City of Albuquerque Integrated Waste Management Plan

Table of Contents for Technical Appendices I

This page intentionally left blank.

A. Applicable City Council Polices

Adopted 2002 – 2006 Vision Statement, Five Year Goals, and Desired Community Conditions

Vision Statement:

Albuquerque is a thriving high desert community of distinctive cultures coming together to create a sustainable future.

GOAL STATEMENT	DESIRED COMMUNITY or CUSTOMER CONDITIONS
Human and Family Development *People of all ages have the opportunity to participate in the community and economy and are well sheltered, safe, healthy, and educated.*	1. Residents are literate and educated and engaged in the educational processes. 2. All levels of government, educational institutions, and the community collaborate to ensure that youth achieve desired educational outcomes. 3. Residents are healthy and have access to health care, mental health care, and recreation. 4. Safe, decent and affordable housing is available. 5. The community collaborates to support the responsible social development of youth. 6. Families are healthy and stable. 7. Senior citizens live and function in optimal environments.
Public Safety *Citizens are safe, feel safe and secure, and have trust and shared responsibility for maintaining a safe environment.*	1. Residents feel safe in their neighborhoods, schools, and the community. 2. Residents are safe from crimes against persons and property. 3. Drivers, cyclists, and pedestrians operate knowledgeably, safely, and courteously, so that travel on city streets is safe. 4. Residents, including youth, and public safety agencies work together to prevent crime and respond to life safety issues in order to create a safe community. 5. Domestic animals are responsibly cared for and provided safe and healthy home environments. 6. The community is prepared to respond to emergencies, natural disasters, catastrophic acts and other events that threaten the health and safety of the public.
Public Infrastructure *Ensure that all existing communities are adequately and efficiently served with well planned, coordinated, and maintained sewer, storm, water and road systems and an integrated multi-modal regional transportation system. Ensure that new development is efficiently integrated into existing infrastructures and that the costs are balanced with the revenues generated.*	1. A reliable water system meets health and safety standards 2. Wastewater systems meet quality standards. 3. The storm water systems protect lives and property. 4. Technological infrastructure is accessible to all. 5. Residents have safe and affordable transportation options that meet the public's needs. 6. The street system is well designed and maintained.
Sustainable Community Development *Guide growth to protect the environment and the community's economic vitality and create a variety of livable, sustainable communities throughout Albuquerque.*	1. Parks, open space, recreation facilities, and public trails are available, accessible, and strategically located, designed and maintained. 2. Neighborhoods with civic and commercial destinations within walking distance are an available choice. 3. Medium to high-density neighborhoods that contribute to a more compact urban form are an available choice. 4. The downtown area is vital, active, safe, and accessible.

Environmental Protection and Enhancement *Protect and enhance Albuquerque's places and natural environment — its mountains, river, Bosque, volcanoes, arroyos, clean air and underground water supply.*	1. Air, land, and water systems protect health and safety. 2. Water resources are sustainably managed, conserved & protected to provide a long term supply & drought reserve. 3. Solid wastes are produced no faster than natural systems and technology can process them. 4. Open Space, Bosque, the River and Mountains are preserved and protected. 5. Residents participate in caring for the environment and conserving natural resources.
Economic Vitality *Achieve a vital, diverse, and sustainable economy in which businesses and residents have opportunities for success.*	1. The economy is diverse and broad-based. 2. The economy is vital, prosperous and consistent with local and regional resources. 3. There are abundant, competitive career oriented employment opportunities.
Community and Cultural Engagement *Residents are fully and effectively engaged in the life and decisions of the community to:* • *promote and enhance our pride, cultural values and resources; and,* • *ensure that Albuquerque's community institutions are effective, accountable and responsive.*	1. Residents are active participants in civic and public affairs. 2. Residents participate in community organizations and sporting and cultural events. 3. Residents are well informed of current community conditions. 4. Residents appreciate, foster, and respect Albuquerque's arts and cultures.
Governmental Excellence and Effectiveness *Government is ethical and accountable; every element of government contributes effectively to meeting public needs.*	ELECTED AND APPOINTED OFFICIALS 1. Leaders work together for the good of the community. 2. Leaders cooperate and coordinate with the other governments in the MRCOG region. 3. Government and its leaders are responsive to changing community and customer conditions. ALL LEVELS OF GOVERNMENT 4. Customers conveniently access city services and officials. 5. Customers can participate in their government by accessing information about services, policies, community conditions, regulations, etc. INTERNAL SERVICES 6. Financial assets are maximized and protected, and analyzed and reported accurately, understandably, and usefully. 7. City assets are protected while responding fairly to inappropriate City actions. 8. Products, services, and materials are obtained efficiently, fairly, and in a timely manner. 9. City services, operations, and finances are measured and audited, as needed, and meet customer needs. 10. Competent, well-trained motivated employees contribute to the achievement of City goals and objectives. 11. The work environment for employees is healthy, safe and productive. 12. City staff is empowered with information and have information processing capacity. 13. Rights of way are obtained and managed and their use maximized for the public's benefit with fair compensation for use. 14. City real property is effectively obtained and managed in the public's interests, & disposed of when public purpose has changed. 15. City fixed assets, property, and infrastructure meet City goals and objectives.

B. Landfill Life Calculation

from Gordon Environmental, Inc.

- Assume base waste acceptance rate from City of Albuquerque at approximately 450,000 tons / year or 1,200 tons / day, 7 days / week, 365 days / year
- Assume 2 % compounded annual increase in waste acceptance rate
- Assume in – place waste density of 1,200 pounds / cubic yard
- Conclusion – Phases I, II, and III (395 acres) become filled by about March, 2037

C. Municipal Solid Waste (MSW) Disposed Tons from City

DISPOSED TONNAGES (A)	
TYPE / LOCATION	**FY 2008 TOTAL TONS**
1 / Commercial	
Commercial	202,691
Roll–Off	14,506
Sub – Total	**217,197**
2 / Residential	
Automated	163,313
W & L / Large Item	5,242
Sub – Total	**168,555**
3 / Transfer Stations / Convenience Centers	
Montessa Park	17,150
Don Reservoir	9,355
Eagle Rock	30,580
Sub – Total	**57,085**
4 / Other	
Animal Control	160
City Departments	11,892
Intermediate Proc. Facility	2,793
Sub – Total	**14,845**
CERRO COLORADO LANDFILL SUB – TOTAL	**457,682**
5 / Waste Management (B) **- Residential** **- Commercial** **- Sub – Total**	 34,488 14,782 **49,270**
TOTAL TONS DISPOSED	**506,952**

(A) Attributable to City of Albuquerque

(B) City of Albuquerque tons disposed at Waste Management landfill in Rio Rancho

D. Construction and Demolition (C & D) Debris

1.0 Overview

The quantities of construction and demolition (C & D) debris being generated in the Albuquerque area on an annual basis will vary depending on economic cycles of building, reconstruction, and deconstruction. Typical C & D materials include brick, concrete, asphalt roofing materials, gypsum wall board, tree remains (e.g., stumps), and vegetative matter from clearing of land.

2.0 Current Conditions

2.1 Regional Facilities Permitted for C&D Debris Disposal

As of August 2008, six landfills in the Albuquerque metropolitan area were authorized by the New Mexico Environment Department / Solid Waste Bureau (NMED / SWB) to accept C & D debris for disposal (see **Table 1**). Of these six landfills, at least one facility (Cerro Colorado Landfill) has used a portion of the C & D debris for on-site road construction. At the present time, based on a review of information obtained from NMED / SWB files and questions posed to each landfill operator, attempts are being made to determine if it is possible to estimate quantities of C & D debris being generated within the jurisdictional limits of Albuquerque.

2.2 Additional C&D Materials in the Albuquerque Metropolitan Area

Generation and recycling of C & D debris in the Albuquerque area also occurs, but the activities are not subject to regulatory reporting. For example, when C&D debris is managed as a resource (and not a waste), beginning with generation and through recycling, information regarding these steps is not subject to mandatory reporting to NMED / SWB. Additional information regarding C & D recycling activities would be especially helpful in establishing an ongoing database and exploring options for coordinating the activities of local / regional recycling stakeholders, including the City of Albuquerque Solid Waste Management Department (COA / SWMD).

3.0 Opportunities

As shown on **Table 1**, up to 200,000 tons / year of C & D materials are disposed in the two landfills located in Bernalillo County. This rate of C & D generation illustrates the potential for improving the recycling and beneficial use of C & D materials. Evaluation of C & D recycling alternatives will require additional information pertaining to specific material types and quantities. In addition, information regarding the geographic location of generators would assist in planning future recovery strategies.

There are two items that should to be addressed early on in the C & D recycling planning process. Both items are related to the Southwest Landfill located in Bernalillo County. The Southwest Landfill is an operating landfill that is permitted by NMED / SWB to accept C & D material for disposal, and Bernalillo County has also approved a

Special Use Permit for the facility. Although the Cerro Colorado Landfill (CCLF) is also permitted by NMED / SWB to dispose of C & D material, the County's Special Use Permit precludes CCLF from disposing of C & D debris. It is unknown if the County's Special Use Permit (and restrictions) also extend to C & D recycling. Additional information regarding this issue needs to be obtained and reviewed.

Assuming COA attains a resolution with Bernalillo County regarding the C & D issues noted above, the subject of where a C & D recycling processing facility would be located also requires further investigation. While ample space may be available on land near the current CCLF operation owned by the COA, there may be other locations and relevant factors that merit consideration, especially in view of potentially competing program, policy, facility, and infrastructure priorities identified by the Integrated Waste Management Plan. Furthermore, the City may benefit from evaluating partnership opportunities with private sector companies having experience with recycling facility operations, financing, and end user markets.

TABLE 1: REGIONAL C & D DEBRIS DISPOSAL SUMMARY 2006 – 2007				
FACILITY	**YEAR**	**DISPOSED TONS (1)**	**% OF TOTAL WASTE DISPOSED AT FACILITY**	**COMMENTS**
Cerro Colorado Landfill	2006	40,618	7 %	C&D disposal data represents a combination of C&D and MSW
	2007	40,283	7 %	C&D disposal data represents a combination of C&D and MSW
Rio Rancho Sanitary Landfill	2006	129,820	37 %	
	2007	101,608	32 %	
Sandoval County Landfill	2006	175,304	89 %	
	2007	157,344	72 %	
Southwest Landfill (2)	2006	225,974	100 %	376 tons MSW and 10 tons scrap tires delivered to site and transported to Cerro Colorado Landfill for disposal
	2007	156,702	100 %	358 tons MSW delivered to site and transported to Cerro Colorado Landfill for disposal
Torrance County / Bernalillo County Landfill	2006	3,642	17 %	
	2007	4,986	19 %	
Valencia Regional Landfill & Recycling Facility	2006	0	0 %	
	2007	9,675	28 %	

Notes:

(1) C & D debris includes steel, glass, brick, concrete, asphalt roofing materials, pipe, gypsum wallboard and lumber from the construction or destruction of a structural project, as well as rocks, soil, tree remains, trees and other vegetative matter that normally results from land clearing activities (20 NMAC 9.1 Section 105.T).

(2) Permitted for C & D debris disposal only.

Source of Data: New Mexico Environment Department / Solid Waste Bureau, 2006 and 2007 Annual Reports

E. Recycling by City for Fiscal Year 2008

RECYCLED TONS FY 2008	
DESCRIPTION	**TONS**
1 / MATERIALS HANDLED AT CITY'S INTERMEDIATE PROCESSING FACILITY (IPF)	
Newspaper	5,531
Cardboard	1,810
Office Paper	63
Phone Books	108
#1 PET	168
#2 HDPE	66
#2 HDPE Mixed	85
Tin	152
Aluminum	45
Glass	40
Sand Glass	18
Super Mix	5,725
Mixed Paper	3
SUB – TOTAL (1)	**13,814**
2 / RECOVERED ORGANIC & GREEN WASTES	
Bedding (manure)	3,397
Green Waste	1,538
Commercial Green Waste	758
SUB – TOTAL (2)	**5,693**
3 / OTHER RECOVERED MATERIALS	
Commercial Roll–off	65
White Goods	628
White Goods (Transfer Stations)	1,404
Office Recycling	87
Electronic Waste	499
Christmas Trees	104
Multi–family and Miscellaneous (A)	255
Commingled Drop–off (A)	5,338
Glass Drop–off	2,156
Drop–off Overflow (A)	201
SUB – TOTAL (3)	**4,943**
TOTAL DIVERTED TONS	**24,450**

(A) Material tonnages from identified sources under # 3 are included in sub–total for # 1 but listed for illustrative purposes under # 3.

F. Residential Rate Elements

ELEMENTS OF MONTHLY RESIDENTIAL RATE	
SERVICE RATE ELEMENT	**CHARGE / $**
1 / Weekly Refuse Collection	8.18
2 / Weekly Recycling Collection	1.89
3 / Environmental Services	
- Household Hazardous Waste	.22
- Dead Animal Pickup	.03
- Bonds / Characterization Study	.24
- Old Landfill Monitoring – Methane Gas	.09
- Clean – up of Old Landfills	.10
4 / Clean City (Graffiti Removal + Weeds & Litter Removal)	No Charge
5 / Two + Electronic Waste Recovery Events Per Year	No Charge
6 / Large Item Pickup (unlimited)	No Charge
7 /Two Green Waste Pickups Per Year	No Charge
8 / Landfill Disposal	No Charge
TOTAL MONTHLY RESIDENTIAL RATE	**$ 10.75 + variable fuel charge & taxes**

G. Population Projections

CITY OF ALBUQUERQUE POPULATION PROJECTIONS		
YEAR	**ANNUAL GROWTH RATE**	**POPULATION**
2005		498,716
2006	3%	513,769
2007	3%	529,277
2008	3%	545,252
2009	3%	561,710
2010	3%	578,665
2011	2.6%	593,886
2012	2.6%	609,508
2013	2.6%	625,540
2014	2.6%	641,995
2015	2.6%	658,882
2016	2.2%	673,409
2017	2.2%	688,256
2018	2.2%	703,430
2019	2.2%	718,939
2020	2.2%	734,790
2021	1.9%	748,587
2022	1.9%	762,643
2023	1.9%	776,964
2024	1.9%	791,553
2025	1.9%	806,416
2026	1.7%	820,014
2027	1.7%	833,841
2028	1.7%	847,901
2029	1.7%	862,198
2030	1.7%	876,736

Source / Bureau of Business and Economic Research, UNM.
Growth rates are for Bernalillo County – is assumed City will grow at same rates.

H. Disposed Waste Projections

CITY OF ALBUQUERQUE DISPOSAL PROJECTIONS	
YEAR	**DISPOSED TONS**
2005	506,952
2006	522,161
2007	537,825
2008	553,960
2009	570,579
2010	587,696
2011	602,976
2012	618,654
2013	634,739
2014	651,242
2015	668,174
2016	682,874
2017	697,897
2018	713,251
2019	728,943
2020	744,979
2021	759,134
2022	773,558
2023	788,255
2024	803,232
2025	818,493
2026	832,408
2027	846,559
2028	860,950
2029	875,586
2030	890,471

(A) Base tonnage of 506,952 (2005) was calculated by adding 457,682 tons sent to City's landfill and 49,270 tons sent to Waste Management landfill.

(B) Assumes recycling stays at current levels.

