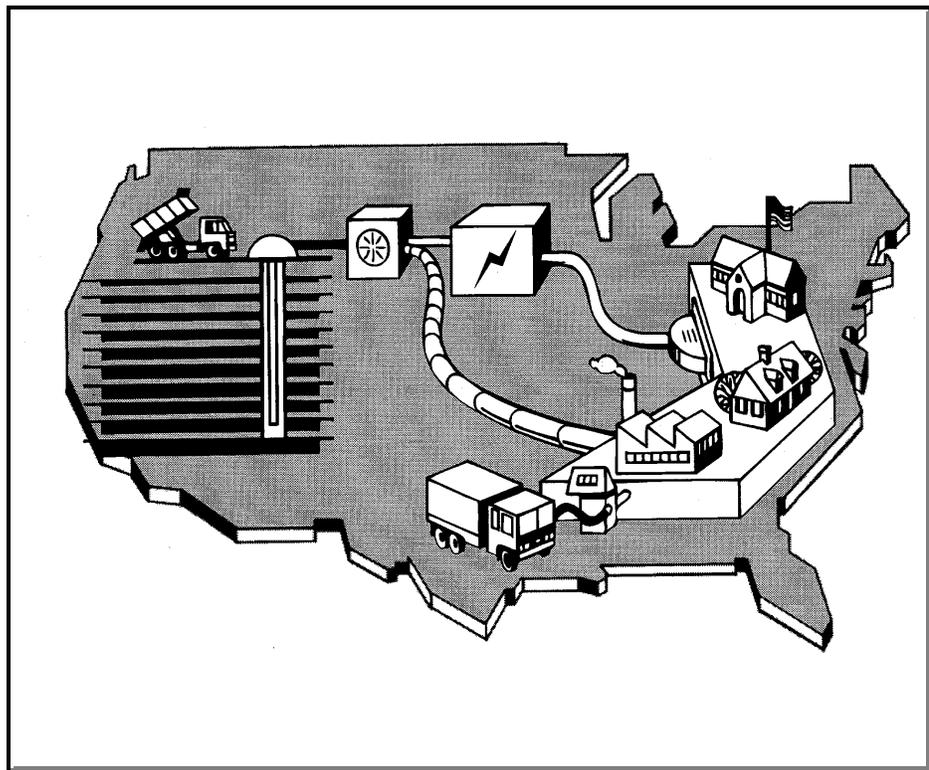




# Landfill Gas-to-Energy Project Opportunities

## Landfill Profiles for the State of Kansas



## EPA Landfill Methane Outreach Program



The EPA Landfill Methane Outreach Program, a key component of the United State's *Climate Change Action Plan*, encourages the use of landfill gas (LFG) as an energy resource. EPA assists utilities, municipal and private landfill owners and operators, tribes, and state agencies in reducing methane emissions from landfills through the development of profitable landfill energy recovery projects. Methane captured from landfills can be transformed into a cost-effective fuel source for electricity, heat, boiler and vehicular fuel, or sale to a pipeline. EPA estimates there are approximately 200 landfill methane recovery projects in the U.S. and that up to 750 landfills could install economically viable landfill energy projects.

The Landfill Methane Outreach Program includes five important components: the State Ally, Energy Ally, Industry Ally, Community Partner, and Endorser programs. EPA establishes separate alliances with state agencies, energy providers (including investor-owned, municipal and other public power utilities and cooperatives), key trade and public sector associations, members of the landfill gas development industry (including developers, engineers, equipment vendors, and others) and local communities, municipalities and landfill owner/operators through a Memorandum of Understanding (MOU). By signing the MOU, each Ally/Partner acknowledges a shared commitment to the promotion of landfill gas-to-energy recovery at solid waste landfills, recognizes that the widespread use of landfill gas will reduce emissions of methane and other gases, and commits to undertake activities to enhance development of this resource. In return, EPA agrees to provide landfill gas-to-energy project assistance and public recognition of the Allies' and Partners' participation in the program.

## Introduction

Since 1994 the U.S. EPA's Landfill Methane Outreach Program (LMOP) has participated in an ongoing effort to gather information on Municipal Solid Waste landfills (MSW). A key component of the LMOP is to provide MSW landfill owners and operators, project developers, utilities, and other potential project participants with information on MSW landfills that may offer attractive energy development opportunities. This document presents state specific landfill information, hereinafter referred to as the landfill profiles. These profiles are useful to evaluate the potential for developing landfill gas-to-energy projects (LFGTE). EPA assembled this information from state and local sources as well as various national solid waste publications, landfill owners and operators, and project developers.

