are still many differences as to what is and is not recyclable in each member county. Our tasks are many and varied if we are to continue our march toward our agreed upon goal of the “South West Region,” a 50 percent recycling rate by reporting year 2011.

Conclusions/Findings

1. At an earlier SWAA meeting, it was requested, as a follow up to this report, take the residential recycling tonnages from counties not utilizing single stream, and increase their tonnages by 40 percent, as a somewhat conservative increase based upon the tonnage increases in those counties who are utilizing single stream. Two of the 9 counties not utilizing single stream recycling, were not factored in, as their per capita recycling rates are already quite high. The remaining 7 counties, with the 40 percent recycling rate increase, did provide a 3,350 ton increase, which correlated to a 3 percent increase in the regional recycling rate, taking the region to a 50.63 percent recycling rate, based upon total MSW generated within the region, and based upon total recyclables accounted for within the region.
2. Yard waste credits are NOT factored in to the county and regional recycling rates.

3. Generally, counties have found their MSW tonnages have dropped, which can be tied to the downturn in the economy.

4. Based upon an informal survey/questionnaire, sent to the SWA’s earlier this year, it was felt the results from this survey should be included as additional follow up to this report, and will include the questions asked, with a summary of the responses.

a. What do you think, specifically in your county, would be the most effective tasks and/or accomplishments to provide a measurable increase in recycling tonnages/rates?
   
   i. Increased education
   ii. Increased commercial/business/school recycling
   iii. Improved efficiencies in recyclable collection systems
   iv. Improved commercial recycling enforcement
   v. Rural 24/7 locations

b. What obstacles do you think you have in your county that may be relevant in negatively impacting your recycling tonnages/rates?

   i. Apathy of constituents
   ii. Lack of staff time available to promote recycling and enforcement
   iii. Affordable competition for hauler
   iv. Commercial recycling could be better
   v. Not improving the convenience in recycling

c. Would a commercial sector audit be of use in reaching those entities who contribute to the solid waste stream?

   i. Yes, and education to the business sector
   ii. Need for collection and outlets for some materials
   iii. Maybe

d. What do you feel the Solid Waste Commission could or should do to help increase participation in recycling or assist in the administration of recycling and solid waste programs:

   i. Promote programs that do not impact existing programs
   ii. Public education
   iii. Promote programs that are working

e. Other ideas or suggestions:

   i. Consider working on developing specialty recycling programs such as mattresses or carpets
ii. The SWA meetings do provide more ideas to bring back to our respective counties

iii. Focus on specific sectors at the SWA meetings, such as commercial recycling

f. What joint/regional activities do you feel would assist you in increasing recycling or increasing the dollar value in your recycling activities?

i. Development of a regionwide recycling message that all counties would promote

ii. Joint activities such as CRT collections

iii. Joint efforts to obtain regionalized staff, such as efforts made earlier

iv. Joint programs and joint purchasing

v. Licensing for all waste haulers throughout the region

vi. Regionwide efforts and access to information in specific county recycling contracts

vii. Regionwide efforts and access to information in specific county solid waste ordinances

viii. Waste composition study
Section 8
Summary, Conclusions, and Recommendations

8.1 Summary

R. W. Beck estimates that LFG generated by the Landfill currently ranges from approximately 570 to 625 cfm. This rate will gradually increase as the Landfill expands, accelerating more so with the continuation of leachate recirculation operations. The previous sections of the report describe the analysis of the potential amount of collectible LFG, the utilization of the collected LFG for either direct utilization in an industrial process, or electricity generation, and pros and cons associated with each option.

As discussed in Section 2, R. W. Beck has completed a detailed analysis of the current and potential LFG generation from the Landfill. Based on projected waste receipts, waste types, moisture content, temperature, the Landfill's current and projected size and construction, a LFG generation model was completed both operation under primarily dry-land conditions and continued leachate recirculation operations. Based on the modeling results, operation under leachate recirculation will increase the LFG production rate 10 to 18% over the first 20 years as compared to traditional landfill operations.

Section 3 discusses typical LFGTE projects and their applicability to this study for the Landfill.

Section 4 evaluates the interest and feasibility of a LFG pipeline to Turkey Valley Farms in Marshall, Minnesota. Turkey Valley Farms was the selected industry due to its consistent annual fuel use and location. The proposed pipeline route is 12.6 miles in length. The LFG would be used in the Turkey Valley Farms' boilers as an alternative to natural gas. A pro forma was completed, and based on the proposed capital costs and operation and maintenance costs, the County would need to sell LFG to the industry for almost $20MMBtu/hr in order to break even. This is more than twice the current cost of natural gas. This cost gap is due primarily to the length of the pipeline (12.6 miles) and that the industry will only be able to use a fraction of the collectable LFG.