I. Estimated Quantities of Recyclables Available from Residential Sector (See Appendix II – A)

J. Estimated Quantities of Recyclables Available from Institutional / Commercial / Industrial (ICI) Sector

MATERIAL TYPE	ANNUAL GENERATED TONNAGE	PERCENT OF WASTE STREAM BY WEIGHT
Food	33,869	14.6%
Composite Paper	28,997	12.5%
Uncoated Corrugated Cardboard	26,214	11.3%
Composite Organic	21,110	9.1%
Other Miscellaneous Paper	13,455	5.8%
Newspaper	11,135	4.8%
Composite Plastic	10,207	4.4%
Film Plastic	9,279	4.0%
Other Ferrous	9,047	3.9%
White Ledger	8,351	3.6%
Textiles	5,104	2.2%
Leaves and Grass	5,104	2.2%
Special Waste	4,872	2.1%
Magazines and Catalogs	4,872	2.1%
Paper Bags	3,712	1.6%
Tin / Steel Cans	3,248	1.4%
Composite Glass	3,248	1.4%
Colored Glass Bottles and Containers	3,016	1.3%
Rock, Soil and Fines	3,016	1.3%
Lumber	2,784	1.2%
Prunings and Trimmings	2,552	1.1%
Other Non – Ferrous	2,320	1.0%
HDPE Containers	2,320	1.0%
Clear Glass Bottles and Containers	2,088	0.9%
Computer Paper	2,088	0.9%
Household Hazardous Waste	2,088	0.9%
Miscellaneous Plastic Containers	1,856	0.8%
Other Office Paper	1,392	0.6%
Colored Ledger Paper	1,392	0.6%
Composite Construction and Demolition Debris	696	0.3%
Aluminum Cans	696	0.3%
Phone Books and Directories	696	0.3%
PET Containers	464	0.2%
Gypsum Board	232	0.1%
Manures	232	0.1%
Asphalt Paving	232	0.1%
Concrete	232	0.1%
Mixed Residue	232	0.1%

Note – % composition by material type based on data from Fresno, CA

K. Disposal Services / Operations / Facilities in Albuquerque Region

Summary of Waste Management Facilities Permitted by NMED / SWB Bernalillo, Sandoval, Torrance and Valencia Counties

Bernalillo County (9)

FACILITY	FACILITY TYPE	OWNERSHIP [1]	PERMIT DATE, DURATION
Albuquerque Composting Facility	Composting	Municipal (ABCWUA)	8/05/99, 20 years
Cerro Colorado Int. Proc. Facility (IPF)	Recycling	Municipal (COA)	8/15/99, 20 years
Don Reservoir Convenience Center	Transfer Station	Municipal (COA)	8/24/00, 20 years
Eagle Rock Convenience Center	Transfer Station	Municipal (COA)	8/7/00, 20 years
East Mountain Transfer Station	Transfer Station	Municipal (Bernalillo County)	12/02/02, 20 years
Montessa Park Convenience Center	Transfer Station	Municipal (COA)	5/11/98, 20 years
Cerro Colorado Landfill	Landfill	Municipal (COA)	6/22/00, 20 years
Southwest Landfill	Landfill	Private (Southwest Landfill, LLC)	11/14/07, 10 years
Stericycle Infectious Waste Proc. & Trans. Fac.	Processing	Private (Stericycle, Inc.)	7/15/94

Sandoval County (2)

FACILITY	FACILITY TYPE	OWNERSHIP [1]	PERMIT DATE, DURATION
Sandoval County Landfill	Landfill	Municipal (Sandoval County)	6/22/00, 20 years
Rio Rancho Sanitary Landfill	Landfill	Private (WMNM)	12/18/98, 10 years [2]

Torrance County (2)

FACILITY	FACILITY TYPE	OWNERSHIP (1)	PERMIT DATE, DURATION
Keers Asbestos Landfill	Special Waste Landfill	Private (Keers Environmental)	10/16/07, 10 years
Torrance County/Bernalillo County Landfill	Landfill	Municipal (EVSWA & Bernalillo County)	6/18/97, 20 years

Valencia County (3)

FACILITY	FACILITY TYPE	OWNERSHIP (1)	PERMIT DATE, DURATION
Los Lunas Transfer Station	Transfer Station	Municipal (City of Los Lunas)	11/17/99, 20 years
Magdalena C & D Landfill (3)	Landfill	Municipal (Village of Magdalena)	8/7/00, 20 years
Valencia Regional LF & Recy. Facility	Landfill	Private (WMNM)	11/20/06, 10 years

Notes:

1. Ownership Abbreviations:

ABCWUA – Albuquerque Bernalillo County Water Utility Authority
COA – City of Albuquerque
EVSWA – Estancia Valley Solid Waste Authority
WMNM – Waste Management of New Mexico, Inc.

2. Permit Renewal Application submitted, Public Hearing completed 6/2/08

3. Facility has not yet opened

Details Regarding Regional Solid Waste Management Facilities

Preface: The information presented below includes facilities located in Bernalillo, Sandoval, Torrance and Valencia Counties that have been issued a Permit by the New Mexico Environment Department / Solid Waste Bureau.

Bernalillo County – Nine (9) Permitted Facilities

- 1 - Composting
- 1 - Recycling
- 4 - Transfer Stations
- 2 – Landfills
- 1 – Processing

FACILITY INFORMATION	PERMIT INFORMATION
Albuquerque Composting Facility 7401 Access Rd. NW Albuquerque, NM 87102 Phone: (505) 836-8713 Authorized Materials: • GM	Owner: Albuquerque Bernalillo County Water Utility Authority Operator: Albuquerque Bernalillo County Water Utility Authority Solid Waste Facility Permit: SW 97-01(P) Permit Type: Composting Facility Permit Date: August 5, 1999 Permit Duration: 20 years
Cerro Colorado Intermediate Processing Facility 18000 Cerro Colorado SW Albuquerque, NM 87121 Phone: (505) 857-8440, 761-8326 Authorized Materials: • For Recycling/Diversion: AL, CC, G, HHW, JM, MP, N, PL. T, WG	Owner: City of Albuquerque Operator: City of Albuquerque Solid Waste Facility Permit: OP1990-03SW Permit Type: Processing Facility Permit Date: August 15, 1999 Permit Duration: 20 years
Don Reservoir Convenience Center 114th Street SW and Sunset Gardens Road Bernalillo County, NM Phone: (505) 857-8440 Fax: (505) 857-8333 Authorized Materials: • For Disposal: MSW • For Recycling/Diversion: GM, HHW	Owner: City of Albuquerque Operator: City of Albuquerque Solid Waste Facility Permit: OP1990-05TS Permit Type: Transfer Station Permit Date: August 24, 2000 Permit Duration: 20 years
Eagle Rock Convenience Center 6301 Eagle Rock Ave. NE Albuquerque, NM Phone: (505) 857-8440, 761-8326 Fax: (505) 857-8333 Authorized Materials: • For Disposal: MSW • For Recycling/Diversion: EW, GM, WG	Owner: City of Albuquerque Operator: City of Albuquerque Solid Waste Facility Permit: SWB 02-04 (P) Permit Type: Transfer Station Permit Date: December 2, 2002 Permit Duration: 20 years

Abbreviations and Descriptions of Authorized Materials

For Disposal: MSW (Municipal Solid Waste); ASB (Asbestos); ASH (Ash); CSR (Chemical Spill Residue); ISW (Industrial Solid Waste); OFF (Offal); SLM (Sludge - Municipal); SLO (Sludge - Other); PCS (Petroleum Contaminated Soils); TFCW (Treated Formerly Characteristic Waste); C & D (Construction and Demolition Debris), OCD (Oil & Conservation Division Waste)

For Recycling/Diversion: AL (Aluminum); BI (Bicycles); C (Cardboard); EW (Electronic Waste); G (Glass); GM (Green Material); HHW (Household Hazardous Waste [could include car batteries, paint cans, propane tanks, etc.); JM (Junk Mail), M (Metal); MP (Mixed Paper); N (Newspaper); PL (Plastic); T (Tires); WG (White Goods)

Bernalillo County (continued)

FACILITY INFORMATION	PERMIT INFORMATION
East Mountain Transfer Station 711 State Highway 333 Tijeras, NM 87509-7306 Phone: (505) 281-9110 Authorized Materials: • For Disposal: MSW, GM • For Recycling/Diversion: GM	Owner: Bernalillo County Operator: Bernalillo County Solid Waste Facility Permit: SWM-011002 Permit Type: Transfer Station Permit Date: December 2, 2002 Permit Duration: 20 years
Montessa Park Convenience Center 3512 Los Picaros SE Albuquerque, NM Phone: (505) 857-8440, 761-8326 Authorized Materials: • For Disposal: MSW • For Recycling/Diversion: BI, HHW	Owner: City of Albuquerque Operator: City of Albuquerque Solid Waste Facility Permit: SWM-010222 Permit Type: Transfer Station Permit Date: December 2, 2002 Permit Duration: 20 years
Cerro Colorado Landfill 18000 Cerro Colorado SW Albuquerque, NM 87121 Phone: (505) 761-8300 Authorized Materials: • For Disposal: MSW, CSR, ISW, OFF, PCS, SLM, TFCW • For Recycling/Diversion: GM	Owner: City of Albuquerque Operator: City of Albuquerque Solid Waste Facility Permit: SWM-010221 Permit Type: Landfill Permit Date: June 22, 2000 Permit Duration: 20 years
Southwest Landfill 5816 Pajarito Rd SW Albuquerque, NM 87121 Phone: (505) 242-2020 Authorized Materials: • For Disposal: Construction and Demolition Debris	Owner: Southwest Landfill, Inc. Operator: Southwest Landfill, Inc. Solid Waste Facility Permit: SWM-010136 Permit Type: Landfill Permit Date: November 14, 2007 Permit Duration: 10 years
Stericycle Infectious Waste Processing and Transfer Facility 1920 First St. NW Albuquerque, NM Phone: Authorized Materials: • For Processing: Infectious Waste	Owner: Stericycle, Inc. Operator: Stericycle, Inc Solid Waste Facility Permit: SWM-010137 Permit Type: Special Waste Processing & Transfer for Infectious Waste Permit Date: March 11, 2008 Permit Duration: 10 years

Abbreviations and Descriptions of Authorized Materials

For Disposal: MSW (Municipal Solid Waste); ASB (Asbestos); ASH (Ash); CSR (Chemical Spill Residue); ISW (Industrial Solid Waste); OFF (Offal); SLM (Sludge - Municipal); SLO (Sludge - Other); PCS (Petroleum Contaminated Soils); TFCW (Treated Formerly Characteristic Waste); C & D (Construction and Demolition Debris), OCD (Oil & Conservation Division Waste)
For Recycling/Diversion: AL (Aluminum); BI (Bicycles); C (Cardboard); EW (Electronic Waste); G (Glass); GM (Green Material); HHW (Household Hazardous Waste [could include car batteries, paint cans, propane tanks, etc.); JM (Junk Mail), M (Metal); MP (Mixed Paper); N (Newspaper); PL (Plastic); T (Tires); WG (White Goods)

Sandoval County – Two (2) Permitted Facilities

- 2 Landfills

FACILITY INFORMATION	PERMIT INFORMATION
Rio Rancho Sanitary Landfill 33rd Ave. & Northern Blvd. Rio Rancho, NM 87174 Phone: (505) 892-2055 Fax: (505) 892-2057 Authorized Materials: • For Disposal: MSW ASH, CSR, ISW, OFF, PCS, SLM, SLO, TFCW	Owner: Waste Management of New Mexico, Inc. Operator: Waste Management of New Mexico, Inc. Solid Waste Facility Permit: SWM-231402 Permit Type: Landfill Permit Date: December 18, 1998 Permit Duration: 10 years
Sandoval County Landfill 2708 Iris NE (corner of Iris and Idalia Roads) Rio Rancho, NM 87144 Phone: (505) 867-0814 Fax: (505) 867-0815 Authorized Materials: • For Disposal: MSW, PCS, SLM • For Recycling/Diversion: GM	Owner: Sandoval County Operator: Sandoval County Solid Waste Facility Permit: SWM-050304 Permit Type: Landfill Permit Date: June 17, 2005 Permit Duration: 20 years

Torrance County – Two (2) Permitted Facilities

- 2 Landfills

FACILITY INFORMATION	PERMIT INFORMATION
Torrance County/Bernalillo County Regional Landfill c/o Estancia Valley Solid Waste Authority P.O. Box 736, 515 Allen Street Estancia, NM 87016 Phone: (505) 384-4270 Fax: (505) 384-3062 Authorized Materials: For Disposal: MSW, PCS For Recycling/Diversion: M, T, WG	Owner: Estancia Valley Solid Waste Authority and Bernalillo County Operator: Estancia Valley Solid Waste Authority Solid Waste Facility Permit: SW 97-04(P) Permit Type: Landfill Permit Date: June 18, 1997 Permit Duration: 20 years
Keers Asbestos Landfill Highway 55, 14 Miles South of Mountainair Mountainair, NM Phone: (505) 847-2917 Authorized Materials: For Disposal: Asbestos Waste	Owner: Keers Environmental Operator: Keers Environmental Solid Waste Facility Permit: Permit Type: Landfill Permit Date: October 16, 2007 Permit Duration: 10 years

Abbreviations and Descriptions of Authorized Materials

For Disposal: MSW (Municipal Solid Waste); ASB (Asbestos); ASH (Ash); CSR (Chemical Spill Residue); ISW (Industrial Solid Waste); OFF (Offal); SLM (Sludge - Municipal); SLO (Sludge - Other); PCS (Petroleum Contaminated Soils); TFCW (Treated Formerly Characteristic Waste); C & D (Construction and Demolition Debris), OCD (Oil & Conservation Division Waste)
For Recycling/Diversion: AL (Aluminum); BI (Bicycles); C (Cardboard); EW (Electronic Waste); G (Glass); GM (Green Material); HHW (Household Hazardous Waste [could include car batteries, paint cans, propane tanks, etc.); JM (Junk Mail), M (Metal); MP (Mixed Paper); N (Newspaper); PL (Plastic); T (Tires); WG (White Goods)

Valencia County – Three (3) Permitted Facilities

- 1 Transfer Station
- 2 Landfills

FACILITY INFORMATION	PERMIT INFORMATION
Los Lunas Transfer Station 7480 Main St. NW (State Highway 6) Los Lunas, NM, 87031 Phone: (505) 839-3840 Fax: (505) 352-3580 Authorized Materials: • For Disposal: MSW • For Recycling/Diversion: AL, C, GM, HHW, N, M, PL, WG	Owner: City of Los Luna Operator: City of Los Lunas Solid Waste Facility Permit: 0132013TS Permit Type: Transfer Station Permit Date: November 17, 1999 Permit Duration: 20 years
Magdalena C & D Landfill ½ Mile North of Magdalena Magdalena, NM 8782 Phone: Not open yet Fax: Not open yet Authorized Materials: • For Disposal: Construction and Demolition Debris	Owner: Village of Magdalena Operator: Facility is not open yet Solid Waste Facility Permit: SWM-281402 Permit Type: Landfill Permit Date: August 7, 2000 Permit Duration: 20 years
Valencia Regional Landfill and Recycling Facility Mystic Mountain Road, 6 mile south of NM State Highway 6 Valencia County, NM Phone: (505) 892-2055 Fax: (505) 892-2057 Authorized Materials: • For Disposal: MSW, CSR, ISW, OFF, PCS, SLM, SLO, TFCW, C&D, OCD	Owner: Waste Management of New Mexico, Inc. Operator: Waste Management of New Mexico, Inc. Solid Waste Facility Permit(s): SWM-013229, SWM-013230(SP) Permit Type: Landfill Permit Date: November 20, 2006 Permit Duration: 10 years

Abbreviations and Descriptions of Authorized Materials

For Disposal: MSW (Municipal Solid Waste); ASB (Asbestos); ASH (Ash); CSR (Chemical Spill Residue); ISW (Industrial Solid Waste); OFF (Offal); SLM (Sludge - Municipal); SLO (Sludge - Other); PCS (Petroleum Contaminated Soils); TFCW (Treated Formerly Characteristic Waste); C & D (Construction and Demolition Debris), OCD (Oil & Conservation Division Waste)

For Recycling/Diversion: AL (Aluminum); BI (Bicycles); C (Cardboard); EW (Electronic Waste); G (Glass); GM (Green Material); HHW (Household Hazardous Waste [could include car batteries, paint cans, propane tanks, etc.); JM (Junk Mail), M (Metal); MP (Mixed Paper); N (Newspaper); PL (Plastic); T (Tires); WG (White Goods)

L. Diversion Services / Operations / Facilities in Albuquerque Region

1.0 Data Gathering

Data identifying quantities and types of materials recovered for recycling from the Albuquerque Metro area is limited. There is presently no reporting requirement derived from Federal, State or local statutes that would facilitate gathering such data. While some information is available, there remains a significant business sector which collects and processes recyclables in the City of Albuquerque but does not document or report their activities to any central source or entity. Therefore all data presented in this appendix must be considered incomplete and only representative of that portion of the recycling industry bound by the State of New Mexico's reporting requirements for solid waste.