The EPA has prepared a separate document to describe the methodology used to develop the state-specific landfill profiles and estimate the benefits of using LFGTE as an energy source. The document, *Landfill Gas-to-Energy Project Opportunities, Background Information on Landfill Profiles*, contains background information on gas collection and use, describes the data fields according to the five sections listed on the landfill profiles, and where applicable, illustrates calculations and default values used to derive estimates. EPA strongly recommends that users read the document prior to using the landfill profiles. Users can obtain the document by calling the LMOP hotline at 1-888-STAR-YES.

### Data Sources

- EPA-ORD Landfill Gas Utilization-Survey (Thorneloe, 1997)
- Directory and Atlas of Solid Waste Disposal Facilities (SWA, 1994)
- Implementation Guide for Landfill Gas Recovery Projects in the Northeast (SCS, 1994)
- Landfill Gas-to-Energy 1994-1995 Activity Report (SWT, 1994)
- Methane Recovery from Landfill Yearbook (GAA, 1994)
- Project developers, landfill owners, and operators
- State and local records
- Survey of Landfill Gas Generation Potential (EPRI, 1992)
- U.S. Landfill Directory (SWANA, 1992)

## Landfill Classification

To facilitate the use of available landfill information, EPA has categorized the landfills into five categories: Current Project,<sup>1</sup> Candidate Project, Shutdown, Other, and Unknown waste-in-place (WIP). These categories are based on the status of the landfill's LFGTE project(s) and WIP. The generation of methane is a function of many factors, the most critical being the amount of waste-in-place and the number of years the waste has been in the landfill. Peak methane generation occurs soon after closure; therefore, the longer the landfill has been closed, the less attractive it becomes for methane recovery. Based on the general timing of peak methane generation, EPA assumes that landfills that ceased accepting waste prior to 1993 have a low probability of generating enough methane to make a gas recovery project economical. Consequently, landfills need to be operating in 1993 to be considered as having a Candidate Project.

### Landfill Categorizes

#### Current Project:

- Landfill with operational LFGTE project or landfill with LFGTE project under construction.

#### Candidate Project:

- Landfill with a potential or planned LFGTE utilization project; or
- Landfill is currently operating or closed after 1993; and has more than 1,000,000 tons of municipal solid waste-in-place.<sup>2</sup>

#### Shutdown:

- Landfill with shutdown LFGTE project.

#### Other:

- Landfill has less than 1,000,000 tons of municipal solid waste-in-place with no current or planned LFGTE project.

#### Unknown WIP:

- Landfill with insufficient data to determine the waste-in-place.

## State Summary

State-specific landfill profile information is summarized in three exhibits. Exhibit 1 presents a summary of the state-specific potential for LFG utilization energy by landfill category. Exhibit 2 summarizes the emissions avoided by fossil fuel displacement for electricity generation and direct use projects. Exhibit 3 presents an index of the state-specific MSW landfills, referenced by category, landfill name and general characteristics.

<sup>1</sup> Current projects illustrate the wide range of successful project development options.

<sup>2</sup> By modeling the relationship between WIP and methane generation, a cut-off of 1,000,000 tons of WIP was established; landfills having at least 1,000,000 tons of WIP are considered candidate landfills.



## Exhibit 1: Kansas MSW Landfill Summary

| Category    | No. of Landfills | Est. Capacity Potential |                         | Est. CH4 Generation (mmscf/d) | Methane Reduction (tons/yr) |         | CO2 Equivalent of CH4 Reduction (tons/yr) |         |
|-------------|------------------|-------------------------|-------------------------|-------------------------------|-----------------------------|---------|---|---------|
|             |                  | Electricity (MW)        | Gas Capacity (mmBtu/hr) |                               | Potential                   | Current | Potential                                 | Current |
|             |                  |                         |                         |                               |                             |         |   |         |
| Current     | 1                | 11                      | 107                     | 3                             | 19,808                      | 15,418  | 415,960                                   | 323,770 |
| Candidate   | 8                | 37                      | 375                     | 12                            | 69,342                      | 0       | 1,456,174                                 | 0       |
| Other       | 19               | 15                      | 144                     | 5                             | 26,555                      | 0       | 557,651                                   | 0       |
| Unknown WIP | 6                |                         |                         |                               |                             |         |   |         |
| Total       | 34               | 63                      | 625                     | 20                            | 115,704                     | 15,418  | 2,429,784                                 | 323,770 |