In Section 5, the feasibility of generating electricity with the LFG was evaluated. The following options were considered: 1) Sale to Lyon-Lincoln Electric Cooperative, 2) Sale to the City of Marshall, and 3) Working with a third party private developer. The results of the analysis indicate the cost of electricity production will be 6 cents per kWh. A study by Laidlaw Technologies, Inc. indicates that LFGTE projects should exceed 1 MW capacity and price the electricity sold at 6 cents per kWh to ensure profitability (Reinhart, 1994). This is more than the standard rate agreement Lyon-
Lincoln Cooperative provided. Follow-up conversations with Lyon-Lincoln Cooperative indicated they may be open to these purchase rates. This in turn, may present the opportunity to work with a third-party developer, if the County chooses.

Section 6 discusses the components of a GCCS and associated capital costs and annual D&M costs. A GCCS will be essential to a LFGTE project, and may eventually (though not for at least 40 years) be required under NSPS regulations. The County may wish to consider installing a GCCS within the next few years, regardless of the outcome of a LFGTE project, with the potential to receive revenue from the sale of carbon offset credits due to the destruction of methane.

Section 7 evaluates the pros and cons of each LFGTE project alternative.

8.2 Conclusions

Based on the analysis described herein, R. W. Beck offers the following conclusions concerning potential LFGTE projects at the Landfill:

1. Sufficient LFG is currently being generated to supply a LFGTE project. Leachate recirculation operations will significantly accelerate LFG production and a LFGTE project viability.

2. Of the two LFGTE alternatives that were evaluated, with the opportunity of selling the electricity at higher rates than originally offered, electric generation may be the most viable.

3. There are other LFGTE project options that should be highlighted and brought to the County’s attention.
   a. The Landfill would be able to provide a feasible energy source should an industry with high energy demand move into an area closer to the Landfill. Economic development around Lynd or Russell, Minnesota would make a direct use option significantly more attractive.
   b. There have been discussions of placing a wind energy farm near the Landfill property. Teaming with the wind energy developers may reduce the power distribution line and interconnect costs.
   c. There is the potential to receive state-issued funds from the American Recovery and Reinvestment Act of 2009 as a renewable energy project. R. W. Beck will follow the progress of this funding bill to track opportunities for the County to receive a portion of these funds.

8.3 Recommendations

Based on the above conclusions and the analysis described herein, R. W. Beck offers the following recommendations concerning the County’s LFGTE options. These recommendations should be considered in conjunction with the County’s other business, legal, policy and financial considerations:
Summary, Conclusions, and Recommendations

1. The County should attempt to negotiate with Lyon-Lincoln Electric Cooperative to obtain a higher electricity sales rate, a longer service term (15 to 20 years) and providing a portion of the interconnection costs. The Co-op has indicated they are open to this discussion, and are very interested in seeing this project come to fruition.

2. Once a County Economic Development Coordinator has been oriented, he or she should research the potential or interest for establishing an industry in Lynd or Russell.

3. Continue discussions with potential wind energy developers for the possibility of sharing the utility interconnect construction costs.
Section 1
EXECUTIVE SUMMARY

1.1 Overview

R. W. Beck was retained by Lyon County, Minnesota (County) to conduct a study of municipal solid waste (MSW) processing. The objective of the study was to provide the County with detailed operations, permitting, and planning level cost information, as well as recommendations on two waste management options: 1) MSW shredding with subsequent landfill disposal at the Lyon County Sanitary Landfill (Landfill), and 2) production of refuse-derived fuel (RDF) with subsequent transport off-site for use as fuel to generate energy. Per the County’s request, R. W. Beck also provided preliminary planning level cost information on a third option - RDF production and use as fuel on-site at the Landfill for energy recovery.

MSW shredding and RDF production would require upfront screening of delivered loads of MSW to remove any unsuitable materials (e.g., bulky waste, hazardous material or propane tanks). In addition, acceptable loads of MSW could be processed to reclaim recyclable materials (e.g., scrap metal and corrugated cardboard).

