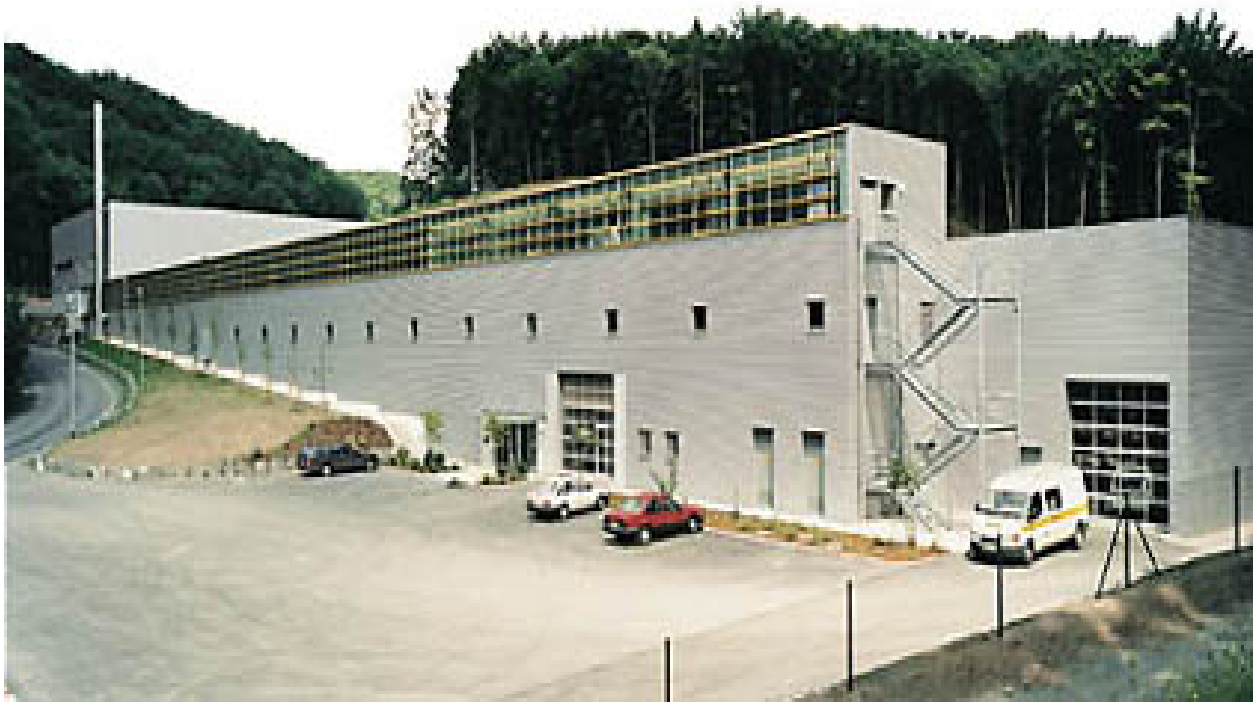
Santa Barbara County
Multi-jurisdictional Solid Waste Task Group



Alternatives to Disposal Final Report

September 22, 2003

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I. EXECUTIVE SUMMARY

This report describes the work of the Multi-jurisdictional Solid Waste Task Group's (MJSWTG) Alternatives to Disposal Subgroup (Subgroup) and their recommendation that a waste conversion facility be considered as a superior long-term alternative to the majority of disposal activity occurring at the Tajiguas Landfill.