## Exhibit 2: Potential Kansas Emissions Avoided by Fossil Fuel Displacement

| Category    | Electricity Generation Project |         |             |               |       |             | Direct Use Project |         |             |               |       |             |
|-------------|--------------------------------|---------|-------------|---------------|-------|-------------|--------------------|---------|-------------|---------------|-------|-------------|
|             | CO2 (tons/yr)                  |         |             | SO2 (tons/yr) |       |             | CO2 (tons/yr)      |         |             | SO2 (tons/yr) |       |             |
|             | Coal                           | Oil     | Natural Gas | Coal          | Oil   | Natural Gas | Coal               | Oil     | Natural Gas | Coal          | Oil   | Natural Gas |
| Current     | 84,453                         | 69,315  | 46,608      | 534           | 446   | 0           | 59,648             | 48,956  | 32,919      | 543           | 285   | 0           |
| Candidate   | 295,189                        | 242,278 | 162,911     | 1,866         | 1,559 | 0           | 208,813            | 171,384 | 115,241     | 1,900         | 999   | 1           |
| Other       | 115,234                        | 94,579  | 63,597      | 729           | 609   | 0           | 79,966             | 65,633  | 44,132      | 728           | 382   | 0           |
| Unknown WIP |                                |         |             |               |       |             |                    |         |             |               |       |             |
| Total       | 494,876                        | 406,172 | 273,116     | 3,128         | 2,614 | 0           | 348,427            | 285,974 | 192,292     | 3,171         | 1,666 | 2           |

### Exhibit 3: Index of Landfills in Kansas

| Category    | Landfill Name           | WIP                                 |                                     |                                     | Landfill Operating in 1998          | LFG Collected            | LFG Utilization Project             | Status of LFGTE Project |
|-------------|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------|
|             |                         | <2.5 million tons                   | 2.5 to 4 million tons               | >4 million tons                     |                                     |                          |                                     |                         |
| Current     | Brooks Site LF          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Operational             |
| Candidate   | Cowley County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Candidate   | Crawford County         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Candidate   | Finney County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Candidate   | Forest View SLF         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Candidate   | Harvey County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Candidate   | Johnson County LF       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Planned                 |
| Candidate   | Reno County LF          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Candidate   | Wheatland LF            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Planned                 |
| Other       | Allen County LF         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Barton County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | City of Olathe LF       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Coffey County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Ford County LF          | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Kiowa County LF         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Marion County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Mitchell County LF      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | N.R. Hamm LF            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Phillips County LF      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Pratt County LF         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Resource Recovery LF    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Rooks County LF         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Russell County LF       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Salina County LF        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Seward County LF        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Shawnee County LF       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Trego County LF         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Other       | Wichita County LF       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Unknown WIP | Butler County LF        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Unknown WIP | Chanute LF              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Unknown WIP | Clay County LF          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Unknown WIP | Graham County LF        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Unknown WIP | Oak Grove (Deffenbaugh) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |
| Unknown WIP | Refuse Service Inc. LF  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Unknown                 |

**A. GENERAL LANDFILL INFORMATION**

|                            |                 |                                       |            |
|----------------------------|-----------------|---------------------------------------|------------|
| Landfill Owner:            | City of Wichita | Annual Acceptance Rate (tons):        | 555,170    |
| Landfill Owner Type:       | Public          | Year Annual Acceptance Rate Reported: | 1994       |
| Alternative Landfill Name: |                 | Design Capacity (tons):               |            |
| City:                      | Wichita         | Acres Currently Landfilled (acres):   |            |
| County:                    | Sedgwick        | Average Depth (feet):                 |            |
| State:                     | KS              | Waste-in-Place (tons):                | 10,737,610 |
| Year Open:                 | 1976            | 1998 Waste-in-Place (tons):           | 11,760,240 |
| Year Closed:               | 2002            |                                       |            |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 3.43 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        | 4.0  |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

## Current Utilization:

|                                |                   |
|--------------------------------|-------------------|
| Utilization System Status:     | Operational       |
| Utilization System Type:       | Boiler            |
| Utilization System Start Year: | 1998              |
| Electric Utility Provider(s):  |                   |
| Natural Gas Provider(s):       |                   |
| Energy Purchaser(s):           | High Plains Corp. |