In Option 1, waste shredding with subsequent landfill disposal, select MSW would pass through a slow speed shredder to break open plastic bags and reduce the size of the waste to be landfilled. The process would be applied to residential-type MSW and organic industrial waste (e.g., Schwan’s). Minimal sorting and handling would be required on the front end to remove bulky material and recyclable material such as large pieces of corrugated cardboard. A magnet would be installed to remove any ferrous metal. The shredding of MSW, prior to disposal, accelerates the waste degradation in conjunction with leachate recirculation because it breaks open bags of MSW and increases the waste surface area. This pre-process results in recirculated leachate reaching more material, which in turn generates more landfill gas (LFG) for recovery and increases the rate of waste degradation. Once the waste has degraded, environmental impacts are significantly reduced.

In Option 2, waste is shredded and processed into RDF fluff. This processed material would then be sold to a company (or companies) as a fuel source. Landfill disposal will be required for the bypass and residual material resulting from the RDF process. Depending on the market location, the Landfill may be used for subsequent ash disposal from the energy recovery.

1.2 Waste Characterization Assumptions

For the analyses, R. W. Beck calculated the quantity of the Landfill’s incoming waste that would be suitable for both shredding and RDF production. The Landfill’s 2007
MSW tons (25,517) and 2007 industrial tons (21,902) were used for the analyses (for a total of 47,419 tons).

Certain materials are not suitable for processing, therefore the composition of the waste stream needed to be characterized so certain tons could be removed from the potential feedstock. The percentages used for the composition of the MSW tons were derived from the Greater Minnesota results from the Statewide MSW Composition Study. Those percentages were considered representative and applied to the total MSW tonnage received at the Landfill in 2007.

Industrial and institutional (I&I) waste composition percentages were calculated based on R. W. Beck's 2008 gate survey/visual waste characterization conducted at the Landfill the week of August 18, 2008. For the study, R. W. Beck staff interviewed haulers and observed loads as they were deposited at the working face of the Landfill. The driver was asked if the load was composed primarily of residential, commercial, industrial, institutional or construction and demolition (C&D) waste. If the load contained a mixture of different types of waste, the driver was asked to provide percentages. If the waste came from commercial accounts, the driver was asked what type of businesses were on the route (i.e., restaurants, office buildings, retail stores, manufacturing, animal processing, other). Lastly, the driver was asked the origin of the waste (City, Township, County, etc.). The results of the gate survey are attached in Appendix A. Those I&I percentages were considered representative and then applied to the Landfill’s 2007 industrial tons.

The results of the waste composition analyses are provided in Appendix B. Certain materials would not be considered suitable for processing and were removed from the available tons (e.g., carpet, bulky waste, household hazardous waste, electronics, etc.). Fractions of other materials may be recovered for recycling, depending on the processing option. For example, a percentage of old corrugated cardboard (OCC) could be manually removed from the waste stream on the tip floor, a portion of the ferrous metals could be removed by a magnetic separator, etc.

Based on the above, the quantity of waste available for both shredding and RDF production was estimated to be 33,600 tons the first year of operations.

1.3 Approach

The project tasks completed by R. W. Beck as part of this study are summarized below:

1. Researched shredding equipment and facilities that are currently shredding MSW or shredded MSW in the past;
2. Researched RDF and facilities that are producing RDF;
3. Determined the compatibility of MSW shredding and the production of RDF with existing and planned County programs;

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1 The Minnesota Statewide MSW Composition Study was conducted by R. W. Beck for the Solid Waste Management Coordinating Board in 1999.
Executive Summary

4. Researched solid waste permit requirements for both options;
5. Conducted greenhouse gas (GHG) emissions impact analyses for both options;
6. Estimated the effects each waste management option would have on LFG generation; and
7. Provided a financial analysis that includes estimated planning level costs to implement and operate each option, with resulting estimated revenue and/or avoided costs.

1.4 Conclusions

Based on the analysis of the two MSW management options presented in this feasibility study, MSW Shredding with Subsequent Landfilling and RDF Production (transported and sold off-site), R. W. Beck offers the following conclusions:

- From discussions with other facility operators around the country, as provided in Section 2 - Benchmarking and Background Research:
  - Shredded waste increases compaction, increases gas production, and improves the workability of waste at landfills.
  - Slow-speed, high-torque shredders are safer than high-powered shredders or tub grinders, especially when foreign objects are encountered during shredding.
  - When considering RDF production, the end-use of the fuel needs to be established. Once the end-use is identified, the RDF production facility can be designed to produce fuel consistent with the end-use specifications.
  - While RDF can be an important renewable energy source, air permitting concerns and transportation were raised by plant operators as factors that must be considered in planning RDF production. A detailed cost-benefit analysis is recommended.