The Subgroup formed in June 2002 and met monthly through September 2003. Several individuals contributed throughout its duration:
Co-conveners:

- Peter Cantle, Santa Barbara County Air Pollution Control District
- John McInnes, County of Santa Barbara Public Works Department

Participants:

- Joerg Blischke, Public/Metcalf & Eddy
- Jon Clark, Public
- Ken Cohen, Public
- Peter Jeschke, Public
- Carlyle Johnston, County of Santa Barbara Public Works, Solid Waste & Utilities
- Robin Klein, Public
- Stephen MacIntosh, City of Santa Barbara Public Works Department
- Ed McGowan, Public
- Maurie McGuire, Public
- Dan Predpall, Public/URS Corporation
- David Raney, Public
- Greg Shipley, Public/Integrated Waste Services, Inc.
- Brian Trautwein, Public/Environmental Defense Center
- Craig Whan, Public/Outspoken Industries
- John Zhao, City of Santa Maria Public Works Department

The Subgroup's purpose was to identify and evaluate the feasibility of conversion technologies that provide alternatives to landfilling of solid waste in Santa Barbara County. In general, waste conversion includes gasification, hydrolysis and anaerobic digestion technologies. These technologies use a variety of sophisticated techniques and equipment to capture or produce recyclable commodities and fuels from MSW. The specific definition of waste conversion used by the Subgroup is:

> *"The processing, through non-combustion thermal means, chemical means, or biological means, of mixed municipal solid waste from which recyclable materials have been substantially diverted and/or removed to produce electricity, alternative fuels, chemicals, or other products that meet quality standards for use in the marketplace, with minimum amount of residuals remaining after processing."*

The technologies investigated are defined as follows:

Gasification is a process that uses heat, pressure, and steam to convert materials directly into a gas composed primarily of carbon monoxide and hydrogen. Three primary products result: hydrocarbon gases (also call syngas), hydrocarbon liquids (oils) and char (carbon black and ash). Syngas can be used as a fuel to generate electricity or steam, or as a basic chemical building block for a multitude of uses.

Hydrolysis is a chemical decomposition process that uses water to split chemical bonds of substances. Material in our solid waste that is derived from plants have structural components composed of lignocellulosic fibers, which in turn are comprised of three major fractions: cellulose, hemicellulose, and lignin. Cellulose and hemicellulose are chains of sugar molecules that can be broken down chemically or biologically into the component sugars. The sugars are then fermented using yeast or bacteria to produce ethanol, which is then distilled to a higher concentration for final use.

Anaerobic Digestion is the bacterial breakdown of organic materials in the absence of oxygen. This biological process produces agricultural fertilizer and a gas, sometimes called biogas, principally composed of methane and carbon dioxide, which can be used as a fuel to generate electricity of steam.

To complete its work, the Subgroup established guiding principles (see **Section III**) and a detailed 12-step work plan (see **Appendix A)**. The guiding principles were adapted from the MJSWTG's guiding principles and focused on local control, regional services, waste diversion, economic efficiencies, reliability and flexibility. The work plan contained the following 12-step approach:

1. Develop Guiding Principles
2. Develop Screening Parameters
3. Identify and Research Technologies
4. Screen Technologies
5. Develop Technology Ranking Criteria
6. Rank Technologies
7. Determine Institutional Arrangements
8. Identify Site Requirements for Technologies
9. Conduct Community Forums
10. Determine Feasible Technologies
11. Identify Level of Interest from Parties with Potential Feedstock for the Feasible Technologies
12. Develop and Present Final Report to MJSWTG TAC

The Subgroup executed the work plan and concluded that there are seven solid waste conversion technologies that are best suited and capable of providing feasible alternatives to landfilling of waste in Santa Barbara County. The technologies are offered by the following short-list of companies:

1. Renewable Resources Alliance, LLC
2. Arrow Ecology, Ltd http://www.arrowecology.com/
3. Ecocorp http://www.ecocorp.com/
4. Brightstar Environmental, LLC http://www.brightstarenvironmental.com/
5. Waste Recovery Systems, Inc. http://www.steinmuller-valorga.fr/index_en.php
6. Herhof Umwelttechnik GmbH http://translate.google.com/translate?hl=en&sl=de&u=http://www.herhof.de/inhalt.htm&prev=/search%3Fq%3DHerhof%26hl%3Den%26lr%3D%26ie%3DUTF-8%26oe%3DUTF-8%26sa%3DG
7. Genehol, Inc. http://www.genaholincorporated.com/pages/689410/index.htm

All of these companies' technologies include complex material recovery systems (MRF) that are capable of: 1) recovering recyclables that aren't currently captured by source separation programs; and, 2) producing a homogeneous feedstock for conversion into a fuel product.