Capacity: Electricity Generation Project (MW) OR Direct Use Project (mmBtu/hr)

|                               |    |     |
|-------------------------------|----|-----|
| Estimated Potential Capacity: | 11 | 107 |
| Current Capacity:             |    | 83  |
| Planned Capacity:             |    |     |

Utilities in County: Butler Rural El Coop Assn Inc; Kansas Gas & Electric Company; Mount Hope Muni Electric System

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | Current                   |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 19,808                                |                      | 15,418                    |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 415,960                               |                      | 323,770                   |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 84,453                                | 534                  | 59,648                    | 543                  |
| <i>Fuel Oil:</i>                                      | 69,315                                | 446                  | 48,956                    | 285                  |
| <i>Natural Gas:</i>                                   | 46,608                                | 0                    | 32,919                    | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator      |
|------------------|----------------|------------------------|
| Contact Name:    |                |                        |
| Mailing Address: |                | 4100 North West Street |
| Phone Number:    |                | 316-268-4087           |
| Fax Number:      |                | 316-268-4002           |

\* *Italicized indicates values estimated by EPA.*

December 5, 1998

State: KS

Page:

1



**A. GENERAL LANDFILL INFORMATION**

|                            |               |                                       |           |
|----------------------------|---------------|---------------------------------------|-----------|
| Landfill Owner:            | Cowley County | Annual Acceptance Rate (tons):        | 32,978    |
| Landfill Owner Type:       | Public        | Year Annual Acceptance Rate Reported: | 1994      |
| Alternative Landfill Name: |               | Design Capacity (tons):               |           |
| City:                      |               | Acres Currently Landfilled (acres):   |           |
| County:                    | Cowley        | Average Depth (feet):                 |           |
| State:                     | KS            | Waste-in-Place (tons):                | 1,095,150 |
| Year Open:                 | 1983          | 1998 Waste-in-Place (tons):           | 1,173,374 |
| Year Closed:               | 1997          |                                       |           |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 0.72 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

|                                |                                     |    |                               |
|--------------------------------|-------------------------------------|----|-------------------------------|
| Current Utilization:           |                                     |    |                               |
| Utilization System Status:     | Unknown                             |    |                               |
| Utilization System Type:       | Unknown                             |    |                               |
| Utilization System Start Year: |                                     |    |                               |
| Electric Utility Provider(s):  |                                     |    |                               |
| Natural Gas Provider(s):       |                                     |    |                               |
| Energy Purchaser(s):           |                                     |    |                               |
| Capacity:                      | Electricity Generation Project (MW) | OR | Direct Use Project (mmBtu/hr) |
| Estimated Potential Capacity:  | 2                                   |    | 22                            |
| Current Capacity:              |                                     |    |                               |
| Planned Capacity:              |                                     |    |                               |

Utilities in County: Butler Rural El Coop Assn Inc; Caney Valley El Coop Assn Inc; Kansas Gas & Electric Company; So

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | Current                   |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 4,152                                 |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 87,188                                |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 17,364                                | 110                  | 12,503                    | 114                  |
| <i>Fuel Oil:</i>                                      | 14,252                                | 92                   | 10,262                    | 60                   |
| <i>Natural Gas:</i>                                   | 9,583                                 | 0                    | 6,900                     | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator                    |
|------------------|----------------|--------------------------------------|
| Contact Name:    |                | Ronnie Thiel, Engineering Department |
| Mailing Address: |                | PO Box 464                           |
| Phone Number:    |                | 316-221-4066                         |
| Fax Number:      |                | 316-221-5448                         |

\* *Italicized indicates values estimated by EPA.*

December 5, 1998

State: KS

Page:

2



**A. GENERAL LANDFILL INFORMATION**

|                            |                    |                                       |           |
|----------------------------|--------------------|---------------------------------------|-----------|
| Landfill Owner:            | Oak Grove Landfill | Annual Acceptance Rate (tons):        | 37,706    |
| Landfill Owner Type:       | Public             | Year Annual Acceptance Rate Reported: | 1994      |
| Alternative Landfill Name: |                    | Design Capacity (tons):               |           |
| City:                      |                    | Acres Currently Landfilled (acres):   |           |
| County:                    | Crawford           | Average Depth (feet):                 |           |
| State:                     | KS                 | Waste-in-Place (tons):                | 1,661,063 |
| Year Open:                 | 1976               | 1998 Waste-in-Place (tons):           | 1,661,064 |
| Year Closed:               | 1994               |                                       |           |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 0.84 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