- From the Landfill Gas Generation Model results of Section 5:
  - The estimated quantities of LFG generated and collected from shredding and landfilling MSW increases over time. The increase in LFG is even more significant (and happens more quickly) when leachate is recirculated through the shredded waste as opposed to in-place MSW that is not shredded.
  - RDF production significantly decreases the overall estimated quantities of LFG generated and collected since waste disposal in the Landfill is reduced over time.

- From the Greenhouse Gas Emissions Impact Analysis presented in Section 6 of this report:
  - The waste management option that would result in the greatest practical reduction of GHG emissions, compared to current Landfill operations, is waste shredding with subsequent landfilling and LFG recovery. However, it should
be noted that the estimated emission reductions from the RDF options (transporting off-site and burning on-site) are only slightly less than the shredding option.

Table 1-1 provides a side-by-side comparison of estimated costs and potential revenue for the two options. The facility/equipment capital and operating costs represent planning level cost estimates with a margin of error of plus or minus 25%. In addition to the total estimated costs, incremental costs per processed ton were also estimated using our industry experience.
# Executive Summary

## Table 1-1

Lyon County MSW Shredding vs. RDF Production Comparison of Estimated Costs

<table>
<thead>
<tr>
<th></th>
<th>MSW Shredding with Landfilling</th>
<th>RDF Production, Off-Site Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Costs</td>
<td>$2,614,580</td>
<td>$2,632,255</td>
</tr>
<tr>
<td>Equipment Costs</td>
<td>1,732,500</td>
<td>3,964,502</td>
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<tr>
<td>Permitting Costs</td>
<td>120,000</td>
<td>250,000</td>
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<tr>
<td><strong>Total Capital Cost</strong></td>
<td><strong>$4,467,580</strong></td>
<td><strong>$6,846,757</strong></td>
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<tr>
<td><strong>Annual Costs in 2018</strong></td>
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<td></td>
</tr>
<tr>
<td>Labor</td>
<td>$318,523</td>
<td>$595,998</td>
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<tr>
<td>O&amp;M</td>
<td>265,125</td>
<td>565,143</td>
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<tr>
<td>Facility Debt Service</td>
<td>209,833</td>
<td>211,219</td>
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<td>Equipment Debt Service</td>
<td>202,666</td>
<td>510,269</td>
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<tr>
<td>RDF Transportation</td>
<td>0</td>
<td>650,374</td>
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<tr>
<td><strong>Total Annual Costs</strong></td>
<td><strong>$996,548</strong></td>
<td><strong>$2,533,003</strong></td>
</tr>
<tr>
<td>Annual Recycling Revenues (^1)</td>
<td>$183,770</td>
<td>$488,030</td>
</tr>
<tr>
<td>Annual Air Space Utilization Avoided Cost (^2)</td>
<td>368,656</td>
<td>875,911</td>
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<tr>
<td>Revenue from Sale of RDF Fluff (^3)</td>
<td>0</td>
<td>913,581</td>
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<tr>
<td><strong>Total Rev &amp; Avoided Costs</strong></td>
<td><strong>$552,626</strong></td>
<td><strong>$2,277,522</strong></td>
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<tr>
<td>Annual Profit (Loss)</td>
<td>($443,922)</td>
<td>($255,481)</td>
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<tr>
<td>Incremental Cost per Processed Ton (^4)</td>
<td>($11.96)</td>
<td>($6.36)</td>
</tr>
<tr>
<td>Incremental Cost per Processed Ton (^5) w/o RDF Fluff Revenue NA</td>
<td>(29.11)</td>
<td></td>
</tr>
</tbody>
</table>