Based on the short-list of companies, a generic description of waste conversion was developed for the Technical Advisory Committee (TAC) using its prescribed executive summary template (see **Appendix B**). The description specifies how a waste conversion facility can maintain local control, support regional services, increase waste diversion, be economically efficient, contribute towards a reliable system and provide flexibility.

Based on the findings summarized in **Appendix B**, the Subgroup recommends that the TAC consider the development of a waste conversion facility as part of a long-term solid waste management plan. Such a facility would be initially designed to accept and process MSW being disposed at the Tajiguas Landfill and would offer the following benefits:

1. Approximately 80% (160,000 tons per year) of all tons processed would be diverted from landfill
2. ca 35% (70,000 tons per year) are recyclables captured by up-front MRF and sent to traditional recycling markets
3. ca 45% (90,000 tons per year) are organic materials converted to "green" energy which is a locally sustainable resource
4. The resulting landfill diversion creates long-term disposal scenarios that would otherwise be unavailable (e.g., the projected 15-year life/capacity of Tajiguas Landfill would be transformed to 50+ years)
5. The net cost of conversion (circa $25/ton) is competitive with existing ($35/ton) and future (circa $80/ton) disposal/landfill costs.
6. A conversion facility would require only a fraction of the land necessary for landfill.
7. While approximately 20% (40,000 tons per year) of all the tons processed by a conversion facility must be landfilled, this waste would be converted into an inert state, which would significantly reduce operational costs and potential long-term environmental risks and associated liabilities.
8. A conversion facility could produce "green" electricity thereby contributing towards the achievement of California's renewable portfolio requirements and supporting local sustainability.

The implementation challenges associated with a conversion facility are significantly less than those attributable to a new landfill scenario. In fact, they are similar to those associated with traditional recycling and composting infrastructure and include:

1. Finding an appropriate site for the facility
2. Securing reliable end markets for the resulting products (i.e., recyclables such as glass and metals, compost, fuel products and green power)
3. Obtaining a waste flow commitment from the participating jurisdictions.

When comparing the benefits and challenges to those associated with long-term disposal, it is apparent that waste conversion should be selected as a component of the long-range solid waste management system for Santa Barbara County.

II. SUBGROUP PURPOSE

The Subgroup developed the following Purpose Statement, which was approved by the Multi-jurisdictional Solid Waste Task Group (MJSWTG) on October 10, 2002.

> *The Alternatives to Disposal Subgroup shall identify and evaluate the feasibility of solid waste conversion technologies that provide alternatives to waste disposal in Santa Barbara County.*

III. SUBGROUP GUIDING PRINCIPLES

The Subgroup developed the following Guiding Principles, which were approved by the MJSWTG on October 10, 2002.

Local Control

Local decision making bodies should retain their authority to set rates and control the waste flow that may be sent to conversion technologies.

Regional Services

Conversion technologies should be flexible to allow for various levels of jurisdictional participation (i.e., the inclusion of additional tonnage or waste-streams in the future).

Waste Diversion

Conversion technologies should be capable of diverting a significant quantity of mixed solid waste that is currently landfilled and providing solutions that are environmentally superior to disposal. They should not replace or hinder existing and successful recycling programs.

Economic Efficiencies

Conversion technologies should be viewed as an integral component of local solid waste systems thereby recognizing the need for responsible fiscal management and fiscal constraints.

Reliability
Conversion technologies should be capable of providing high-quality and consistent service over the life of their projected operation.

Flexibility
Conversion technologies should be part of an integrated system, which is flexible to accommodate both advances in technologies and various levels of jurisdictional participation in system components.

IV. TECHNOLOGY SCREENING PARAMETERS

The Subgroup developed the following technology screening parameters, which were approved by the MJSWTG on October 28, 2002.