The State of New Mexico does require certain recycling facilities to report their activities on an annual basis to the Environment Department's Solid Waste Bureau. This reporting requirement is established by the State of New Mexico in the Solid Waste Regulations, NMAC 20.9.5.16, which states "Owners or operators of solid waste facilities shall submit an annual report to the Department for each facility or operation, within 45 days from the end of each calendar year, describing the operations of the past year." These same regulations define a Solid Waste Facility as follows:

> "Solid waste facility" means any public or private system, facility, location, improvements on the land, structures or other appurtenances or methods used for processing, transformation, or disposal of solid waste, including landfill disposal facilities, transfer stations, resource recovery facilities, incinerators and other similar facilities not specified. Solid waste facility does not include:
>
> (a) equipment or processing methods approved by order of the Secretary to render infectious waste generated on site non-infectious;
>
> (b) a facility that is permitted pursuant to the provisions of the Hazardous Waste Act, NMSA 1978, Sections 74-4-1 through 74-4-14, as amended;
>
> (c) a facility fueled by a densified refuse-derived fuel as long as that facility accepts no other solid waste;
>
> (d) a recycling facility that accepts only source separated recyclable materials;
>
> (e) that portion of a facility that refurbishes or re-sells used clothing, furniture or appliances for reuse;
>
> (f) commercial scrap metal or auto salvage operations;
>
> (g) a composting facility that accepts only source separated compostable materials;
>
> (h) manufacturing facilities that use recyclable material in production of a new product;
>
> (i) facilities designed and operated to dispose of sewage sludge on land, such as land application or land injection;
>
> (j) landfarming of petroleum contaminated soils unless within a landfill, where "landfarming" is the remediation of petroleum contaminated soils on the land surface;

(k) any facility or location where clean fill material is accepted, stockpiled, or used, if the facility or location would not otherwise be classified as a solid waste facility;

(l) collection centers;

(m) a facility that uses tire-derived fuel for the purpose of extracting its stored energy; or

(n) air curtain incinerators.

While by definition this requirement would seem to be an effective means of gathering a complete data set related to recycling activities it excludes a large portion of the recycling sector and therefore falls significantly short of capturing the entire industry. It specifically exempts composting operations as well as recycling facilities handling source separated materials from the requirement. These two specific exclusions alone limit the scope of the data gathered from the targeted facilities / operations.

A second problem with the State reporting requirement is that those entities required to report, especially in the Albuquerque area, often gather recyclables from across New Mexico. These broad geographic service areas inherently challenge the reported data by representing material from outside Albuquerque as attributable to activities within the Albuquerque area. While the managers of this data at the Environment Department do correct the data to avoid inconsistencies related to double-counting, they are only able to address those materials reported elsewhere. Materials delivered to these companies from non-reporting sources is then attributed to Albuquerque by default.

In addition, data gathering is also hampered by the broad array of businesses and industries who perform recycling activities as an adjunct to their core, and decidedly unrelated, business. Large retailers, for instance, typically manage recyclables through in-house operations which often are supported by national materials purchasing contracts. As these materials frequently leave New Mexico via company owned transportation equipment there is no way to gather relevant data unless each individual location becomes subject to a new or expanded reporting procedure / requirement adopted by the City of Albuquerque and / or Bernalillo County.

If a comprehensive data set is deemed valuable by the City of Albuquerque it would require the codification of a strict and broad reporting mechanism. Even if implemented, however, the data would continue to be suspect as monitoring and verification of data would be cumbersome and likely ineffective. A voluntary reporting tool, similar to an annual questionnaire published and distributed via the Chamber of Commerce or internally as part of a business licensing program, may prove more effective and certainly simpler to implement.

If the data is incomplete at best, does it retain any value in informing the City of Albuquerque's solid waste decision-making process? In fact it does. The reported data does reflect some of the largest businesses providing recycling services in the greater Albuquerque region. This sample offers an introduction to the regional recycling industry and the potential role it could play, in cooperation with the City's Solid Waste Management Department (SWMD), to expand both commercial and residential recycling.

2.0 Reported Recycling

Table 1.0 portrays all recycling reported through the aforementioned State of New Mexico protocol. It identifies major participants in the recycling industry in Bernalillo County and the

materials handled by type and quantity in tons. A key is provided to further define the particular commodities.

While limited, this data clearly represents some of the largest players handling recyclables in the Albuquerque area. It indicates possible partnership opportunities between portions of the existing private sector regional recycling infrastructure and the City's SWMD. Appendix X, sections F, G, and H list additional diversion services, operations, and facilities in the Albuquerque region that are also potential partners.

Table 1.0
Recycling in Bernalillo County 2007
Source: NMED Annual Report Submissions

		OCC	ONP #7	OP	Old TD	Mixed Paper	Plas.	AL	Tin Cans	GL	MC	White Goods	Other Plas.	E – Scrap	Tex-tiles	Car. Pad	Film Plas.	Other	TOTAL
City of ABQ	Inter. Proc. Fac. (IPF)	1585	4558	56	21		124.75	46	105.5	36.5	31.73	1401	112					3932	**12009.48**
	Don Reservoir											242							**242**
	Eagle Rock											704							**704**
	Montessa Park											361							**361**
	E-Scrap Event													286.31					**286.31**
	Tijeras Transfer	135.11	660				11.8	180	5.75			646.61							**1639.27**
	Durango McKinley	40493.4	-86.04	689.75		954	94.39												**42145.5**
	Master Fibers	10685.1	724.9	3323.89		1569.87	252.22	1.6				867.8				401.3	299.2		**18125.91**
	Kirtland AFB	622.63	16.58	31.35				0.15				282.56							**953.27**
	UNM	150.8	28.39	49.2	20.55	299.27	5.14	2.27		5.5	6.27	68.05	1.18	9.76	1.7			260.85	**908.93**
Wise Recycling	ABQ							1487.85				5294.94							**6782.79**
	Coors							149				222.2							**371.2**
	Sandia							136				702.7							**838.7**
	Heights							154				92.2							**246.2**
	Juan Tabo							96				77.2							**173.2**
TOTAL		**53672.1**	**5901.83**	**4150.19**	**41.55**	**2823.14**	**488.3**	**2252.87**	**111.25**	**42**	**38**	**10962.3**	**113.18**	**296.07**	**1.7**	**401.3**	**299.2**	**4192.85**	85787.76
% OF ALL RECYCLING		**63%**	**7%**	**5%**	**0.05%**	**3%**	**1%**	**3%**	**0.13%**	**0.05%**	**0.04%**	**13%**	**0.13%**	**0.35%**	**0.00%**	**0.47%**	**0.35%**	**5%**	

Explanation of Material Abbreviations

OCC: old corrugated cardboard

ONP #7: mixed paper with minimum 70 % newsprint

OP: office paper

Old TD: old telephone directories

Mixed Paper: no specification other than paper products only

Plas.: #1 PET & #2 HDPE plastic bottles/containers

AL: aluminum cans

GL: glass bottles & jars

MC: mixed containers - plastic, tin, aluminum, glass

White Goods: appliances & scrap metal

Other Plas.: rigid non – container plastic

E - Scrap: electronic equipment

Textiles: clothing & various fabrics

Car. Pad: carpet underlayment

Film Plas.: plastic bags, shrink wrap, other film plastic

Other: undefined recycling

M. Basic Land Inventory Criteria

Below are some suggested criteria for identifying land / sites regarding future development of a transfer station, material recovery facility, or multi – purpose "Resource Recovery Park" incorporating several waste handling functions (see Appendix T for conceptual diagram):

1 / Owned by the City / within City limits

2 / Minimum 10 to 15 acres in size and preferably more so there is room for expansion / modification

3 / Zoning suitable for industrial development with no immediate residential neighbors

4 / Easily accessible by major highway or road

5 / Existing or potential rail access

6 / Existing documentation concerning environmental status of property

7 / Relatively flat topography

N. Transfer Station Analysis

CITY OF ALBUQUERQUE
SOLID WASTE MANAGEMENT DEPARTMENT
TRANSFER STATION FEASIBILITY ANALYSIS

This appendix presents the results from a draft transfer station Feasibility Analysis (February, 2006) conducted by Gordon Environmental, Inc. for the City of Albuquerque Solid Waste Management Department (SWMD). The SWMD will benefit from continuing to evaluate the feasibility of constructing and operating a transfer station to reduce waste hauling costs. Most of the SWMD collection fleet would use the transfer station to unload. This would provide efficiencies over the current practice of "direct haul" by the collection vehicles to the Cerro Colorado Landfill.

The siting of a centrally located solid waste transfer station can provide savings, typically when the distance to the disposal site exceeds 15 miles one way. The average distance from the end of SWMD collection routes to the Cerro Colorado Landfill is approximately 20 miles, and the loaded vehicles must climb Nine-Mile Hill and spend approximately thirty minutes at the landfill.

The current SWMD complex on Edith Boulevard was selected as a representative transfer station location near the centroid of waste generation for modeling purposes. Here, the collection fleet would unload on an enclosed concrete tipping floor, where equipment loads the waste onto special high-volume trailers. The transfer trailers are sized to haul the loads of at least 3 to 4 collection vehicles, providing more cost-effective waste transport. At the target rate of 1500 tons/day (tpd), this would reduce the daily truck trips to Cerro Colorado from 250 to 75. This reduced traffic can provide efficiencies at the landfill as well.

The collection fleet would have a shorter distance to the transfer station than the landfill, saving an average of 2.5 hours of travel time per day. The collection trucks would save on unloading time at the transfer station versus Cerro Colorado, and also cut down on vehicle wear-and-tear due to landfill conditions. The time savings would increase the efficiency of the collection fleet by an estimated 50%. For instance, residential trucks now serving two routes per day could more readily complete 3 routes/day. This would provide a reduction in fleet size from 124 to 82 trucks, and SWMD would be able to purchase future vehicles that are more efficient at their primary function of collection rather than long–distance hauling.

For this initial feasibility analysis a conceptual design was developed for a transfer station that would meet the City's current and future waste disposal needs. Capital costs are based on this design, and a list of equipment necessary for an initial 1500 tpd operation is provided 1n **Tables 1.1–1.3**. Operating costs are projected, including staffing transferred from the reduced solid waste collection operation to the transfer station (**Tables 2.1–2.4**). There is no net loss in staff count, as the cost savings are produced by hauling efficiencies.

The results of the Feasibility Analysis indicate that there are significant savings in annual costs when transfer replaces direct haul. Using conservative assumptions, the City would save approximately $1,000,000 per year in collection system management costs. Contracting the haul-to-landfill component to a private entity could further increase the savings based on prevailing market conditions (**Table 2.4**). The hauling cost analysis performed on a $/ton/hour basis (**Tables 3.1–3.3**) confirms the savings. The "break even" point at approximately 45 minutes per round-trip is well below the average current haul time of 90 minutes.

The cost advantage of transfer in comparison direct haul would continue to increase with the following trends:

- Fuel costs – represent approximately 15% to 20% of hauling costs. Fuel cost increases are typically addressed in hauling contracts as an escalator, i.e., "1% increase in unit hauling cost for each 7¢ increase in diesel price".
- Population/service area growth – multiplies the savings proportionately.
- Transfer payload – the current Feasibility Analysis is based on a conservative 20-ton payload for transfer haul. Payloads up to 24 tons may be achievable in a single trailer, and "pup" trailers can increase the total to over 30 tons. Higher payloads decrease the number of trips to the landfill, and the corresponding haul costs ($/ton/hour).
- Recycling – comparable savings could be achieved for the transport of recyclables using the transfer station.

A solid waste transfer at the Edith Boulevard site, or another similar central location, would offer additional advantages not considered in a strict economic evaluation:

- Overall reduction in traffic, savings in fuel use, and highway wear-and-tear.
- Potential efficiencies at the landfill through reducing traffic by over 70%.
- Environmental benefits resulting from lower engine emissions and depletion of non-renewable resources (i.e., fuel, tires).
- Opportunities to consolidate SWMD operations by co-locating the transfer station with other operations, such as receiving / processing / storing recyclable materials.
- More effective waste screening and inspection on the enclosed tipping floor versus the daily working area of the landfill.

LIST OF TABLES

TABLE 1.1 – CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS CAPITAL COST ESTIMATES - SITE DEVELOPMENT				
TASK DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**EXTENSION**
1.0 Site Work				
1.1 Concrete				
· Roadways	sf	103,000	$7.00	$721,000
1.2 Asphalt				
· Transfer Trailer Parking	sf	78,000	$4.50	$351,000
· Misc. Parking	sf	11,000	$4.50	$49,500
1.3 Earthwork				
· Compacted Fill	yd^3	40,000	$4.00	$160,000
· Select Fill	yd^3	10,000	$10.00	$100,000
1.4 Fencing				
· 6' Chain Link and 60' Gates	ea	1	$66,000.00	$66,000
1.5 Scales				
· 11' x 70' Pitless Scale	ea	3	$85,000.00	$255,000
· 10' x 70' Pit Scale w/ Scoreboard	ea	4	$40,000.00	$160,000
· 20' x 40' Scale House	sf	800	$ 175.00	$140,000
1.6 Retaining Walls (concrete)				
· 17' H - 4' H (taper)	lf	1,200	$100.00	$120,000
1.7 Landscaping	ea	1	$25,000.00	$25,000
1.8 Site Survey	ea	1	$10,000.00	$10,000
			Site Work Subtotal:	**$2,157,500**
2.0 Transfer Station Structure				
2.1 Concrete				
· Backing Aprons (8")	sf	50,000	$7.00	$350,000
· Tipping Floor & Tunnel (15")	sf	40,000	$12.00	$480,000
· Tunnel Walls	sf	6,800	$15.00	$102,000
· Push Walls (12" x 12' H)	sf	4,600	$15.00	$69,000
· Push Walls (12" x 4' H)	sf	1,200	$15.00	$18,000
2.2 Engineered Clear-Span				
· Metal Building (28' min clearance)	sf	40,000	$15.00	$600,000
2.3 Doors				
· Roll-up Bay Doors (15'W x 28'H)	ea	20	$15,000.00	$300,000
· Roll-up Tunnel Doors (15'W x 16'H)	ea	4	$12,000.00	$48,000
2.4 Utilities Installation				
· Plumbing, electrical, ventilation, fire suppression	ea	1	250,000.00	$250,000
2.5 Amenities				
· Catch basin, slot drains, eyewash stations	ea	1	$35,000.00	$35,000
· Bollards	ea	90	$300.00	$27,000
· Restrooms	sf	1500	$150.00	$225,000
· Contingency-Equipment	ea	1	$25,000.00	$25,000
			Transfer Station Structure Subtotal:	**$2,529,000**
			Construction Subtotal:	**$4,686,500**
3.0 Contingency @ 10% of Construction Subtotal				**$468,650**
			Construction Total:	**$5,155,150**
4.0 Engineering				
4.1 Permitting	ea	1	$140,000	$140,000
4.2 Construction Plans and Specifications @ 6% of Construction Total	ea	1	$309,309	$309,309
4.3 Architecture @ 2% of Construction Total	ea	1	$103,103	$103,103
			Engineering Subtotal:	**$552,412**
5.0 Project Total				**$5,707,562**