---

\(^1\) Capital costs are based on 2009 prices. Annual costs and revenues are estimates for 2018, when the processes are in full operating mode.  
\(^2\) Facility debt service is based on the capital cost estimates, assuming a 20-year loan period at 5% interest rate.  
\(^3\) Equipment debt service is based on the equipment cost estimates plus the following assumptions:  
For MSW Shredding, the material balance has an adjusted life of 12 years and the loan period is 15 years at 5% interest rate.  
For RDF Production, the material balance has an adjusted life of 10 years and the loan period is 10 years at 5% interest rate.  
\(^4\) Based on 22,860 tons of RDF fluff transported from Fannin to Fairmont, Minnesota in 2019.  
\(^5\) The recovery of recyclable materials differs between the two options based on the degree of automation used to separate the materials from the waste stream. Annual recycling revenue is based on the following assumptions:  
For MSW Shredding, the materials to be recovered include OCC, ferrous metal and mixed plastic bottles. The quantities and market price assumptions can be found in Section 3 of the report.  
For RDF Production, the materials to be recovered include OCC, ferrous metal and aluminium cans. The quantities and market price assumptions can be found in Section 4 of the report.  
\(^6\) Air space net revenue from 2018.  
\(^7\) Assumes 22,860 tons of RDF at $40 per ton based on $4.00 per MWh.  
\(^8\) Based on 40,150 tons of MSW processed in 2018.
As shown in the table, the production of RDF would require higher capital costs to construct and would require significantly higher annual costs to operate than MSW shredding. However, the RDF option is estimated to generate higher revenues due to the automated separation of recyclable materials from the MSW, as well as from the potential sale of RDF fluff.

The Landfill is the cornerstone of the County’s current waste management program and both options would realize air space utilization avoided costs because less waste would be landfilled. The MSW shredding option would optimize the use of the Landfill’s airspace and extend the life of the County’s asset. The production of RDF would provide similar benefits, but may require the County to implement waste designation to direct waste to Lyon County in order to make this option financially feasible.

As stated above, the costs presented in Table 1-1 and in this report are planning level cost estimates. More detailed financial analyses will need to be conducted if and when the County chooses to further pursue one of these MSW management options. Please note that the cost analysis does not compare the potential impact on LFG revenues between these two options.

Table 1-2 lists the benefits and drawbacks of each waste management option.

### Table 1-2

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MSW Shredding with Subsequent Landfilling</strong></td>
<td><strong>Odor control issues</strong></td>
</tr>
<tr>
<td>Simple mechanical and biological technology</td>
<td>Manual material handling on both front end and back end of system</td>
</tr>
<tr>
<td>Limited staff required to operate</td>
<td>Moderate O&amp;M costs due to excessive wear &amp; tear of shredding equipment</td>
</tr>
<tr>
<td>Reference project at scale</td>
<td>Increased net per ton costs for MSW handling and disposal</td>
</tr>
<tr>
<td>Relatively low power consumption</td>
<td></td>
</tr>
<tr>
<td>Permittable</td>
<td></td>
</tr>
<tr>
<td>No combustion on-site</td>
<td></td>
</tr>
<tr>
<td>Lower capital and operating costs</td>
<td></td>
</tr>
<tr>
<td>Increased landfill densities and airspace savings</td>
<td></td>
</tr>
<tr>
<td>Increased landfill diversion of recyclable &amp; potentially hazardous materials</td>
<td></td>
</tr>
<tr>
<td>Potential for revenue from the sale of recyclables</td>
<td></td>
</tr>
<tr>
<td>Increased landfill gas (LFG) flow rates for energy recovery</td>
<td></td>
</tr>
<tr>
<td>Compatible with County’s current solid waste management plan</td>
<td></td>
</tr>
</tbody>
</table>

1-6 R. W. Beck
1.5 Recommendations

Based on the above conclusions and the analysis described herein, R. W. Beck offers the following recommendations for Lyon County’s consideration, specific to each MSW management option. These recommendations should be considered in conjunction with the County’s other business, legal, policy and financial considerations.

1.5.1 MSW Shredding with Subsequent Landfilling

- Further evaluate the feasibility of MSW shredding if the County establishes a viable LFG-to-Energy project, to determine if the cost is justified by the increase in revenue through a cost benefit analysis.

1.5.2 RDF Production

- Initiate discussions with POET’s ethanol plant near Chancellor, South Dakota regarding the extent of their interest in RDF for boiler fuel. Issues to be addressed...
Section 1

include fuel quantities, form (e.g. pelletized, fluff), material handling, and transportation requirements.

- Arrange to visit one or more RDF plant(s). R. W. Beck recommends the RDF plant owned and operated by the City of Ames, Iowa.\(^2\) MSW is converted to RDF and is co-fired with coal to generate electricity. This facility, built in 1975, was the first municipally-operated waste-to-energy facility in the nation and is a good reference for capital, O&M costs, and lessons learned for a successful program.