## Current Utilization:

|                                |         |
|--------------------------------|---------|
| Utilization System Status:     | Unknown |
| Utilization System Type:       | Unknown |
| Utilization System Start Year: |         |
| Electric Utility Provider(s):  |         |
| Natural Gas Provider(s):       |         |
| Energy Purchaser(s):           |         |

Capacity: Electricity Generation Project (MW) OR Direct Use Project (mmBtu/hr)

|                               |   |    |
|-------------------------------|---|----|
| Estimated Potential Capacity: | 3 | 26 |
| Current Capacity:             |   |    |
| Planned Capacity:             |   |    |

Utilities in County: Arcadia Munic Elec Dept; Arma Electric Dept; Girard Munic Light & Water Dept; Kansas Gas & Ele

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | Current                   |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 4,873                                 |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 102,333                               |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 20,521                                | 130                  | 14,674                    | 134                  |
| <i>Fuel Oil:</i>                                      | 16,843                                | 108                  | 12,044                    | 70                   |
| <i>Natural Gas:</i>                                   | 11,325                                | 0                    | 8,099                     | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator       |
|------------------|----------------|-------------------------|
| Contact Name:    |                | Dan Swyers, Deffenbaugh |
| Mailing Address: |                | 18181 West 53rd St.     |
| Phone Number:    |                | 913-631-3300            |
| Fax Number:      |                |                         |

\* *Italicized indicates values estimated by EPA.*

December 5, 1998

State: KS

Page:

3



**A. GENERAL LANDFILL INFORMATION**

|                            |               |                                       |           |
|----------------------------|---------------|---------------------------------------|-----------|
| Landfill Owner:            | Finney County | Annual Acceptance Rate (tons):        | 50,846    |
| Landfill Owner Type:       | Public        | Year Annual Acceptance Rate Reported: | 1994      |
| Alternative Landfill Name: |               | Design Capacity (tons):               |           |
| City:                      | Garden City   | Acres Currently Landfilled (acres):   | 12        |
| County:                    | Finney        | Average Depth (feet):                 |           |
| State:                     | KS            | Waste-in-Place (tons):                | 1,339,005 |
| Year Open:                 | 1986          | 1998 Waste-in-Place (tons):           | 1,582,461 |
| Year Closed:               | 2012          |                                       |           |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 0.82 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

|                                |                                     |    |                               |
|--------------------------------|-------------------------------------|----|-------------------------------|
| Current Utilization:           |                                     |    |                               |
| Utilization System Status:     | Unknown                             |    |                               |
| Utilization System Type:       | Unknown                             |    |                               |
| Utilization System Start Year: |                                     |    |                               |
| Electric Utility Provider(s):  |                                     |    |                               |
| Natural Gas Provider(s):       |                                     |    |                               |
| Energy Purchaser(s):           |                                     |    |                               |
| Capacity:                      | Electricity Generation Project (MW) | OR | Direct Use Project (mmBtu/hr) |
| Estimated Potential Capacity:  | 3                                   |    | 26                            |
| Current Capacity:              |                                     |    |                               |
| Planned Capacity:              |                                     |    |                               |

Utilities in County: Garden City Muni Utils; Lane-Scott Electric Coop Inc; Pioneer Electric Coop Inc; Victory Electric Co

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | <i>Current</i>            |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 4,757                                 |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 99,893                                |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 20,521                                | 130                  | 14,324                    | 130                  |
| <i>Fuel Oil:</i>                                      | 16,843                                | 108                  | 11,757                    | 69                   |
| <i>Natural Gas:</i>                                   | 11,325                                | 0                    | 7,905                     | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator      |
|------------------|----------------|------------------------|
| Contact Name:    | Max Morgan     | Jim Spencer            |
| Mailing Address: | 504 St. John   | 2745 North Ohio Street |
| Phone Number:    | 316-272-3500   | 316-838-4920           |
| Fax Number:      |                |                        |