TABLE 1.2 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS CAPITAL COST ESTIMATES - EQUIPMENT				
EQUIPMENT LIST	**UNITS**	**QUANTITY**	**UNIT COST**	**EXTENSION**
1.0 Rolling Stock				
1.1 Live-Floor Transfer Trailers	ea	40	$55,000	$2,200,000
1.2 Tractors	ea	30	$95,000	$2,850,000
Rolling Stock Total		70		
			Rolling Stock Subtotal:	**$5,050,000**
2.0 Site Equipment				
2.1 Front-End Loader (CAT 980G)	ea	5	$368,000	$1,840,000
2.2 Load Levelers				
Mobile Excavator (CAT M318) 19' Reach or	ea	3	$143,000	$429,000
Stationary Tamper (Grizzly 6369 R6) 25' Reach				
2.3 Integrated Toolcarrier IT 28G (with accessories)	ea	2	$125,000	$250,000
2.4 Yard Jockey	ea	2	$90,000	$180,000
Site Equipment Total		12		
			Site Equipment Subtotal :	**$2,699,000**
3.0 Equipment Total				**$7,749,000**

TABLE 1.3 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS CAPITAL COST SUMMARY	
DESCRIPTION	**COST ESTIMATE**
1.0 Site Development	
1.1 Site Work	$2,157,500.00
1.2 Transfer Station Structure	$2,529,000.00
1.3 Engineering and Contingency	$552,412.00
Site Development Subtotal:	$5,238,912.00
2.0 Equipment	
2.1 Rolling Stock	$5,050,000.00
2.2 Site Equipment	$2,699,000.00
Site Equipment Subtotal:	$7,749,000.00
Capital Cost Total:	**$12,987,912.00**

TABLE 2.1 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS OPERATING COST - STAFFING (PROJECTED)				
DESCRIPTION	**NUMBER REQUIRED**	**UNIT WAGES $/HR (W/BENEFITS)**	**SUBTOTAL ($/HR)**	**ANNUAL COST ($/YR)**
Transfer Station				
1. Supervisor	2	$29.16	$58.32	$121,305.60
2. Equipment Operator	10	$23.18	$231.80	$482,144.00
3. Scale Attendant (office)	3	$18.79	$56.37	$117,249.60
4. General Laborer	4	$18.79	$75.16	$156,332.80
Subtotal Transfer Station	**19**	**$89.92**	**$421.65**	**$877,032.00**
Transfer Haul				
5. Driver	25	$24.00	$600.00	$1,248,000.00
TOTAL	**44**	**$113.92**	**$1,021.65**	**$2,125,032.00**

Notes:

- Unit Wages based on current COA benefits multiplier of 1.4452
- Hours based on 2080 per employee (i.e., no overtime), overlapping shifts.
- Staffing List based on 1500 tons/day.
- Drivers for transfer haul and yard jockeys.

TABLE 2.2 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS OPERATING COST ESTIMATES- EQUIPMENT OPERATION				
EQUIPMENT	**UNITS REQUIRED**	**UNIT COSTS ($/HR)**	**ANNUAL HOURS**	**ANNUAL COST ($/YR)**
1. Front-end Loader	5	$50.00	7,000	$350,000.00
2. Mobile Excavator	3	$50.00	4,200	$210,000.00
3. Integrated Toolcarrier	2	$30.00	2,500	$75,000.00
4. Yard Jockey	3	$40.00	4,000	$160,000.00
TOTAL	**13**	**$170.00**	**17,700**	**$795,000.00**

Notes:

- Equipment operating costs do not include labor, capital cost, depreciation, or replacement.
- Hours based on 1500 tons/day.
- Fuel included.

TABLE 2.3 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS ANNUAL OPERATING COSTS - GENERAL	
DESCRIPTION	**ANNUAL COST ($/YR)**
1. Utilities, and Communications, etc.	$90,000.00
2. Materials and Supplies	$80,000.00
3. Facility Maintenance, Landscaping, etc.	$100,000.00
TOTAL	**$270,000.00**

TABLE 2.4 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS OPERATING COST COMPARISON (ANNUAL)			
DESCRIPTION	**DIRECT HAUL**	**TRANSFER**	**SUBCONTRACT HAUL**
1.0 Collection Costs			
1.1 Labor	$6,789,000	$4,526,000	$4,526,000
1.2 Maintenance	$4,527,000	$2,414,000	$2,414,000
1.3 Fuel	$2,286,000	$1,219,000	$1,219,000
1.4 Other	$2,063,000	$1,376,000	$1,376,000
Subtotal	**$15,665,000**	**$9,535,000**	**$9,535,000**
2.0 Transfer Station Costs			
2.1 Labor		$877,000	$877,000
2.2 Equipment		$795,000	$635,000
2.3 General		$270,000	$270,000
Subtotal		**$1,942,000**	**$1,782,000**
3.0 Transfer Haul Costs			**$3,120,000**
3.1 Labor		$1,248,000	
3.2 Maintenance		$1,040,000	
3.3 Fuel		$ 520,000	
3.4 Other		$ 416,000	
Subtotal		**$3,224,000**	**$3,120,000**
Totals - Collection and Transfer:	**$15,665,000**	**$14,701,000**	**$14,437,000**
Potential Savings:		**$964,000**	**$1,228,000**

TABLE 3.1 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS HAUL COST – COLLECTION VEHICLES (6 TON PAYLOAD)	
DESCRIPTION	**$/hr**
1. Labor	$ 24.00
2. Maintenance	$ 18.00
3. Fuel	$ 10.00
4. Other (Insurance, License, etc.)	$ 8.00
Total:	**$ 60.00**
Payload:	**÷ 6 tons**
Haul Cost:	**$ 10.00 ton/hr**

Note:
Equipment operating costs do not include labor, capital cost, depreciation, or replacement.

TABLE 3.2 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS HAUL COST – TRANSFER VEHICLES (20 TON PAYLOAD)	
DESCRIPTION	**$/hr**
1. Labor	$ 24.00
2. Maintenance	$ 20.00
3. Fuel	$ 15.00
4. Other (Insurance, License, etc.)	$ 8.00
Total:	**$ 67.00**
Payload:	**÷ 20 tons**
Haul Cost:	**$ 3.35 ton/hr**

Note:

Equipment operating costs do not include labor, capital cost, depreciation, or replacement.

TABLE 3.3 CITY OF ALBUQUERQUE SWMD TRANSFER STATION FEASIBILITY ANALYSIS HAUL LOGISTICS				
DESCRIPTION	**COLLECTION ROUTES (HRS)**	**TO LANDFILL (HOURS)**	**TO TRANSFER STATION (HOURS)**	**TOTAL HOURS**
1.0 Collection Vehicles				
1.1 Direct Haul (2 routes/day)				
Collection route	4			4
Travel (round-trip)		3		3
Unloading		1		1
			Direct Haul Total:	**8**
1.2 Haul to Transfer (3 routes/day)				
Collection route	6			6
Travel			0.5	0.5
Unloading			0.75	0.75
			Haul to Transfer Total:	**7.25**
2.0 Transfer Haul (3 trips/day)				
Loading			1.5	1.5
Unloading		1.5		1.5
Travel (round trip)		4.5		4.5
			Transfer Haul Total:	**7.5**

Notes:

The third trip to transfer (Travel under 1.2) does not include the third delivery because the vehicle has returned to base.

O. Cost Estimate for Materials Recovery Facility (MRF)

City of Albuquerque
Cost Estimate for MRF Stage 1 – Residential Recyclables
(see Appendix II – A)

P. Household Hazardous Waste (HHW) Program Options

1.0 Introduction

Hazardous wastes generated by residences are exempt from federal laws and regulations. These wastes are classified as household hazardous waste (HHW) and should be distinguished from daily municipal solid waste (MSW) disposed by residential, commercial, institutional, and industrial sources. HHW can include mercury and mercury–containing items (thermostats, thermometers, fluorescent bulbs), paints (latex or oil–based), electronic wastes, organic solvents, household cleaners, fuels, lead acid batteries, motor oil, antifreeze, herbicides and pesticides. The table below shows common household items containing potentially hazardous ingredients that are commonly found throughout the home.

TABLE 1: COMMON RESIDENTIAL HHW ITEMS

CLEANING PRODUCTS	INDOOR PESTICIDES	AUTOMOTIVE PRODUCTS	WORKSHOP & PAINTING SUPPLIES
Oven cleaners	Ant sprays and baits	Motor oil	Adhesives and glues
Drain cleaners	Cockroach sprays and baits	Fuel additives	Furniture strippers
Wood and metal cleaners and polishers	Flea repellents and shampoos	Carburetor and fuel injection cleaners	Paint strippers and removers
Toilet cleaners	Bug sprays	Air conditioning refrigerants	Stains and finishes
Tub, tile, shower cleaners	Houseplant insecticides	Starter fluids	Paint thinners and turpentine
Bleach (laundry)	Moth repellents	Automotive batteries	Oil or enamel based paint
Pool chemicals	Mouse and rat poisons and bait	Antifreeze	Photographic chemicals
		Transmission and brake fluid	Fixatives and other solvents

Source: Environmental Protection Agency website – www.epa.gov

TABLE 1: COMMON RESIDENTIAL HHW ITEMS (continued)

LAWN AND GARDEN PRODUCTS	MISCELLANEOUS	OTHER FLAMMABLE PRODUCTS
Herbicides	Batteries	Propane tanks and other compressed gas
Insecticides	Mercury thermostats or thermometers	Gas cylinders
Fungicides / wood preservatives	Fluorescent light bulbs	Kerosene
	Driveway sealer	Home heating oil
		Diesel fuel
		Gas / oil mixture
		Lighter fluid

HHW can harm the environment and human health if it is not properly handled and disposed. For example:

- **Product Use** – Some pesticides, when used improperly (for example, at high application rates), may enter surface waters and kill aquatic life and contaminate drinking water.
- **Product Storage** – Improperly stored products can result in accidental poisonings of children and animals. Similarly, storage of flammable products (solvents, fuels, oil–based paint) in homes may start fires, add to the fuel load of buildings, and endanger firefighter safety.
- **Waste Handling** – There have been incidents at solid waste facilities where workers have been injured or endangered as a result of hazardous waste disposal from households. For example, some pool chemicals are highly reactive and can release a poisonous gas. Alternatively, flammable products may ignite inside the collection vehicle or disposal facility.
- **Product Disposal** – Many hazardous products, unless segregated and collected separately from other wastes, can damage the environment, including contamination of soil and water, and pollution of air. Environmental damage can occur in several ways, including direct releases to the environment (dumping outside), releases from disposal sites (landfills and incinerators), and releases from wastewater treatment facilities. Used oil dumped on the ground, automotive batteries thrown in a roadside ditch, and herbicides dumped down the storm drain are all examples of direct releases that may harm the environment. Even disposal of some types of HHW in lined landfills can result in environmental damage. For example, mercury disposed of with regular garbage may eventually leach out of the landfill. If collected, the leachate is typically treated on–site or sent to a wastewater treatment facility.

2.0 Existing Programs

To deal with HHW, many communities have set up collection programs to discourage it from being disposed of in MSW landfills and incinerators. HHW collection programs ensure the materials are properly handled and sent to facilities designed to treat or dispose of hazardous waste. HHW collection programs include periodic one–day events held throughout the year, more regular collection activities, or permanent collection facilities.

3.0 Program Development

The primary goal should be to minimize environmental and health impacts associated with HHW. Efforts should be directed at educating the public about the potential hazards of household products, as well as proper handling and disposal methods.

4.0 HHW Program Options

Below are the basic types of programs that should be considered as alternatives for proper management.

4.1 Periodic Collection Programs

Periodic collection events are defined as one–day collection events that do not require permanent structures. These collections are usually operated by contractors and held at municipal facilities such as transfer stations, public works facilities, and school parking lots.

On the scheduled collection day the contractor sets up a receiving area at a pre–designated site. The event is frequently scheduled during the weekend, and is organized by employees and volunteers. In some instances, residents must pre–register so that communities can estimate the waste types and quantities that will be received. At the end of the event the collected waste is transported to a facility (or facilities) permitted to handle HHW.

One–day events have low fixed costs because they do not require a permanent structure. However, participation rates and amounts collected can be affected by weather on collection day, travel distance, promotion level, receiving area wait time, and ease of access to event location.

4.2 Semi–Permanent Collection Programs

Semi–permanent programs are defined as HHW collection operations that are held at a regularly scheduled time, but that have no permanent structures or facilities associated with that collection day. For example, a semi–permanent collection facility can be located at a landfill and operate on a year–round basis collecting wastes every Sunday. The collection site houses no permanent structures. Temporary storage lockers can be set up on–site and are maintained by entity employees or a private contractor.

4.3 Permanent Collection Programs

Permanent HHW collection programs are increasing in number across the country as many communities have transitioned to providing more convenient collection options for their residents. Permanent programs are defined as having an established location with a permanent structure(s) dedicated for the collection of HHW. It is common for permanent programs to have a covered shelter area, cabinets for storage of flammable and reactive materials, drum storage pads, and office space for managing paperwork.

Hours of operation vary depending on the size and participation rates of the community. Most permanent programs provide at least three days a week for acceptance, often operating some time during the weekends. Contractors, entity employees, or a combination of both can staff these programs. Many permanent programs also choose to continue with periodic community collection days. While this provides additional convenience for residents, it also has a significant cost factor.

5.0 Program Costs

HHW program cost savings could be realized by partnering with neighboring communities, sharing contract and marketing expenses, and establishing periodic collection events, which are generally less expensive than a permanent facility.

6.0 Public Participation

Public participation rates in communities with permanent drop–off programs tend to be higher than communities with periodic collection programs. The convenient hours of the permanent program together with the ability to drop off materials on a year–round basis provides residents with additional incentive to use the program.

7.0 HHW Program Marketing

Some of the most common types of marketing techniques used for HHW programs are Internet access as well as printed materials to communicate collection times, days, and locations. Some communities utilize public access television as well as print media advertising. Education is key to a program's success. Many people are not aware of the potential dangers of their household waste, nor do they realize that a program exists for disposal of such items. Educational materials should describe non–toxic alternatives to toxic chemical use, proper disposal methods, and HHW facility location(s) and services.

8.0 Strategies For Reduction

The best way to handle residential HHW is to reduce the amount initially generated by using the entire purchased product, giving leftover products to someone else to use, or purchasing products that are less hazardous. Below are some strategies for minimizing HHW:

- Use and store products containing hazardous substances carefully to prevent any accidents at home. Never store hazardous products in food containers; keep them in their original containers and never remove labels. However, corroding containers require special handling.
- When leftovers remain, never mix HHW with other products. Incompatible products might react, ignite, or explode, and contaminated HHW might become non–recyclable.
- Remember to follow any instructions for use and disposal provided on product labels.
- Use safer alternatives.
- Buy only what is needed and that can be used up.
- If products are left over, give them to friends, neighbors, or charitable institutions to use up.
- Recycling is an economical and environmentally sound way to handle some types of household hazardous waste, such as used automobile batteries and oil. Auto parts stores and service stations frequently accept used automobile batteries, and many of these batteries are currently recycled.

Q. "Dirty" MRFs (Material Recovery Facilities)

On April 18, 2008, the Solid Waste Management Department (SWMD) sent the Council the following response to a question posed by Council regarding curbside residential recycling alternatives.

> *Has the Department conducted a cost / benefit analysis to replace the curbside recyclable pickup program with a program that separates the recyclables at the landfill before burial?*
>
> Staff Response: The Solid Waste Management Department has visited a "Dirty MRF" plant in Canada. New technologies have made this potential more appealing in recent years. Typically, a Dirty MRF will recycle with magnets, air systems, weight systems, screeners and optical scanners. In older facilities, the extraction process has been less than desired with much of the stream landfilled. Furthermore, some models require the use of water.