Executive Summary

Background

Lyon County and three surrounding counties - Yellow Medicine, Lincoln, and Pipestone - currently rely on private vendors to provide collection and processing services for residential recyclable materials collected within the counties. The recyclable materials are collected from households at the curb, as well as at recycling sheds or drop-off sites located throughout each of the four counties.

Lyon County is interested in evaluating the options concerning the processing of residential recyclable material in the future. Specifically, the County has an interest in the feasibility of having the recyclable materials collected and processed via a single-stream system.

Purpose of Study

Lyon County chose to conduct a feasibility study to determine the economic and operational viability of a Material Recovery Facility (MRF). The County retained the services of R. W. Beck, Inc. (R. W. Beck) to conduct the study.

The goal of the feasibility study was to determine the viable options for the County to consider in the development of a MRF located in Lyon County. The study will assist the County in determining cost-effective and operationally-efficient recycling processing services. The objectives of this program are to bring about increased recycling participation, increased diversion of waste from the Lyon County Landfill, and to facilitate the marketing of recyclable products.

Study Format

R. W. Beck has described the evaluation and analysis completed for this study in the following sections of the report:

Section 1: Overview of Existing Residential Recycling Programs in Four County Region

Section 2: Target Design Capacity

---

1 The four counties currently contract for source-separated recyclable materials collection, in which each type of material is kept separate from other materials. With a single-stream collection program, all recyclable material is collected together (i.e., newspaper, plastic, aluminum and glass, are all commingled in one container).

2 A MRF is a processing facility that separates and processes collected recyclable material for sale to end-markets.
Executive Summary

Section 3: Capital Funding Requirements
Section 4: Processing Technology Requirements
Section 5: Costs Associated with Single-Stream Recycling
Section 6: Options for MRF Ownership and Operations
Section 7: Findings and Recommendations

Findings

Throughout the study, R. W. Beck analyzed two single-stream recycling collection scenarios: 1) collection of the recyclable materials manually using curbside bins, and 2) collection of the recyclable materials with fully-automated collection vehicles and wheeled carts.

In Sections 3, 4, and 5 of this study (Capital Funding Requirements, Processing Technology Requirements, and Costs Associated with Single-Stream Recycling, respectively), R. W. Beck provided planning level cost estimates for the various components of a single-stream recycling program. Table ES-1 below includes the cost estimates for capital and operations less the revenues from the sale of the recyclable materials to estimate net costs. Please note that this estimate does not include estimated collection costs.
Table ES-1
Planning Level Cost Estimates for a Single-Stream MRF

<table>
<thead>
<tr>
<th></th>
<th>Low Estimate</th>
<th>High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Capital Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing Equipment¹</td>
<td>$48,000</td>
<td>$96,000</td>
</tr>
<tr>
<td>Facility Construction²</td>
<td>113,000</td>
<td>113,000</td>
</tr>
<tr>
<td><strong>Annual Capital Total</strong></td>
<td>$161,000</td>
<td>$269,000</td>
</tr>
<tr>
<td><strong>Annual Operating Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations &amp; Maintenance³</td>
<td>$207,000</td>
<td>$470,000</td>
</tr>
<tr>
<td>Residuals Disposal⁴</td>
<td>$24,000</td>
<td>$24,000</td>
</tr>
<tr>
<td><strong>Annual Operating Total</strong></td>
<td>$231,000</td>
<td>$494,000</td>
</tr>
<tr>
<td><strong>Annual Capital + Operating Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$302,000</td>
<td>$655,000</td>
</tr>
<tr>
<td><strong>Potential Revenue⁵</strong></td>
<td>$377,670</td>
<td>$463,310</td>
</tr>
<tr>
<td>Net Revenue/Expense</td>
<td>&lt;$14,330&gt;</td>
<td>&lt;$53,690&gt;</td>
</tr>
</tbody>
</table>

¹ Processing equipment amount will depend on degree of automation and mechanization. The low estimate is based on total equipment costs of $300,000; the high estimate is based on costs of $1,400,000. The costs were amortized over 15 years at 5% interest.
² The building cost estimate of $1,406,250 is based on 18,750 feet at $75 per square foot, amortized over 20 years at 5% interest.
³ The O&M costs are based on the annual tonnages estimated for both manual collection (450 lbs/Hr/day, based on every week collection) and fully-automated collection (800 lbs/Hr/day, based on every other week collection). The low range is estimated at $45 per ton and the high range is $100 per ton.
⁴ The residuals disposal costs are based on R. W. Beck’s estimate of residuals tonnage multiplied by Lyon County’s internal tipping fee of $15 per ton.
⁵ Potential revenue is based on projected tonnages and assumptions listed in Section 5.4, including current market prices.