\* *Italicized indicates values estimated by EPA.*

**A. GENERAL LANDFILL INFORMATION**

|                            |                      |                                       |            |
|----------------------------|----------------------|---------------------------------------|------------|
| Landfill Owner:            | Waste Management Inc | Annual Acceptance Rate (tons):        | 288,262    |
| Landfill Owner Type:       | Private              | Year Annual Acceptance Rate Reported: | 1994       |
| Alternative Landfill Name: |                      | Design Capacity (tons):               |            |
| City:                      | Kansas City          | Acres Currently Landfilled (acres):   | 82         |
| County:                    | Wyandotte            | Average Depth (feet):                 |            |
| State:                     | KS                   | Waste-in-Place (tons):                | 9,935,717  |
| Year Open:                 | 1976                 | 1998 Waste-in-Place (tons):           | 10,881,981 |
| Year Closed:               | 2007                 |                                       |            |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 3.20 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

|                                |                                     |    |                               |
|--------------------------------|-------------------------------------|----|-------------------------------|
| Current Utilization:           |                                     |    |                               |
| Utilization System Status:     | Unknown                             |    |                               |
| Utilization System Type:       | Unknown                             |    |                               |
| Utilization System Start Year: |                                     |    |                               |
| Electric Utility Provider(s):  |                                     |    |                               |
| Natural Gas Provider(s):       |                                     |    |                               |
| Energy Purchaser(s):           |                                     |    |                               |
| Capacity:                      | Electricity Generation Project (MW) | OR | Direct Use Project (mmBtu/hr) |
| Estimated Potential Capacity:  | 10                                  |    | 100                           |
| Current Capacity:              |                                     |    |                               |
| Planned Capacity:              |                                     |    |                               |

Utilities in County: Kansas City Bd of Pub Util; Kansas City Power & Light Co; Western Area Power Admin; Western R

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | <i>Current</i>            |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 18,509                                |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 388,685                               |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 78,928                                | 499                  | 55,737                    | 507                  |
| <i>Fuel Oil:</i>                                      | 64,780                                | 417                  | 45,746                    | 267                  |
| <i>Natural Gas:</i>                                   | 43,559                                | 0                    | 30,760                    | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator |
|------------------|----------------|-------------------|
| Contact Name:    | Kevin O'Brien  | Kevin O'Brien     |
| Mailing Address: | PO Box 11116   | PO Box 11116      |
| Phone Number:    | 816-521-3118   | 816-521-3118      |
| Fax Number:      |                |                   |

\* *Italicized indicates values estimated by EPA.*

**A. GENERAL LANDFILL INFORMATION**

|                            |               |                                       |           |
|----------------------------|---------------|---------------------------------------|-----------|
| Landfill Owner:            | Harvey County | Annual Acceptance Rate (tons):        | 38,993    |
| Landfill Owner Type:       | Public        | Year Annual Acceptance Rate Reported: | 1994      |
| Alternative Landfill Name: |               | Design Capacity (tons):               |           |
| City:                      | Newton        | Acres Currently Landfilled (acres):   | 80        |
| County:                    | Harvey        | Average Depth (feet):                 |           |
| State:                     | KS            | Waste-in-Place (tons):                | 1,511,401 |
| Year Open:                 | 1976          | 1998 Waste-in-Place (tons):           | 1,655,345 |
| Year Closed:               | 2002          |                                       |           |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 0.84 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

## Current Utilization:

|                                |         |
|--------------------------------|---------|
| Utilization System Status:     | Unknown |
| Utilization System Type:       | Unknown |
| Utilization System Start Year: |         |
| Electric Utility Provider(s):  |         |
| Natural Gas Provider(s):       |         |
| Energy Purchaser(s):           |         |

Capacity: Electricity Generation Project (MW) OR Direct Use Project (mmBtu/hr)

|                               |   |    |
|-------------------------------|---|----|
| Estimated Potential Capacity: | 3 | 26 |
| Current Capacity:             |   |    |
| Planned Capacity:             |   |    |

Utilities in County: Ark Valley Elec Coop Assn Inc; Butler Rural El Coop Assn Inc; Flint Hills Rural E C A Inc; Kansas G

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | <i>Current</i>            |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 4,865                                 |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 102,155                               |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 20,521                                | 130                  | 14,649                    | 133                  |
| <i>Fuel Oil:</i>                                      | 16,843                                | 108                  | 12,023                    | 70                   |
| <i>Natural Gas:</i>                                   | 11,325                                | 0                    | 8,085                     | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator |
|------------------|----------------|-------------------|
| Contact Name:    | Craig Simons   | Craig Simons      |
| Mailing Address: | PO Box 687     | PO Box 687        |
| Phone Number:    | 316-284-6806   | 316-284-6806      |
| Fax Number:      |                |                   |