This technical appendix provides an update and analysis on Dirty MRFs.

1.0 Recent Trends

Curbside residential recycling programs around the country are being upgraded to include:

- Commingling or mixing of recyclable materials to collect more materials more quickly where there is sufficient processing capacity for a wide variety of materials collected together. Larger, more sophisticated materials recovery facilities (MRFs) have been built to process commingled materials. A wide range of MRFs have been developed, with residual materials disposed of in landfills varying from 5 % of the total received materials to over 40 %. Some local governments have established contractual standards for the amount of allowable residue, thus encouraging higher levels of processing efficiency.
- Increased collection of materials, especially mixed paper, corrugated cardboard boxes, and more types of plastics.
- Co-collection of garbage, recyclables, and / or organics in the same truck, but in different compartments.
- Increasingly, communities are collecting discarded food scraps and food– soiled paper with yard trimmings, where the composting processing capacity is available to handle these materials.
- The use of automated and semi–automated collection equipment. Most commingled recycling programs collect recyclables placed in sturdy, plastic rolling carts, usually 64 to 96 gallons in size, which can be emptied with trucks using automatic, extending "arms" that grab the cart.
- Expanded collection beyond single–family residential units to also include at least some multi–family dwellings along with small businesses located along the collection routes of trucks.
- Pay-as-you-throw (PAYT) programs, which provide residents with incentives to recycle more and waste less. Residential PAYT rate structures are based on the same principle as is

typical for commercial generators – the more you put out for disposal the more you pay. For example, if you have one 35–gallon cart collected weekly you pay less than if you have three 95–gallon carts. This encourages residents to keep materials out of the garbage can and sorted for recycling and / or composting.

2.0 Dirty MRFs–Limitations and Benefits

"**Dirty MRFs**" refer to facilities that remove reusable and recyclable materials from unseparated trash or municipal solid waste (MSW). "**Clean MRFs**" upgrade and process recyclables that have been previously removed from MSW. These materials are stored either in separated or commingled form and are typically collected through residential and / or commercial recovery programs.[1]

Dirty MRFs were initially focused on sorting all of the MSW in an area. Although there were a number of such plants built, they have not been embraced by many communities. Some of the difficulties with Dirty MRFs have been:

- Dirty MRFs are not able to produce as clean products as clean MRFs. That means that these facilities are not able to sell their recycled materials for as much money as clean MRFs can.
- Dirty MRFs do not recycle as much material from the waste stream.
- Dirty MRFs have a larger amount of residue, which must still be disposed of in landfills or with other disposal techniques. That means materials are being double–handled, adding cost to the system. It means that landfill disposal capacity is still being used that is a valuable resource in itself. It also means less of a contribution to solving global warming concerns.
- Dirty MRFs do not benefit from the thousands of hours of free labor provided by residents and businesses sorting their materials to make them more recyclable, and replace those with costly sorting equipment and laborers working in questionable working conditions to sort through these materials.
- Dirty MRFs do not provide cost savings to generators, as all waste continues to be hauled as before the facility was built. This eliminates one of the major drivers for generators to recycle more.

The City of Portland, OR demonstrated the latter point when they were considering their commercial solid waste and recycling options several years ago. After a lengthy period of outreach and discussion with business leaders, businesses chose to be required to develop commercial recycling plans and implement them rather than be forced to go to a central Dirty MRF that would eliminate the benefit for them of recycling more.

The latter point is also demonstrated by Zero Waste Businesses. Zero Waste Businesses that have been documented as diverting over 90 % of their waste from landfills and incineration have saved money, reduced their liabilities, and increased their efficiency of operations.[2] They save money the most from eliminating wastefulness in the production cycle. They save some money from reusing products and using reuse systems (e.g., reusable shipping containers and

1 Source: http://www.ciwmb.ca.gov/schools/wastereduce/Report2000/Appendices/Glossary.htm

2 See: http://www.grrn.org/zerowaste/business/profiles.php and http://www.earthresource.org/zerowaste.html

reusable pallets). They still save some money, but usually the least, from recycling and composting the rest of their discarded materials.

Some of the advantages of Dirty MRFs are:

- They do not require waste generators to sort their materials.
- They require very little outreach and education effort.
- Payment of municipal franchise fees for collection of materials can be controlled more.
- Once they are designed and implemented, there is a relatively constant level of recycling success, which is usually dependent on the number of workers involved in sorting and the speed at which belts travel through the facilities.

3.0 Hawthorne, CA Case Study–Options for Service Providers

A variation on the design concept of Dirty MRFs was the regulatory system established by the City of Hawthorne, CA. In the adoption of their Commercial Recycling Ordinance, the City required businesses to achieve a 50 % waste reduction target (the CA state goal), and required apartment owners to provide the opportunity to recycle to all their tenants. To implement the Commercial Recycling Ordinance two categories of recyclables collection systems were set up[3]:

> **"Clean Recyclables"** means recyclables separated at the point of generation from mixed solid waste which are not commingled with more than 3 types of recyclables (examples–papers, plastics, metals) and which contain no putrescible solid waste and less than 5 % of total weight in contaminating solid waste that is not recyclables.
>
> **"Dirty Recyclables"** means recyclables separated at the point of generation from mixed solid waste but which nevertheless contain up to 10 % of total weight in contaminating solid waste that is not recyclables for commercial recycling services and no more than 30 % of total weight in contaminating solid waste for C & D (construction and demolition) debris recycling services, including no more than 1 % of total weight in putrescible solid waste as part of the contaminating waste.

The collection of Clean Recyclables is done by a wide variety of entrepreneurs specializing in different forms of reuse and recycling activities and materials. As long as the material streams are kept clean, all those haulers are required to do is obtain a permit to operate in the City, and report on how much material they collect.

In Hawthorne, the collection of Dirty Recyclables requires a non–exclusive franchise to collect such materials. One of the goals of the Hawthorne system was to encourage both generators and haulers to keep materials separated at the source, to ensure the highest and best use of materials and the greatest value for the sale of the recovered products. The non–exclusive franchise system was designed to include a higher degree of regulation by the City on the types of materials collected, the amount and type of processing, and the payment of franchise fees to the City for the collection of commingled recyclables.

4.0 San Jose, CA Case Study – Dirty MRF for Targeted Streams, Not All MSW

San Jose, CA, is pioneering a new concept for the use of Dirty MRFs to assist with targeted waste streams, rather than being used for all the MSW in the area. These waste streams have been difficult to recycle and represent continuing challenges for the City to increase its waste

[3] http://www.cityofhawthorne.com/civica/filebank/blobdload.asp?BlobID=2136

diversion level above its current rate of diverting 62 % of all wastes from landfills and incinerators.

Beginning May 2008, GreenWaste Recovery (GWR, one of several major collection and recycling companies in San Jose) began processing municipal solid waste (MSW)[4] collected from:

- all Public Litter Cans,
- events held on City property
- public schools located within City boundaries
- Team San Jose, the current operator of the San Jose Convention Center Complex (Convention Center, Civic/Parkside Hall complex, Center for Performing Arts and the Montgomery Theater), and
- San Jose Museum of Art

Beginning November 2008, GWR committed to achieve a minimum 70 % diversion rate from processing MSW collected from these sources. Residue landfilled shall not exceed 30 %. This MSW Processing Program will be discontinued should the diversion rate fall below 50 %.

The diversion standards also do not allow the counting of "Transformation" activities (other than biomass fuel production from the woody materials in yard trimmings). The City's agreement with GWR says that they shall not "Process any Recyclable Materials [5]collected under this Agreement," nor shall they ship, transport, deliver or otherwise make available "any such Recyclable Materials to any person for the purpose of transformation."

The diversion standards also require GWR to ensure that the Recyclable Materials and MSW processed is neither disposed of in a landfill nor utilized as alternative daily cover (ADC) at a landfill or other landfill application.

GWR will process the materials at its Solid Waste Processing Facility[6] as follows:

1. Incoming loads of MSW will be weighed before being processed.

2. MSW will be fed onto the processing line using a Caterpillar-loader, which also provides a cursory mechanical sort by removing large, non-compostable items. Other non-compostable and recyclable materials will be manually removed as the material passes over the processing line. The remaining MSW will continue through a bag breaker where bags are slit and opened, which allows the sorters and screens to pull out the recyclable materials.

3. The MSW will then continue across a disc screen where 3" minus materials are removed. The larger 3" plus materials will continue across a conveyor line for additional sorting of non-

[4] MSW is all putrescible and non-putrescible solid and semi-solid waste including garbage, rubbish, demolition and construction wastes, industrial wastes, vegetable and animal solid waste and semi-solid wastes, reusable or recyclable materials, bulky goods and other discarded waste materials, excluding hazardous waste.

[5] Newsprint (including inserts); mixed paper (including magazines, catalogs, envelopes, junk mail, corrugated cardboard, Kraft brown bags and paper, paperboard, paper egg cartons, office ledger paper, and telephone books); glass containers; aluminum beverage containers; small scrap and cast aluminum (not exceeding forty (40) pounds in weight nor two (2) feet in any dimension for any single item); steel including "tin" cans and small scrap (not exceeding forty (40) pounds in weight nor two (2) feet in any dimension for any single item); bimetal containers; mixed plastics such as plastic bags, plastic film, plastics # 1-7, and bottles including containers made of HDPE, LDPE, PET, or PVC; textiles; aseptic containers; and other materials that are capable of being recycled and that would otherwise be disposed of as MSW.

[6] This facility is located in San José, CA.

compostables and recyclables. A magnet at the end on the conveyor will remove ferrous metals for recycling. Recyclables such as metals, glass containers, and aluminum cans will be sorted into individual containers and marketed. Hazardous Waste will be sorted into appropriate containers and recycled or disposed of as required by State and local ordinances.

4. The remaining 3" minus MSW will be delivered to the Z-Best[7] Composting Facility along with all remaining Organics. Materials will arrive at the facility and be loaded into a bagging machine using a modified manure spreader truck. The bagging machine will eject the blended MSW into CTI-Bags. Each CTI-Bag shall be equipped with air distribution piping that pumps air into the bags, assuring aerobic composting at high temperatures. Retention time in the bags will be approximately 14 weeks (that is, the material remains in the bag for about 14 weeks).

5. Upon completion of the retention time, the contents of several CTI-Bags will be combined to form one windrow. Windrows will be turned for two to four weeks to thoroughly cure the materials.

6. After curing, the materials will be screened to a ¼" minus to generate the finished product.

7. Residuals remaining after screening will be disposed of at Newby Island Landfill.

8. For every five thousand cubic yards of finished compost generated, samples will be sent to an independent laboratory to test for pathogen reduction.

All expenses related to processing and marketing of Recyclables and Compostable Waste are the sole responsibility of GWR. Additional market development research may be necessary to ensure adequate markets exist for composted material.

The following products are "Approved Products" under the City's agreement for the compostable fraction of the MSW as long as they are processed to meet the State requirements for inclusion in the calculation of the landfill diversion rate.

Compost–"Compost" means organic waste that has been in a controlled decomposition process for a period of not less than twelve (12) weeks, including the U.S. EPA time–temperature relationship defined as PFRP (Process to Further Reduce Pathogens).

Top Soil Additive–"Top soil additive" means a material made from fines blended with soils where the fines are generated from stockpiled "overs" from the composting process (e.g., tree trimmings) that are placed in windrows and periodically turned and screened to produce the fines.

Co–Generation Fuel–"Co-generation fuel" means material that is produced by regrinding and screening "overs" from the pre–processing of incoming materials or from the post–processing of finished products and that is sold to the co– generation market as fuel.

Compostable Waste includes vegetable and other food scraps including meat, dairy products, kitchen grease and bones paper and cardboard that have been contaminated with food, fat or kitchen grease, compostable paper associated with food preparation or food consumption such as paper towels, paper plates, and tissue, and other materials designated by the City that are capable of being composted, that would otherwise be disposed of as garbage.

[7] The Z-Best Composting Facility is located in Gilroy, California.

5.0 CIWMB Waste Analysis of Different MRFs

The California Integrated Waste Management Board (CIWMB) published its Targeted Statewide Waste Characterization Study[8] in 2006. In this study, it analyzed some of the different diversion outcomes resulting from different types of MRFs. Specifically, the study compared the following types of facilities:

1 / **Multi–stream MRFs** that receive and process multiple types of recyclables separately. Incoming recyclables may be collected in a source separated manner or from a curbside dual–stream diversion program that separates paper from containers.

2 / **Single–stream MRFs** that sort individual recyclable materials from recyclables that have been commingled in one stream (for example, paper and containers mixed together).

3 / **Mixed Waste Processing Facilities** (MWPF, also referred to as "Dirty MRFs"), that remove one or more recyclable materials from municipal solid waste (MSW) streams.

4 / **Construction and Demolition (C&D) Processing** facilities that separate one or more materials from mixed construction and/or demolition debris.

The CIWMB study also highlighted the distinction between facilities that used "positive" or "negative" sorts[9], as follows:

- **Positively Sorted**—refers to recyclable or residual material which is physically removed, by human labor or mechanical equipment, from a processing line. Most recyclables are positively sorted into specifically targeted material categories such as aluminum cans, cardboard, and so on.
- **Negatively Sorted**—refers to recyclable or residual material which is not positively sorted or removed from the processing line either manually or mechanically. Negatively sorted material typically is discharged via conveyor belt(s) at the end of a processing line.

Key findings from the CIWMB study of MRFs are presented in the sections below[10]:

5.1 Findings for MRFs Receiving Single–Stream Recyclables

- Single-stream MRFs are the most prevalent (a total of 40, estimated at 46 percent of all MRFs statewide in CA).
- Mixed waste processing facilities or Dirty MRFs disposed of the vast majority of residuals.
- "More than 90 percent of the material processed at the host single-stream MRFs were residential recyclables…The processing technologies at single-stream MRFs ranged from a staff of laborers positively removing large residuals and recoverable material from a system of conveyor belts, to a highly mechanized and automated series of separation technologies. Each MRF used conveyor belts as the primary means of moving material through the processing system. Laborers were used at each MRF to presort large, bulky items which could potentially damage the conveyance or sorting equipment. When laborers were used, each laborer would typically target one type of material for removal. Various types of technologies utilized at single-stream host MRFs included, but were not limited to, disc screens, trommel screens, air classifiers, magnets, eddy currents, and shaker or finger screens…"

[8] Source: http://www.ciwmb.ca.gov/LGLIbrary/infoCycling/2006/Fall.htm
[9] Source: http://www.ciwmb.ca.gov/WasteChar/WasteStudies, p. 40
[10] Source: http://www.ciwmb.ca.gov/WasteChar/WasteStudies, pp. 20-33

- "Although the sorting sequence was fairly consistent, each MRF had a unique processing arrangement and procedure. In general, the order of processing / removal was large presorted residuals followed by various types of fiber or paper, plastics, metals, and glass, respectively. One facility positively removed their entire residual stream and the end-of-line discharge was recovered as mixed paper. The other facilities positively removed large residuals and recyclables and the end-of-line discharge was residual…"

- "The average annual tonnage of incoming material at single-stream Confirmed MRFs was determined to be approximately 52,900 tons. The average residual from single-stream Confirmed MRFs is 7,400 tons. The resulting proportion of residual to the total quantity of incoming material processed was approximately 14 percent, typically ranging from 2 percent to 50 percent."

- "More than 58 percent of the residual from this MRF type was determined to be either paper or plastic. A majority of the paper was miscellaneous or remainder/composite (R/C) paper, which is typically unfeasible and/or undesirable to recover. Various types of miscellaneous paper were unopened junk mail, cereal and cracker boxes, milk and juice cartons, and books. R/C paper included paper with food contamination or moisture, aseptic packages, paper towels or tissues, and photographs. Common R/C plastic items were used food/beverage trays or containers and various plastics which were attached to other types of materials or otherwise not representative of another category."