The above analysis reflects that the potential exists for the processing costs to be offset by the revenues from the sale of recovered materials. The addition of the landfill rebate revenue would, for the most part, ensure that the costs of processing are covered even with the selection of a highly automated processing system.

Because the collection and processing of recyclable materials in the four counties is currently provided by the private sector as a bundled service, a breakdown of collection versus processing costs on a per household basis was not available. The estimated annual costs for single-stream recycling collection are shown below in Table ES-2.
# Executive Summary

## Table ES-2
Estimated Annual Costs for Single-Stream Recycling Collection Equipment and Staff

<table>
<thead>
<tr>
<th>Annualized Capital Costs per Recycling Collection Vehicle</th>
<th>Manual Collection (Every Other Week)</th>
<th>Fully-Automated Collection (Every Other Week)</th>
<th>Manual Collection (Every Week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase Price of one Fully-Automated Collection Vehicle</td>
<td>$100,000</td>
<td>$160,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Term (years)</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Annual Vehicle Amortization Subtotal</td>
<td>$17,282</td>
<td>$27,651</td>
<td>$17,282</td>
</tr>
<tr>
<td>Labor Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Annual Salary, Including Benefits</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$45,000</td>
</tr>
<tr>
<td>Crew Size</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Labor Cost Subtotal</td>
<td>$45,000</td>
<td>$45,000</td>
<td>$45,000</td>
</tr>
<tr>
<td>Vehicle Operations &amp; Maintenance (O&amp;M) Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average O&amp;M Cost per Truck</td>
<td>$15,000</td>
<td>$24,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>O&amp;M Cost Subtotal</td>
<td>$15,000</td>
<td>$24,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>Total Annual Cost per Recycling Collection Vehicle (est.)</td>
<td>$77,282</td>
<td>$96,651</td>
<td>$77,282</td>
</tr>
<tr>
<td>Estimated Number of Vehicles Required, Including One Spare Truck</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Total Annual Cost for Collection Vehicles (est.)</td>
<td>$380,410</td>
<td>$483,255</td>
<td>$463,692</td>
</tr>
<tr>
<td>Monthly Cost per Household (est.)</td>
<td>$2.08</td>
<td>$2.61</td>
<td>$2.50</td>
</tr>
<tr>
<td>Curbside Recycling Collection Containers</td>
<td>Curbside Bins</td>
<td>Wheeled Carts (use current bins)</td>
<td>n/a</td>
</tr>
<tr>
<td>Initial Cost</td>
<td>$96,000§</td>
<td>$800,000§</td>
<td>n/a</td>
</tr>
<tr>
<td>Useful Life (years)</td>
<td>7</td>
<td>7</td>
<td>n/a</td>
</tr>
<tr>
<td>Total Estimated Annual Cost for Collection Vehicles AND Amortized Containers</td>
<td>$403,000</td>
<td>$621,500</td>
<td>n/a</td>
</tr>
<tr>
<td>Monthly Cost per Household for Collection Vehicles AND Containers (est)</td>
<td>$2.18</td>
<td>$3.36</td>
<td>$2.50</td>
</tr>
</tbody>
</table>

1. Estimates the cost of the drop-off (shed) recycling program in each county.
2. Estimated at 15% of the purchase price.
3. Based on a 50% participation rate and 1200 households collected per fully-automated vehicle, 350 HR's per manual vehicle.
4. Total annual cost divided by 10,410 HR's with curbside collection, divided by twelve.
5. 16,000 18-gallon bins at $6.00 each.
6. 16,000 64-gallon carts at $20.00 each.
Executive Summary

The estimated costs in Table ES-2 are planning level estimates. Table ES-3 below shows the current annual collection and processing costs based on the reported contract costs and estimated number of households in each county. When these costs (which include not only the curbside collection costs, but also the cost of servicing the recycling sheds) are divided by the number of households with curbside recycling, the monthly cost per household, per county, is as follows:

<table>
<thead>
<tr>
<th>Table ES-3</th>
<th>Current Collection and Processing Costs per Household</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lyon</td>
</tr>
<tr>
<td>Estimated Annual Contract Cost$</td>
<td>$138,000</td>
</tr>
<tr>
<td>Hh's with Curbside Recycling (2004 est.)</td>
<td>7.869</td>
</tr>
<tr>
<td>Current Monthly Cost per HH for Collection &amp; Processing of Recyclable Materials</td>
<td>$1.46</td>
</tr>
</tbody>
</table>

1. Source: Individual county service contracts as provided by Lyon County staff, as well as information provided by Solid Waste Administrators.
2. Source: State of Minnesota Department of Administration, Land Management Information Center, “2003 Census: City-a-County.” The number of households with curbside recycling is the sum of the number of households for each municipality in each County that has curbside recycling.