\* *Italicized indicates values estimated by EPA.*

December 5, 1998

State: KS

Page:

6



**A. GENERAL LANDFILL INFORMATION**

|                            |         |                                       |            |
|----------------------------|---------|---------------------------------------|------------|
| Landfill Owner:            |         | Annual Acceptance Rate (tons):        | 887,869    |
| Landfill Owner Type:       | Private | Year Annual Acceptance Rate Reported: | 1994       |
| Alternative Landfill Name: |         | Design Capacity (tons):               |            |
| City:                      | Shawnee | Acres Currently Landfilled (acres):   | 487        |
| County:                    | Johnson | Average Depth (feet):                 |            |
| State:                     | KS      | Waste-in-Place (tons):                | 11,097,340 |
| Year Open:                 | 1979    | 1998 Waste-in-Place (tons):           | 12,330,376 |
| Year Closed:               | 2004    |                                       |            |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 3.57 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

|                                |                                     |    |                               |
|--------------------------------|-------------------------------------|----|-------------------------------|
| Current Utilization:           |                                     |    |                               |
| Utilization System Status:     | Planned                             |    |                               |
| Utilization System Type:       | High Btu                            |    |                               |
| Utilization System Start Year: | 1998                                |    |                               |
| Electric Utility Provider(s):  |                                     |    |                               |
| Natural Gas Provider(s):       |                                     |    |                               |
| Energy Purchaser(s):           | Williams Pipeline                   |    |                               |
| Capacity:                      | Electricity Generation Project (MW) | OR | Direct Use Project (mmBtu/hr) |

|                               |    |     |
|-------------------------------|----|-----|
| Estimated Potential Capacity: | 11 | 112 |
| Current Capacity:             |    |     |
| Planned Capacity:             |    |     |

Utilities in County: DeSoto Elec Light Dept; Gardner Muni Elec Syst; Kansas City Power & Light Co; Western Area Pow

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | <i>Current</i>            |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   |                                       | 20,651               |                           | 0                    |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     |                                       | 433,665              |                           | 0                    |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 88,399                                | 559                  | 62,187                    | 566                  |
| <i>Fuel Oil:</i>                                      | 72,554                                | 467                  | 51,040                    | 297                  |
| <i>Natural Gas:</i>                                   | 48,786                                | 0                    | 34,320                    | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator |
|------------------|----------------|-------------------|
| Contact Name:    |                | Bob Vantuyl       |
| Mailing Address: |                | PO Box 3220       |
| Phone Number:    |                | 913-631-3300      |
| Fax Number:      |                |                   |



**A. GENERAL LANDFILL INFORMATION**

|                            |             |                                       |           |
|----------------------------|-------------|---------------------------------------|-----------|
| Landfill Owner:            | Reno County | Annual Acceptance Rate (tons):        | 97,933    |
| Landfill Owner Type:       | Public      | Year Annual Acceptance Rate Reported: | 1994      |
| Alternative Landfill Name: |             | Design Capacity (tons):               |           |
| City:                      | Hutchinson  | Acres Currently Landfilled (acres):   | 100       |
| County:                    | Reno        | Average Depth (feet):                 |           |
| State:                     | KS          | Waste-in-Place (tons):                | 2,624,021 |
| Year Open:                 | 1976        | 1998 Waste-in-Place (tons):           | 2,873,928 |
| Year Closed:               | 2006        |                                       |           |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 1.15 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

|                                |                                     |    |                               |
|--------------------------------|-------------------------------------|----|-------------------------------|
| Current Utilization:           |                                     |    |                               |
| Utilization System Status:     | Unknown                             |    |                               |
| Utilization System Type:       | Unknown                             |    |                               |
| Utilization System Start Year: |                                     |    |                               |
| Electric Utility Provider(s):  |                                     |    |                               |
| Natural Gas Provider(s):       |                                     |    |                               |
| Energy Purchaser(s):           |                                     |    |                               |
| Capacity:                      | Electricity Generation Project (MW) | OR | Direct Use Project (mmBtu/hr) |
| Estimated Potential Capacity:  | 4                                   |    | 36                            |
| Current Capacity:              |                                     |    |                               |
| Planned Capacity:              |                                     |    |                               |

Utilities in County: Ark Valley Elec Coop Assn Inc; Haven Light & Water Power Plant; Ninnescah Rural E C A Inc; Sedg