5.2 Findings for MRFs Receiving Multi–Stream Recyclables

- "Approximately 63 percent of the material processed at the host multi-stream MRFs were residential recyclables, with the remainder from commercial sources…"

- "The processing technologies were similar at both of the multi-stream MRFs which hosted sampling and sorting activities. Both of these facilities were dual-stream, with a separate line for fiber or paper and for containers. Each MRF used conveyor belts as the primary means of moving material through the processing system. Laborers were used to presort large, bulky items which could potentially damage the conveyance or sorting equipment. One MRF primarily utilized laborers to positively remove the recyclables, whereas the other was significantly more advanced although hand sorters were still largely relied upon. Various types of technologies utilized at the multi-stream host MRFs included, but were not limited to, disc screens, trommel screens, magnets, and shaker or finger screens… one of the host MRFs had two separate lines running simultaneously, and the other processed the materials on the same line at different times. For the fiber or paper line, the order of processing/removal was large presorted residuals followed by OCC, newspaper, and mixed paper, respectively. The order of container processing was not consistent between the two host MRFs. Recyclable containers from the fiber line were collected and transferred to the container line for recovery, and vice versa."

- "Multi-stream processing facilities represent approximately 18 percent of the total number of statewide Confirmed MRFs."

- "The average annual tonnage of incoming material at multi-stream Confirmed MRFs was determined to be approximately 20,900 tons. The average residual from multi-stream Confirmed MRFs is 1,300 tons. The resulting proportion of residual to the total quantity of incoming material processed was approximately 6 percent, ranging from 1 percent to 19 percent."

- "As expected, there was minimal residual generated by multi-stream processing facilities, generally due to the quality of incoming material. Less contaminants are present because such curbside programs require customers to separate fiber materials from commingled containers. Furthermore, processing can be more efficient because each stream is more homogeneous. Fiber processing typically has less moisture or food contamination."

- "Similar to single-stream residuals, more than half of the residual stream was paper or plastic. The large percentage of glass (22 percent) in the residual was most likely attributed to the significantly smaller residual quantity of multi-stream MRFs and the fact that there were less contaminants present in the incoming material."

5.3 Findings for MRFs Processing Mixed Waste Material

- "Similar to other MRF types, the processing technologies at mixed waste MRFs ranged from a staff of laborers positively removing large residuals and recoverable material from a system of conveyor belts, to a marginally mechanized and automated series of separation technologies. Each MRF used conveyor belts as the primary means of moving material through the processing system. Laborers were used at each MRF to presort large, bulky items which could potentially damage the conveyance or sorting equipment. When laborers were used, each laborer would typically target one type of material for removal. Various types of technologies utilized at mixed waste host MRFs included, but were not limited to, disc screens, trommel screens, magnets, and shaker or finger screens…"

  "Although the sorting sequence was fairly consistent, each MRF had a unique processing arrangement and procedure. In general, the order of processing/removal was large presorted residuals followed by various types of fiber or paper, plastics, metals, and glass, respectively. Each mixed waste MRF produced an end-of-line residual since the incoming material was solid waste to begin with…"

- "Mixed waste processing facilities represent approximately 24 percent of the total number of statewide Confirmed MRFs. The average annual tonnage of incoming material at mixed waste Confirmed MRFs was determined to be approximately 234,700 tons. The average residual from mixed waste Confirmed MRFs is 189,800 tons. The resulting proportion of residual to the total quantity of incoming material processed was approximately 81 percent, ranging from 27 percent to 97 percent."

- "The incoming material at mixed waste processing facilities is essentially municipal solid waste and the residual percentage is predictably much higher than any other type. Many mixed waste MRFs are increasingly accepting more commercial waste and less residential waste, as commercial waste typically has a higher degree of recoverable materials. Based on information from Confirmed mixed waste MRFs, slightly more residential waste is currently processed. These types of MRFs attempt to remove as many recyclables as possible but there is typically more moisture, food contamination, and more unrecoverable material to sort through. Since incoming quantities are much larger, these types of MRFs often load the processing line at a higher rate."

- "Although approximately the same amount of paper was present within mixed waste residual, a larger portion was R/C paper primarily due to food and/or moisture contamination. The remainder of the residual stream expectedly included larger quantities of C & D and organic material."

5.4 Findings for MRFs Processing C & D Material

- "A total of 6 MRFs were confirmed to process C&D materials throughout the state of California. C&D processing facilities represent approximately 12 percent of the total number of statewide Confirmed MRFs."
- "Almost all of the material processed at the host C & D MRFs was commercial material…"
- "Similar to other types of MRFs, the processing technologies at C&D MRFs ranged from a staff of laborers positively removing large residuals and recoverable material from a system of conveyor belts, to a moderately mechanized and automated series of separation technologies. Each MRF used conveyor belts as the primary means of moving material through the processing system. Laborers were used at each MRF to presort large, bulky items which could potentially damage the conveyance or sorting equipment. When laborers were used, each laborer would typically target one type of material for removal. Various types of technologies utilized at mixed waste host MRFs included, but were not limited to shredders or chippers, disc screens, trommel screens, magnets, and shaker or finger screens…"
- "MRFs processing C&D material are increasingly common throughout the state of California due to the growing number of acceptable uses for the materials. The C&D recycling programs in California are largely accepted as some of the most innovative and effective in the nation. Currently, C&D MRFs represent an estimated 12 percent of the total statewide MRFs by number. Many more C&D recovery facilities were identified but did not meet the specific criteria of a residual-generating MRF, usually because the material was homogeneous (such as pure loads of concrete) and did not require processing."
- "Each MRF had a unique processing arrangement and procedure. Some MRFs positively removed their entire residual stream, while others presorted large, bulky residues and recoverable materials and the end-of-the line was disposed as residual. Each host MRF recovered wood for bio-fuel at conversion plants and fines for landfill alternative daily cover (ADC)…"
- "The average annual tonnage of incoming material at Confirmed C&D MRFs was determined to be approximately 40,000 tons. The average residual from Confirmed C&D MRFs is 9,170 tons. The resulting proportion of residual to the total quantity of incoming material processed was approximately 23 percent, ranging from 1 percent to 41 percent…"
- "A significant portion (55 percent) of the C&D residual was determined to be C&D material. However, some of the materials were not recoverable because they were either treated or composite. An example of composite C&D material is wood framing members which still have metal anchors or joints attached and removal would not be cost-effective."

R. Utilization of Methane from Landfill

METHANE GAS GENERATION AND UTILIZATION OPPORTUNITIES AT CERRO COLORADO LANDFILL

I. 0 Overview

A portion of municipal solid waste (MSW) includes organic material that decomposes due to natural microbial processes. The decomposition proceeds through an aerobic (with air) phase, followed by an anaerobic (without air) phase. During the anaerobic phase, landfill gas (LFG) is produced. LFG is comprised of both organic and inorganic compounds, although organic gases dominate the mixture. Of the organic gases, methane and carbon dioxide are present in approximately equal proportions. LFG also includes the trace presence of other compounds at very low concentrations (e.g., hydrogen sulfide, which gives LFG its characteristic "rotten egg" odor).

2.0 Landfill Gas - Properties and Hazards

Both methane and carbon dioxide are odorless and colorless. Hazards posed by landfill gas can be grouped into three general categories:

- It is potentially explosive in air at concentrations between 5% and 15% due to the methane content.
- It can act as a simple asphyxiant by displacing oxygen in confined spaces, creating an oxygen-deficient atmosphere.
- It contains low-level concentrations of non-methane organic compounds (NMOCs), plus hydrogen sulfide, which are inhalation irritants and can be toxic if prolonged inhalation occurs.

Due to the hazards listed above, EPA regulations require landfills to characterize and control LFG emissions to protect human health and the environment. For example, landfills greater than a certain size that have accepted waste in excess of a specific threshold are subject to EPA's LFG emissions control regulations.

3.0 Landfill Gas - Regulatory Requirements

Based on CCLF's (CCLF = Cerro Colorado Landfill) permitted design capacity (size), amount of MSW accepted, and LFG/ NMOC emissions calculations, CCLF was required to install a landfill gas collection and control system (GCCS). Therefore, a GCCS Design Plan was submitted to the COA/Environmental Health Department (COA/EHD), and the Plan was approved on March 15, 2004 (note: COA/EHD has been provided authority by EPA to implement Clean Air Act requirements for landfills). The COA/EHD approval authorized the construction and operation of a GCCS.

4.0 GCCS Description

4.1 Summary

The GCCS is comprised of a network of LFG extraction wells connected to piping that conveys the gas to a flare for destruction. A blower is used to apply a vacuum to the extraction well/piping network and transport the LFG to the flare. The extraction well/blower/flare system

is designed to operate continuously. The approved GCCS Design Plan also requires routine monitoring, recordkeeping and reporting of GCCS information on a semi-annual basis.

4.2 Current Conditions and Future GCCS Expansion

As of August, 2008, forty (40) LFG extraction wells were in service. Additional extraction wells are planned for installation when waste deposits become five years of age (per regulatory requirements). The approved GCCS Design Plan also includes provisions for expanding the GCCS as waste disposal continues into the future.

5.0 Options for Beneficial Use

As an alternative to flaring the LFG, the energy potential of LFG can be converted for beneficial use. **Table 1** (attached) lists potential LFG to energy (LFGTE) options and associated LFG flow requirements. In addition, a preliminary list of facilities near the CCLF has been compiled to assist in evaluating potential partners and purchasers of the LFG (or electricity derived from the gas; see **Table 2**).

A successful LFGTE project requires a combination of financial and technical resources, cooperation among stakeholders, and a supportive governmental/regulatory framework. Each of these topics is briefly discussed below.

5.1 LFG Production

A successful LFGTE project requires a reliable fuel supply (LFG) for a length of time that is advantageous to both the producer of the gas and the consumer of the gas. In this context, the consumer could be an entity that agrees to one or more of the following: to either purchase the gas; purchase the electricity produced from the gas; or purchase a commodity produced from the gas. Typically, LFG must be generated at a sufficient flow rate and methane concentration for an acceptable length of time. The fuel/energy needs of the end user dictate the fuel specifications for delivery (e.g., methane content, contaminants, moisture, pressure) and consequently, the types and costs of gas processing and distribution.

Based on monthly LFG data recorded from January 2008 to June 2008, the GCCS is collecting between 265 standard cubic feet per minute (scfm) and 285 scfm. Methane concentrations recorded at the blower/flare station for this same time period range from 39% to 43%.

5.2 On-site Use of LFG

After collection and limited gas processing, LFG could be used on-site in one of following ways:

- To power an engine
- To power a turbine
- To generate electricity using a microturbine
- To produce a supplemental fuel via additional processing

The first three options utilize methane's energy potential to produce power. The fourth item refers to production of an alternative fuel or fuel supplement through additional on-site processing (e.g., production of ethanol). Potential LFGTE alternatives are summarized in **Table 1**. The LFG generation requirements in **Table 1** also show that the majority of LFGTE options require higher flow rates than those currently being generated. However, LFG generation rates are expected to increase over time.

5.3 Distribution of LFG for Off-site Use

Processing and transport of the LFG to a local user is another option for beneficial use. For a low-producing facility, a medium BTU (~500 BTU/cfm) fuel application is often the most viable option. For example, many industrial boilers (like those at the nearby jail) can be modified to burn natural gas (~1000 BTU/cfm), landfill gas (~500 BTU/cfm), or a combination of the two. To evaluate potential off-site customers of LFG, a list of nearby facilities has been compiled (see **Table 2,** attached).

5.4 Electricity Generation and Distribution

The potential for generating electricity on-site and selling it to PNM (or others) is also an option, although the cost for LFG-to-electricity infrastructure may be prohibitive. Another option is for the City to sell electricity to a distant user at a cost less than PNM's standard rates. However, the power generator (the City or its partner) would be required to pay a wheeling charge to the utility, and the charge could be prohibitive. Additional research would be required to evaluate these scenarios further.

5.5 Other Options

Consistent with the City's goal of promoting and utilizing alternative fuel vehicles, the LFG could be processed to produce compressed natural gas (CNG) for the City's fleet of vehicles. The LFG could also be processed to produce ethanol or methanol. Additional research would be necessary to assess the variables and costs related to these options.

TABLE 1 – LANDFILL GAS TO ENERGY ALTERNATIVES

ENERGY USE	DESCRIPTION	TYPICAL LFG REQUIREMENTS (CFD [(1)] at 50% METHANE)
1.0 Gas		
1.1 High BTU	Natural gas – pipeline quality	≥ 4,000,000
1.2 Medium BTU		
• Detention Center	Direct pipeline after processing	≥ 1,200,000
• Other Commercial Users	Direct pipeline after processing	Dependent upon demand
• On-site	Direct pipeline after processing	No current gas service
1.3 CNG/LNG	Compressed fuel – for vehicles after processing	≥ 5,000,000
1.4 Methanol	Fuel additive after processing	≥ 5,000,000
2.0 Power Production		
2.1 Internal Combustion	On-site power generation - for on- or off-site use	≥ 500,000
2.2 Microturbine	On-site power generation	≥ 100,000
2.3 Combustion Turbine	On-site power generation - for on- or off-site use	≥ 2,000,000
2.4 Steam Turbine	Off-site use	≥ 5,000,000

Note:
(1) CFD = cubic feet per day. 1,000,000 CFD is approximately 700 CFM (cubic feet per minute)

TABLE 2 – NEARBY FACILITIES INVENTORY			
FACILITY NAME	**APPROX. MILES FROM LANDFILL**	**RELATIVE DIRECTION FROM LANDFILL**	**NOTES**
Route 66 Casino/Truck Stop	3	WNW	Located across Rio Puerco, South of I-40
Wastewater Treatment Plant	3	WNW	Located across Rio Puerco, South of I-40
Exxon Service Station	3	WNW	North of I-40
Quarry/Excavation	2.5	NW	North of I-40; no apparent utilities
Metropolitan Detention Center	1 (or less)	E	Closest to blower/flare; adjacent property
Sandia Motorsports Speedway	1	NE	Uses only electricity; not adjacent site
Far West Storage	3	NE	North of I-40; no apparent utilities
Channel 7 Doppler Radar	3.5	NE	North of I-40
Enchanted Trails RV Park	4.5	NE	North of I-40
Iceberg A/C	5.5	NE	South of I-40
Ritchie Bros. Auctioneers	6	NE	South of I-40
Air Traffic Control Center	4	E	South of I-40
Microwave/Cell Tower	4	E	Building marked with faded AT & T signs

S. Utilization of Natural Gas as Vehicle Fuel

1.0 Introduction

This analysis has been prepared as a preliminary response to the following question posed by City Council to the City of Albuquerque Solid Waste Management Department (COA / SWMD):

> To further the City's goal to reduce greenhouse gas and avoid the City listed as non-containment by the EPA for PM 10, has the Department determined a cost to convert the vehicles used to pick up solid waste from customers to natural gas? Has the Department tested a natural gas vehicle for residential pick-up?

In an inter-office memorandum dated April 18, 2008, the SWMD stated:

> The Solid Waste Management Department has communicated with manufacturers of natural gas disposal vehicles to determine the feasibility of using natural gas in our vehicles. In order to properly analyze the use of natural gas in collection vehicles, SWMD has requested a vehicle demonstration. This would assist us in evaluating the effects of high altitudes as well as highway performance. Currently, the SWMD does not have the infrastructure in place to meet the fueling requirement associated with natural gas. For example, a major concern is the traveling range, fuel capacity, and time requirements for refueling based on the natural gas product.

In evaluating the feasibility of converting the City's solid waste fleet to consumption of natural gas in place of conventional diesel fuel, data from similar efforts in other parts of the country and information reported by federally funded research projects on the subject was reviewed.