The estimated monthly cost per household for collection only of single-stream recyclable materials (from Table ES-2) ranges from $2.18 to $3.36 with the purchase of new containers, and $2.08 to $2.61 without the purchase of new containers.

Once again, these are only planning level estimates, but it does not appear that there would be any savings in switching to a single-stream recycling collection method, as compared to the reported existing recycling program costs. To determine the cost to the counties for single-stream recyclable materials collection provided by private service providers, the County or counties would need to formally request bids or negotiate with existing collection vendors. It is not certain how this pricing would compare to the estimated costs of providing this service as outlined above.

Recommendations

R. W. Beck has developed a set of recommendations for Lyon County to consider relating to the issues addressed in this study. Specifically, R. W. Beck has focused on recommendations that would have an impact on the feasibility of a single-stream MRF. These recommendations are provided in complete detail in Section 7.

1. Develop and Implement an On-going Public Education and Awareness Campaign.
Executive Summary

An important factor for any single-stream recycling program is the level of commitment municipalities dedicate toward education and awareness. R. W. Beck would recommend that the County develop and implement an on-going public education and awareness campaign to all residents of all four counties. The education should be tailored to those with existing curbside collection, as well as those in the rural areas who use the recycling sheds.

Properly educating residents on single-stream collection could have a significant impact on increasing the quantity of material recycled and reducing contamination levels, which are of major concern to any single-stream program. Contamination can affect the overall marketability of recyclable commodities to end-markets. Therefore, a consistent public education and awareness campaign geared towards all residents in all counties served would allow for minimizing contamination levels.

2. Further Evaluate Ownership and Operations Options.

Lyon County has two primary options to consider with regard to a MRF that could be used for the processing of single-stream recyclable materials. Specifically, the County could own and operate the facility or they could issue a Request for Proposals (RFP) for a services agreement in which the County would own the MRF, and in some form of a public-private partnership, develop and/or operate it with private sector involvement. Either option would serve the County’s needs. However, at this time it is premature to recommend which option would be the better alternative until the County’s scope of preferred control and comparative costs of each option are determined.

3. Gather more detailed data on the present effectiveness of the existing curbside recycling collection programs.

Due to limited data currently available on the curbside versus drop-off quantities of recyclable material collected, we recommend the County require this data be submitted by the haulers.

4. Conduct a More Detailed Cost Analysis for the Development of a County-Owned MRF.

While R. W. Beck has completed preliminary analyses specific to this issue, there is a need for more detailed analysis. We recommend the County address the following issues:

A. Analyze Costs to Develop, Construct and Equip the MRF: Section 3 of the study provides an estimate of $1.9 to $2.4 million for the capital funding requirements associated with the development and construction of a MRF. The County should further review this information to obtain a more detailed understanding of the specific costs as it applies to building a MRF on the County’s landfill property.

B. Analyze Costs to Operate and Maintain the MRF: The County should determine the extent to which it would like to be involved in the operation of the MRF. R. W. Beck would recommend that the County consider contracting with a private company to operate the MRF. The benefits include the potential...
Executive Summary

to achieve higher economies of scale (by having greater volumes from the private sector) and actual MRF operation expertise. If the County prefers to have a private company operate the MRF, R. W. Beck would recommend that the County request proposals from the private sector for a processing services agreement.

5. Analyze the Costs of Recyclable Materials Collection.

Because the current collection services are bundled, it is not clear what the collection costs are as compared to the processing costs. R. W. Beck recommends the County or counties consider developing a request for proposals for the collection of single-stream recyclable materials.

6. If major changes are required in the way recyclable materials are collected at the curb, we recommend the County form an ad hoc committee composed of representatives from each of the private haulers to address key program changes.

Because the private haulers are a vital component to recyclable materials collection in all four counties, it is imperative that the County include the haulers early in the discussion of single-stream recycling. The haulers may have to make changes to their fleet, crews, schedules, and possibly make capital purchases if automated collection is considered, and all of these things would require ample time to prepare.