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | <i>Current</i>            |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 6,667                                 |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 139,999                               |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 28,414                                | 180                  | 20,076                    | 183                  |
| <i>Fuel Oil:</i>                                      | 23,321                                | 150                  | 16,477                    | 96                   |
| <i>Natural Gas:</i>                                   | 15,681                                | 0                    | 11,079                    | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner      | Landfill Operator |
|------------------|---------------------|-------------------|
| Contact Name:    | George Sugars       | George Sugars     |
| Mailing Address: | 206 West 1st Street | 206 West 1st      |
| Phone Number:    | 316-694-2976        | 316-694-2976      |
| Fax Number:      |                     |                   |

\* *Italicized indicates values estimated by EPA.*

**A. GENERAL LANDFILL INFORMATION**

|                            |                   |                                       |           |
|----------------------------|-------------------|---------------------------------------|-----------|
| Landfill Owner:            | American Disposal | Annual Acceptance Rate (tons):        | 228,263   |
| Landfill Owner Type:       | Private           | Year Annual Acceptance Rate Reported: | 1994      |
| Alternative Landfill Name: |                   | Design Capacity (tons):               |           |
| City:                      | Columbus          | Acres Currently Landfilled (acres):   |           |
| County:                    | Cherokee          | Average Depth (feet):                 |           |
| State:                     | KS                | Waste-in-Place (tons):                | 1,514,421 |
| Year Open:                 | 1976              | 1998 Waste-in-Place (tons):           | 1,658,654 |
| Year Closed:               |                   |                                       |           |

**B. LANDFILL GAS COLLECTION**

|   |      |
|---|------|
| Estimated Methane Generation (mmscf/d):                 | 0.84 |
| LFG Collection System Status:                           |      |
| Current LFG Collected (mmscf/d):                        |      |
| Collection and Treatment System Required Under NSPS/EG: | No   |

**C. LANDFILL GAS UTILIZATION**

|                                |                                     |    |                               |
|--------------------------------|-------------------------------------|----|-------------------------------|
| Current Utilization:           |                                     |    |                               |
| Utilization System Status:     | Planned                             |    |                               |
| Utilization System Type:       | Reciprocating Engine                |    |                               |
| Utilization System Start Year: |                                     |    |                               |
| Electric Utility Provider(s):  |                                     |    |                               |
| Natural Gas Provider(s):       |                                     |    |                               |
| Energy Purchaser(s):           | Empire Electric                     |    |                               |
| Capacity:                      | Electricity Generation Project (MW) | OR | Direct Use Project (mmBtu/hr) |
| Estimated Potential Capacity:  | 3                                   |    | 26                            |
| Current Capacity:              |                                     |    |                               |
| Planned Capacity:              |                                     |    |                               |

Utilities in County: Empire District Elec Co; Sekan Electric Coop Assn Inc; Twin Valley Electric Coop Inc; Western Area

**D. ENVIRONMENTAL BENEFITS OF UTILIZATION**

|   | <i>Potential</i>                      |                      | <i>Current</i>            |                      |
|---|---------------------------------------|----------------------|---------------------------|----------------------|
| <i>Methane Reduction (tons/yr):</i>                   | 4,869                                 |                      | 0                         |                      |
| <i>CO2 Equivalent of CH4 Reduction (tons/yr):</i>     | 102,257                               |                      | 0                         |                      |
| <i>Emissions Avoided by Fossil Fuel Displacement:</i> | <i>Electricity Generation Project</i> |                      | <i>Direct Use Project</i> |                      |
|   | <i>CO2 (tons/yr)</i>                  | <i>SO2 (tons/yr)</i> | <i>CO2 (tons/yr)</i>      | <i>SO2 (tons/yr)</i> |
| <i>Coal:</i>  | 20,521                                | 130                  | 14,664                    | 133                  |
| <i>Fuel Oil:</i>                                      | 16,843                                | 108                  | 12,035                    | 70                   |
| <i>Natural Gas:</i>                                   | 11,325                                | 0                    | 8,093                     | 0                    |

**E. CONTACT INFORMATION**

|                  | Landfill Owner | Landfill Operator |
|------------------|----------------|-------------------|
| Contact Name:    |                |                   |
| Mailing Address: |                |                   |
| Phone Number:    |                | 316-479-6131      |
| Fax Number:      |                |                   |

\* *Italicized indicates values estimated by EPA.*

December 5, 1998

State: KS

Page:

9