The need for assessing how to reduce air emissions and diesel fuel consumption by refuse and also recycling collection trucks is clear. These trucks have very low fuel efficiency, due in part to continuously stopping and starting throughout their daily routes. Other factors which encourage an examination of this issue include: rising fuel costs, pending and more stringent diesel emissions standards, desire to limit domestic dependence on foreign oil supplies, growing availability of natural gas collection vehicles, and the reduction of noise generated by the refuse fleet as it operates in residential and commercial areas.

However, limiting the scope of inquiry to only one alternative fuel source, natural gas, would be shortsighted. The use of bio-based fuels provides many of the same benefits and can often be accomplished cost–effectively. Natural gas and diesel blends also support the goal of reducing air emissions while retaining the benefits of increased torque and fuel efficiency offered by the diesel engine.

If the goal of the City is limited to the most effective means of limiting air emissions and thereby supporting compliance with provisions of the Clean Air Act related to PM 10, the use of natural gas as a vehicle fuel is clearly advantageous when compared to the current use of conventional diesel. However, through the aforementioned research, the conversion to natural gas may present significant obstacles and challenges for the Department.

Below is an introductory discussion of the advantages and disadvantages related to three alternative fuels and their associated technologies. These fuels are: natural gas, natural gas and conventional diesel blend, and bio-diesel. Table 1 presents the emissions characteristics of natural gas and bio-diesel fuels.

2.0 Natural Gas

The City of Albuquerque currently utilizes natural gas to fuel its urban bus fleet and some passenger vehicles. These vehicles are designed and built to utilize only Compressed Natural Gas (CNG). This dedicated fuel system also requires specialized fueling infrastructure to deliver the CNG. While the City has developed four fueling stations for CNG equipped passenger vehicles and transit busses, it is likely that additional capacity will be required to undertake a fleet-wide shift to CNG by the SWMD.

Due to the specialized nature of CNG utilization it requires a significant capital investment to implement. The existing fleet could not be affordably converted to this fuel and would therefore require a complete replacement of existing equipment, at a significant cost to the City. The cost of a CNG collection vehicle can be 15% to 20% more than a comparable conventional diesel vehicle.

An often unanticipated expense of this scale of fuels conversion involves fleet maintenance costs. Existing facilities and staff are designed to service conventional diesel vehicles. A fleet-wide switch would require large investments in not only tools and equipment but would also demand a corollary investment in knowledge and training for staff to manage the new vehicles. While an incremental conversion may allow for improved maintenance preparedness, it will also place an even greater burden on current maintenance personnel as they would be managing two distinctly different fleets at once. These considerations are even more important given the logistical and space constraints already present at the Edith maintenance / storage facility.

Another financial barrier to CNG conversion involves the need for new and specialized fuel delivery infrastructure. While the City now operates four CNG fueling stations, it is likely that due to the size and fueling requirements associated with a CNG–based solid waste fleet an additional and dedicated fueling facility would be required. With estimates starting at close to $1 million, this cost could present a real economic barrier given that there are other SWMD priorities related to basic operational functions along with parallel development of resources and infrastructure for increasing material diversion through recycling, composting, and reuse.

In addition, there are also operational concerns that which must be addressed when exploring a conversion to CNG. Factors such as range and refueling time must be evaluated to ensure the conversion does not negatively impact the fleet's ability to carry out its primary functions. As well, there are physical design characteristics of CNG vehicles which may pose problems. For instance, due to the size and capacity requirements of CNG vehicles, their turning radii are greater and some collection platforms (such as front–load) may not be available with a CNG–powered chassis.

The available research on the conversion of solid waste fleets to natural gas suggests that success is found where these efforts have strong external support and motivations. For example, fleet conversions in California are driven by a stricter and more aggressive regulatory environment and are supported by a variety of economic incentives to defray the capital intensity of the conversions. The fleets are also performing within operational realities which lend themselves to the previously discussed constraints of natural gas.

3.0 Natural Gas and Diesel Blend

Starting in 2001 the US Department of Energy's Advance Vehicle Testing Activity began a two year study of a new technology which relies on a blend of conventional diesel and liquefied natural gas (LNG). This technology allows operators to retain some of the efficiency and torque benefits provided by a traditional diesel engine while gaining the emissions benefits of LNG.

Even though this equipment is not yet commercially available the success of the pilot effort has encouraged the equipment manufacturer to pursue full-scale commercial deployment. While the main challenges presented by traditional natural gas conversions remain present in this dual-fuel technology, the performance benefits may make it more advantageous for the City.

4.0 Bio–Diesel

Unlike natural gas fleet conversions, bio-diesel conversions can be accomplished with limited capital investment while attaining similar emissions benefits. Bio-diesel is typically a fuel blend of conventional diesel with some portion of vegetable-based diesel, however, fleets can utilize 100% vegetable-based diesel in place of conventional diesel.

The greatest advantage of bio-diesel over natural gas and other alternative fuels is its ability to be used in existing equipment with little or no modifications. It is simply deployed in place of conventional diesel. Many diesel engine manufacturers have recognized bio-diesel and continue to honor related warranties provided the bio-diesel being used meets ASTM standards. Existing fuel delivery systems remain uninterrupted and existing maintenance / service facilities require no upgrades or expansions.

Fleet operators involved in bio-diesel conversions have reported few negative outcomes, most of which are related to the “scrubbing” effects of the bio-diesel (one of bio-diesel’s side effects is that it cleans fuel systems of corrosion and deposits and thereby impacts fuel filtration systems.) A second negative outcome, fuel gelling in cold weather, can be almost universally attributed to sub-standard fuels which do not meet the performance specifications prescribed by ASTM and others.

Bio-diesel also affords other benefits including improved fuel efficiency and the retention of the power and torque characteristics of conventional diesel. Bio-diesel is proven to be more effective at lubricating engine components thereby extending service life and reducing maintenance costs.

The most significant hurdle to implementing bio-diesel conversion is the procurement of clean and appropriately blended bio-diesel. It should be noted that finding ASTM compliant bio-diesel has sometimes been difficult in New Mexico.

Unlike ethanol, bio-diesel contains the equivalent of 3.2 times the energy required to produce it (recent reports have found that ethanol may in fact embody slightly more energy than need to produce it in contrast to earlier reports in which ethanol proved to have a significant energy deficit.) Current bio-diesel production capacity is predominantly based on surplus supplies of various vegetable oils including soy. However as bio-diesel utilization expands it is likely to experience similar challenges faced by the ethanol industry relative to the competition between food and fuels.

TABLE 1 / EMISSIONS CHARACTERISTICS OF NATURAL GAS AND BIO-DIESEL AS VEHICLE FUEL SOURCES				
FUEL	**PERCENT CHANGE RELATIVE TO CONVENTIONAL DIESEL**			
	NITROGEN OXIDES (NOX)	**PARTICULATE MATTER (PM)**	**CARBON MONOXIDE (CO)**	**TOTAL HYDRO CARBONS (THC)**
Natural Gas	-45%	-90%	+92%	-69%
B20 Bio-diesel	0.0%	-10%	-11%	-21%
B100 Bio-diesel	+10%	-50%	-50%	-88%

Source: US Department of Energy, National Renewable Energy Laboratory

References and Related Reports

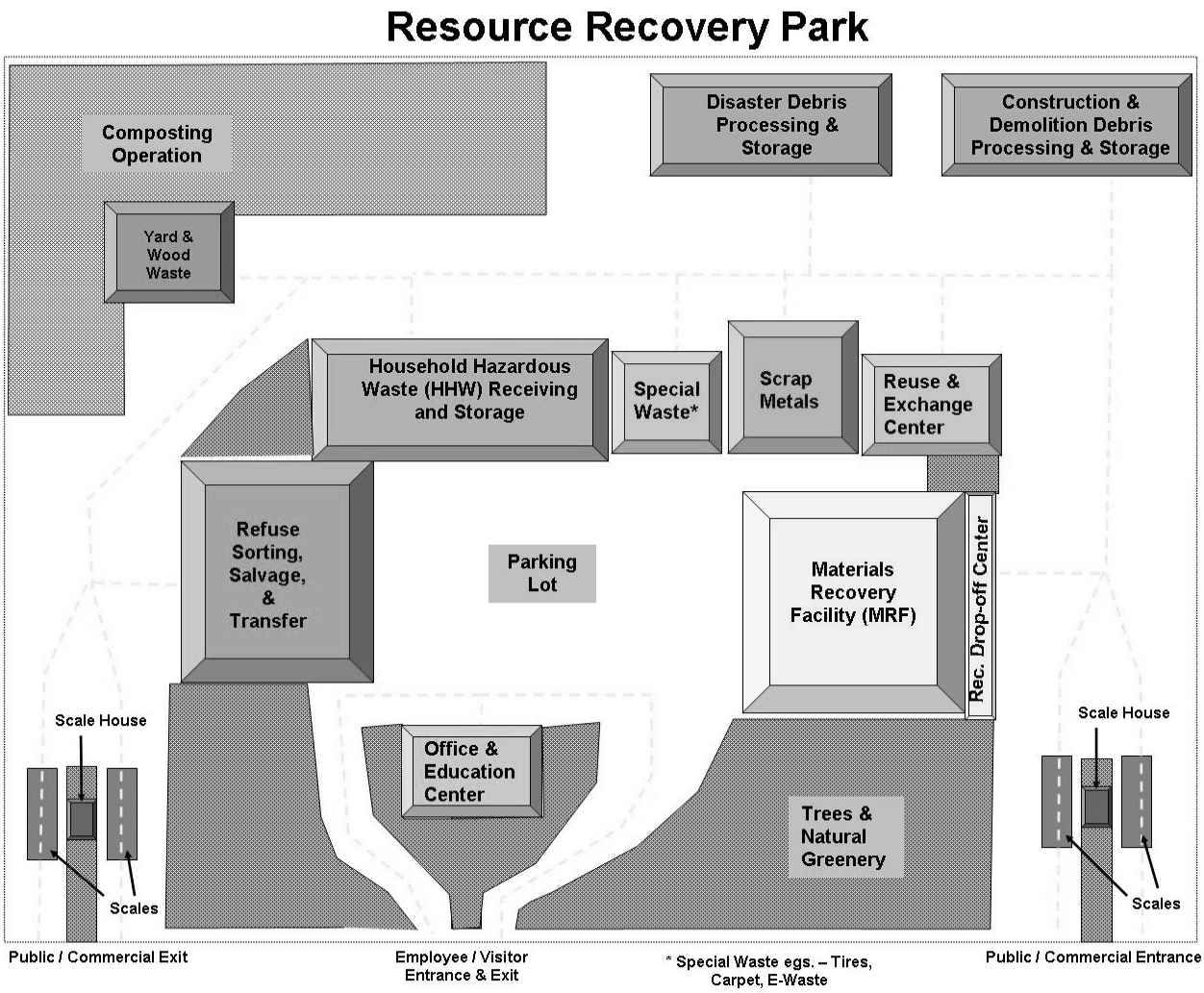
Cannon, J., 2006, *Greening Garbage Trucks: Trends in Alternative Fuel Use, 2002-2005*, INFORM Inc.

Burdelski, J., Cannon, J., Gordon, D., 2003, *Greening Garbage Trucks: New Technology for Cleaner Air*, INFORM Inc.

Chandler K., Proc K., 2004, *Norcal Prototype LNG Truck Fleet*, U.S. Department of Energy.

U.S. Department of Energy, http://www.eere.energy.gov/afdc/

T. Concept Drawing for Resource Recovery Park



U. Stakeholders

A / Regional Non – Governmental Organizations			
NAME	***ADDRESS***	***EMAIL***	***PHONE***
Alternative Fuels Vehicle	11621 San Antonio Drive		87122
Amigos Bravos	610 Gold Ave. SW	bravos@amigosbravos.org	505-452-9387
Archaeological Conservancy	5301 Central Ave. NE	tacinfo@nm.net	505-266-1540
Citizens for Alternatives	202 Harvard Dr. SE		87106
Hawk Watch International	1420 Carlisle Blvd.	hwi@hawkwatch.org	505-255-7622
Hawks Aloft	6715 Eagle Rock Ave. NE	gail@hawksaloft.org	505-828-9455
Holistic Management International	1010 Southwest Tijeras	hmi@holisticmanagement.org	505-842-5252
Nature Conservancy	1307 Rio Grande NM	nm@tnc.org	505-988-3867
NM Volunteers for the Outdoors	2403 San Mateo Blvd NE, Suite W15D	1nmvfo@nmvfo.org	505-884-1991
NM Wilderness Alliance	142 Truman St. NE b-1	Nathan@nmwild.org	505-843-8696
NM Wildlife Federation	2921 Carlisle Blvd. NE 200J	nmwildlife@nmwildlife.org	505-299-5404
Rep America	3200 Carlisle Blvd. NE	newmexico@repamerica.org	
Rural Community Assistance	3150 Carlisle BLVD. NE	edrew@rcac.org	505-421-0261
Sage Council	510 3rd Steet SW	Sage@sagecouncil.org	505-260-4696
Sierra Club NM	100 2nd Street SW	Mudd_pi@mac.com	505-884-3315
Southwest Research and Information Center	105 Stanford Drive SE	info@sric.org	505-262-1862
Tree NM	6101 Andersen Drive SW	tnm@treenm.org	
USGBC NM	320 Central Ave. SW	chrismkerlin@yahoo.com	505-227-0474
AGC	Vicki Mora	Vicki@agc-nm.org	505-842-1462
Habitat for Humanity			
Placitas Recycling Association	John Richardson	Jrichardson28@comcast.net	
NMRC	English Bird	English@recyclenewmexico.com	505-983-4470
ABQ Convention and Visitors Bureau	Novella Trujillo	novella@itsatrip.org	505-222-4307
La Montanita Coop	Michelle Franklin	mf@lamontanitacoop.com	505-217-2010
Build Green NM	Kristy Moyer	kmoyer@hbacnm.com	505-344-3294

B / Regional Counties

NAME	POPULATION	CONTACT	EMAIL	PHONE
Bernalillo		Mike Salas	msalas@bernco.gov	505-224-1640
Sandoval		Robert Sanchez	rmsanchez@sandovalcounty.com	505-867-0814
McKinley		Kit South	ksouth@co.mckinley.nm.us	505-862-8402
Valencia		Bill Chavez		505-866-2034
Torrance (EVSWA)		Joseph Ellis	josephe@lobo.net	505-384-4270
Santa Fe				

C / Regional Towns and Cities

NAME	POPULATION	CONTACT	EMAIL	PHONE
Edgewood			info@townofedgewood.com	505-286-4518
Moriarty				505-832-4406
Los Ranchos		Mayor Larry Abraham	mayorabraham@vllr.com	505-344-6582
Rio Rancho		Mayor Thomas Swisstack	tswissstack@ci.rio-rancho.nm.us	505-891-5001
Bernalillo				
Los Lunas		SW Dir. Bob McQueen	mcqueenb@loslunas.gov	505-352-7632
Belen		Leonard Carillo		505-864-8221
Bosque Farms		Mayor Wayne Ake	Wayne.ake@bosquefarms.us	505-869-2357
Corrales		Anissa Tallada	atallada@corrales.nm.us	505-897-0502

D / Regional Pueblos and Tribes

NAME	POPULATION	CONTACT	EMAIL	PHONE
Eight Northern Pueblos		Sage Deon	Sagedeon22@yahoo.com	505-692-8181
Acoma Pueblo		Rex Salvador	rsalvador@puebloofacoma.org	505-552-5178
Cochiti Pueblo		Mark Chalan	Mars_chalan@puebloofcochiti.org	505-465-3111
San Felipe Pueblo		Michael Romero	tribalutilities@aol.com	505-867-8645
Sandia Pueblo		Alex Puglisi	apuglisi@sandiapueblo.nm.us	505-771-5080
Santa Ana		Deborah Goss	dgoss@santaana.org	505-771-6771
Santo Domingo		Ventura Lovato	vlovato@sdutilities.com	505-465-0055

E / Regional Institutions and Large Employers

NAME	# OF EMPLOYEES	CONTACT	EMAIL	PHONE
UNM	14300	Linda McCormick	lindamcc@unm.edu	505-277-1681
CVNM	1770	Sam Romo	sromo@cnm.edu	505-363-6903
Kirtland Airforce Base	40,000	John Poland	john.poland@kirtland.af.mil	505-846-2751
Sandia National Lab	8730			
ABQ Public Schools	14480			
Intel	3500	O. Paul Gallegos	Orlando.p.gallegos@intel.com	505-893-0836
Honeywell	1100			
Eclipse Aviation	1600			
Ethicon	530			
GE	500			
PNM		John Acklen	John.acklen@pnmresources.com	505-241-2998
US DOE		Charlie Henn	chenn@doeal.gov	505-845-4396

F / Regional Large Recyclers

NAME	*MATERIALS*	*CONTACT*	*EMAIL*	*PHONE*
Ace Metals	Scrap metal	Paul Winn		505-877-1092
Acme Iron and Metals	Scrap Metal			505-345-3471
Cintas/Roadrunner Paper		Craig Spooner	spoonerc@cintas.com	505-764-9832
Coronado Wrecking	C&D, Concrete Rubble	Keith Whale	info@coronadowrecking.com	505-877-2821
Durango McKinley Paper		Martha Reyes	mxreyes@mckinleypaper.com	505-890-6526
Envirosolve	HHW	Scott Logan	Tulsa@enviro-solve.com	505-873-0012
Interstate Battery			recycle@ibsa.com	888-USA-4001
Jai Tire				800-795-TIRE
LaFarge	Concrete rubble			
Master Fibers		Hector Valverde	hevalverde@masterfibers.com	505-345-6413
Natural Evolution		Traci Phillips	recycle@naturalevolution.com	918-836-2995
Rastra	Styrofoam	Walter Amon	walter@rastra.com	505-873-0012
Rinchem	HHW	Polly Wagner	pwagner@rinchem.com	505-345-3655
Safety-Kleen	HHW			505-884-2277
Southwest Oil Recycler				
Thermo Fluids	Oil & antifreeze			505-247-9699
Valley Proteins	Cooking oil			
Waycor	concrete			
Wise Recycling	Non ferrous metals	Aubrey McWilliams	almcwill@wiserecycling.com	410-609-9256
Wood U Recycle	C&d/greenwaste	Matt Allen	mallen@7cities.net	505-287-9469

G / Regional Small Recyclers

NAME	*MATERIALS*	*CONTACT*	*EMAIL*	*PHONE*
AAA Pumping	Cooking oil			
Absolute Computing	ewaste			
Bentley Auction Service	Ewaste			
Best Buy	Misc electronics (not ewaste)			
Best Deals Recycling	Radiators & Pb Acid Batteries			
Big D's Flooring	Carpet padding			
Bob's Appliances	Resale appliances			
Boys Appliances	Resale Appliances			
Buffalo Exchange	Resale clothing			
Checker Auto	Motor oil & antifreeze			
Computer Corner	Ewaste			
Computer Reruns/Technet	Ewaste			
Document Solutions	Paper shredding			
Earth Day Recycling	Hauler	Javier Solis	earthdayrecycling@gmail.com	505-232-9211
Electronic Surplus	Ewaste			
Enchantment Electronic Recycling	Ewaste	Joel Belding	digitalempirenm@hotmail.com	505-232-9483
Furniture on Consignment	Furniture			
Ghost Town Trading				
Glasscapes				
Greater ABQ Habitat for Humanity				
Green Planet Recycling	Carpet/padding	Charles Greenwood	Stellarivera30@msn.com	505-837-1950
Hi-Z Computer Systems	Inkjet and toner			
Highland Tire	Tires			
Jaco Environmental	White goods			

Jiffy Lube	Oil & antifreeze			
Lens Crafters	Eyeglasses			
Office Depot	Ink and toner			
Office Max	Ink and Toner			
R & M Metal	Scrap metal			
RDB Office Furniture				
Rio Grande Autos	Scrap Metal			
Rite Way Pallets	pallets			
Rudy's Downtown Recycling	Scrap Metal			

G / Regional Small Recyclers

NAME	*MATERIALS*	*CONTACT*	*EMAIL*	*PHONE*
Staples	Ink and toner, ewaste			
Tandus	Carpet			
West Silver Recycling	Scrap metals			

H / Regional Composters

NAME		*CONTACT*	*EMAIL*	PHONE
Barela Landscaping		Eddie Barela	Mbarela710@aol.com	505-877-8522
Natures Way Composting				
New Leaf Resources			Zamora.newleaf@gmail.com	505-379-1437
Soilutions		Misch Lehrer	misch@soilutions.net	505-877-0220

V. Summary of Comments from Community Recycling Forums and a List of Neighborhood Association and Other Presentations

City of Albuquerque

Solid Waste Management Department

Martin Chávez, Mayor

MEDIA ADVISORY

CITY TO HOLD COMMUNITY RECYCLING FORUMS

FOR IMMEDIATE RELEASE

The City of Albuquerque, Solid Waste Management Department is hosting five community recycling forums for public input and comments. Mayor Chavez has set forth an aggressive plan to move forward on reaching the goal of ZERO LANDFILL by 2030. The forums will outline several recycling initiatives that are being proposed toward meeting this goal. The forums will be repeated from October 27-30th at the following locations. All are invited.

Monday, October 27, 6:00–7:30 PM – Ladera Golf Course, 3401 Ladera Dr NW (Residential Focus)

Tuesday, October 28, 6:00–7:30 PM – Highland High School Library, 4700 Coal Ave SE (Residential Focus)

Wednesday, October 29, 9:00–10:30 a.m. (Business focus) - Solid Waste Management Department Training Room, 4600 Edith NE

Wednesday, October 29, 6:00–7:30 PM – Bio Park Education Center, 2601 Central Ave NW (Residential Focus)

Thursday, October 30, 6:00–7:30 PM – Eldorado High School Cafeteria, 11300 Montgomery Blvd NE (Residential Focus)

####

For More Information Contact:
Jill Holbert
City of Albuquerque
Deputy Director Solid Waste Management Department
505-761-8342 (office)
505-350-1395 (cell phone)

Compiled Comments from the Community Recycling Forums (Oct. 27-30, 2008)

(Green Waste): One of the proposed approaches is to use curbside carts for residential green waste pickup.

- *What do you feel are the benefits of this type of service?*
  - Composting options
  - Less in landfill/diversion
  - No trash bags [needed].
  - Convenient to use. More efficient for green waste
  - Benefits to ecology
  - Compost is a great thing
  - Provides education for kids
  - Garbage [cart] doesn't fill as quickly
  - Not tempted to burn it
  - NO bugs
  - Free mulch
  - Reducing methane
  - Beautify neighborhood
  - Christmas tree storage
  - Saves money
  - Planning for future
  - Local source for gardens

- *What do you feel are the obstacles or barriers to this approach?*
  - Rate structure for those who xeriscape is missing
  - Placement of 4 carts takes a lot of space
  - Fitting of large pieces of green waste into the cart- large limbs, tumbleweeds etc.
  - The increase in our rates
  - Too much green waste
  - Twice a year is not enough
  - Twice a month is too much
  - Could be easy to forget
  - Part of year you won't use service/seasons
  - Neighborhood collection site?
  - Demand will differ by sector of the city/offer services by district?
  - Not a county effort
  - Household organics not included
  - Pro rate it
  - Fee for service basis
  - Wind blows over carts

(Recycling): One of the proposed approaches is to use curbside carts for residential commingled recycling pickup.

- *What do you feel are the benefits of this type of service?*
  - Curbside cart is convenient/easier to recycle
  - Less in landfill

- Curbside reduces [amount] into garbage [cart]
- Makes you feel good
- Can throw anything in cart when in doubt what goes in
- Saves resources
- Individual carts are encouraging
- Source of income
- Won't be left behind if not packaged correctly
- Mess won't blow down the street/keeps neighborhood clean
- Encourage more people [to participate]
- No –plastic bags [needed]
- More space
- Doing the right thing
- Dogs won't get in bags
- Automation makes it an easier task
- Discourages stealing aluminum
- Security of personal info
- Recycling should start FIRST
- Diversion can save money
- Love the proposal
- Like the co-mingling
- Weekly pick-up
- Save money city wide (diversion from landfill)

- *What do you feel are the obstacles or barriers to this approach?*
  - Plastics limited to #1 & #2
  - Not enough education.
  - If recycling the item is not profitable, make it profitable.
  - Sorting must be a horrendous process.
  - Rate increases.
  - Potential to become expensive.
  - Compliance issues
  - [Cart] size can limit amount of recycling
  - What happens to old containers?
  - No parameters on what to recycle
  - Concerned about private sector
  - No penalty for throwing away recyclables
  - Hard to chop up cardboard to fit
  - Carts plus drop off
  - How many carts will we have to store?
  - 96 gallon for recycling or different rate for different sizes
  - Vandalism/repair costs?
  - No consequences
  - Consistency in packaging (commercial)

- *What do you feel are the obstacles or barriers to this approach? (continued)*
  - How do you know it gets recycled/ proof to public
  - Give incentives
  - Trying to determine plastic #1 & #2

- Why can't you recycle all plastic?
- Collection of glass NOT easy
- More collection sites for glass that are PERMANENT
- Understanding what you can and can't recycle
- Time of collections/earliness
- Add glass also
- Pickup could be hazardous
- Could encourage non-recyclables

- *Would you prefer these types of pickup once a week or every other week?*

	Weekly	Every other week	Monthly
Recycling	47	7	
Green Waste	5	35	34

(PAYT): One of the proposed approaches is to use PAYT curbside carts for residential garbage pick up.

- *What do you feel are the benefits of this type of service?*
  - Incentive to recycle.
  - Nice option for a smaller household.
  - Gives you control over you cost.
  - The smaller cart is easier to handle. Gives you a choice
  - Smaller container saves space
  - Offers a financial incentive
  - Saves fuel costs and transportation
  - May put pressure on businesses to reduce packaging
  - Have incentive to recycle
  - Personal challenge
  - Feedback where is it going
  - Realize what and how much you recycle
  - Enhance recycling
  - Puts cost where it belongs
  - Setting a trend

- *What do you feel are the obstacles or barriers to this approach?*
  - Can I trade in my old one (What is the bluebook)?
  - How often can I go form one container size to another w/o penalty?
  - Ease and timeliness of cart distribution to the customer.
  - Not enough cost disparity between small and large cart.
  - Will it impact illegal dumping?
  - May not be as effective for multi-dwelling

- *What do you feel are the obstacles or barriers to this approach? (continued)*
  - Increase of fees over the years
  - Stealing/ wrong carts

- Process of getting bigger cart
- If revenue is made from recycling price should be made to smaller cart
- Super size mentality
- Need for re-education
- Might dump trash elsewhere
- Smaller options for recycling
- Big education pushes to get participants

At this point I would like to finish our focus group by offering you the opportunity to make general comments about this evening presentation on the IWMP.

- Get education out
- More incentives for recycling?
- Use recycling trucks at night in industrial areas
- Recycling at parks ad other public places
- Other items such as: plastic bags, batteries, chip board, empty propane bottles, wood etc…
- Construction waste for homeowner
- Why can't it be tax supporting?
- Can and bottling bins at parks
- Use rail system to transfer to 1 central location
- Encourage city to follow up on pilot projects
- Neighborhood contests
- Recycling in schools
- Incentives for packaging and producing
- Commercial application
- Number of apartments (-25) for recycling
- Clarity on structure & recycling center
- What's recycled the most?
- More opportunity for glass pick- up (recycling)
- Like to know end change on recycling market/ no factories here
- Presentation notes
- What happens to large items?
- Good time management
- Very Informative
- Proposed implementation date telling us when will this take effect
- Offer other options for glass collection like deposits on glass and cans

116 Neighborhood Association (and Additional) IWMP Presentations By SWMD Staff

December 2008	January 2009	February 2009	March 2009	April 2009
Keystone Park NA	Alamosa NA	Academy Ridge East NA	Albuquerque Academy In-service	Fair West NA
La Luz Del Sol NA	Alta Monte NA	Anderson Hills NA	Alvarado Gardens NA	1st Unitarian Church
La Luz Landowners NA	Alvarado Park NA	Cottonwood Trails HOA	American Business Women Assoc.	Heart of the Heights
Zero Waste Workgrp, Climate Action Task Force	Avalon NA	Del Norte NA	Bosque Montano NA	Hodgin NA
	Barelas NA	Elder Homestead NA	Cielito Lindo NA	Los Terrazas NA
	Bel-Air NA	Glenwood Hills NA	Clayton Heights/Loma del Cielo NA	Los Volcanes NA
	Civitan International	Kiva Monte Park NA	Glenwood Hills South Casa Grande NA	Pat Hurley NA
	Countrywood Area NA	Laurelwood NA	Jerry Cline Park NA	Quintessence NA
	Downtown NA	Near North Valley NA	Loma del Rey NA	South West Alliance of Neighbors
	Estates at Desert Ridge NA	Nob Hill NA	Louisiana Purchase Condo Assoc.	West La Cueva NA
	Heritage Hills NA	North Hills NA	Lovelace Employees	Whole Foods Market Earth Day
	Highland Business NA	North Valley Coalition	McDuffie - Twin Parks NA	
	Huning Castle NA	Osuna Park NA	Nor Este N.A.	
	Indian Moon NA	Paradise Hills Civic Assoc.	North Domingo Baca NA	
	Los Duranes NA	Quail Springs NA	North Hills NA	
	Manzano Manor NA	Solid Waste Mgmt. Department Employees	North Valley Senior Center	
	Reynolds NA	South Guadalupe Trail NA	North Wyoming NA	
	Tres Volcanes NA	Thomas Village NA	Palomas Park NA	
	Villages of Parkwest NA	Tuscany NA	Pinon Creek Townhome Assoc.	
		Victory Hills NA	San Gabriel NA	
		Vista Grande NA	Sandia H.S. Area NA	
		Volcano Cliffs NA	Sierra Ranch NA	
			Siesta Hills NA	
			Sonora Assoc. HOA	
			South San Pedro NA	
			Stardust Skies NA	
			Stronghurst NA	
			Tanoan Community Assoc.	
			Ventana Ranch NA	
(4 Presentations)	(19 Presentations)	(24 Presentations)	(29 Presentations)	(11 Presentations)

116 Neighborhood Association (and Additional) IWMP Presentations By SWMD Staff

May 2009	June 2009	July 2009	August 2009	September 2009
2009 Int'l Facility Managers Assoc.	Better World Connections		Nob Hill NA	Academy Estates East
Boyds-Leslie Park NA	Elite Asset Management Team		Rancho Sereno NA	Monte Largo Hills NA
Estates at Tanoan HOA	Quailridge NA		Rotary Club of Albuquerque Del Sol	New Mexico Municipal League
Four Hills HOA	SWMD Driver Trainees		St Joseph Townhouse Assoc.	Vista Magnifica NA
Los Griegos NA				
Parkland Hills NA				
Pueblo Alto NA				
Rio Rancho Rotary Club				
Santa Barbara Martinez Town NA				
Snow Heights NA				
Sycamore NA				
(11 Presentations)	**(4 Presentations)**	**(0 Presentations)**	**(4 Presentations)**	**(4 Presentations)**

October 2009	November 2009	December 2009	January 2010	February 2010
Leadership ABQ	Eight Northern Pueblos Intertribal Resource Advisory Committee		New Mexico Society of Hazardous Materials Managers	New Mexico Chapter Air and Waste Management Association
Matheson Park NA				
Quigley Park NA				
(3 Presentations)	**(1 Presentation)**	**(0 Presentations)**	**(1 Presentation)**	**(1 Presentation)**