1. A conversion technology should be capable of processing mixed solid waste that is disposed of in county landfills (100,000 – 400,000 tons per year).

2. A conversion technology should be capable of operating for a minimum of 20 years.

3. A conversion technology should be compatible with local solid waste management systems including existing recycling programs.

4. The majority of processed waste from a conversion technology should be diverted from landfill.

5. In consideration of fiscal management and constraints, a conversion technology should be competitive with the costs of siting, developing and operating a new landfill.

6. A conversion technology should produce end products that have probable, identifiable or existing markets.

V. TECHNOLOGY IDENTIFICATION & RESEARCH

The Subgroup performed literature and Internet searches and contacted several industry representatives to identify waste conversion technology vendors that may be capable of handling MSW. Fifty-one vendors were identified worldwide (see **Table 1**). A Request for Information (RFI) was then developed and sent to all of the companies (see **Appendix C**). The RFI focused on information contained in the screening parameters listed in Section IV above.

TABLE 1: LIST OF CONVERSION TECHNOLOGY VENDORS	
GASIFICATION	American Plasma Corp. BAV Umwelttechnik Brightstar Environmental, Inc. CR&R, Inc. (Renewable Resources Alliance, LLC) Doug Blackburn Compact Power Ltd Costich Company Down Stream Systems, Inc. Eco Electric Power Company Energy Products of Idaho (EPI) Future Energy Resources Corp. Global Energy Solutions International Combustion Systems, Inc. Interstate Waste Technologies JF Ventures Ltd Lurgi Energie und Entsorgung GmbH MEI Power Corp. Nextpath Environmental Primenergy LLC PCG Electric/Bioshpere Process Plasma Waste Conversion Corp. Precision Energy Services US Plasma Recovered Energy, Inc. RGR Ambiente Srl Scientific Utilization, Inc. Startech The Bioshpere Process Thermogenics, Inc.
HYDROLYSIS	Arkenol, Inc. BC International Corp. Filter Tech. Corp. Genehol, Inc. Masada OxyNol LLC
ANAEROBIC COMPOSTING	Arrow Bio, LLC BioConverter Park, LLC BioMil AB BLT Enterprises, Inc. (OWS nv) Canada Compost, Inc (BTA) CITEC group EcoCorp (Linde-KCA/BRV) Farmatic Biotech Energy AG Kompogas Onsite Power Systems Schwarting Unwelttechnik GmbH Waste Recovery Systems, Inc. (Steinmuller/Valorga)
OTHER	Herhof Umwelttechnik GmbH (Refuse Derived Fuel) Outspoken Industries (Aerobic Composting) ReCulture Engineering (Fiber Extraction)

VI. TECHNOLOGY SCREENING

The Subgroup received 21 responses to its RFI. Using the approved screening parameters, the Subgroup evaluated the responses and determined that 18 of the technologies met the requirements (see **Table 2**). The three companies who did not meet the parameters all stated that they were interested to receive source separated organic materials (not MSW as stipulated in the RFI). Their responses were therefore forwarded to the Green Waste and Biosolids Subgroups for further consideration.

TABLE 2: CONVERSION TECHNOLOGY VENDORS WHO MET SCREENING PARAMETERS

GASIFICATION	Brightstar Environmental, Inc. CR&R, Inc. (Renewable Resources Alliance, LLC) Down Stream Systems, Inc. Eco Electric Power Company Global Energy Solutions Recovered Energy, Inc. Scientific Utilization, Inc. Thermogenics, Inc.
HYDROLYSIS	Arkenol, Inc. Genehol, Inc. Masada OxyNol LLC
ANAEROBIC COMPOSTING	Arrow Bio, LLC BLT Enterprises, Inc. (OWS nv) Canada Compost, Inc (BTA) EcoCorp (Linde-KCA/BRV) Waste Recovery Systems, Inc. (Steinmuller/Valorga)
OTHER	Herhof Umwelttechnik GmbH (Refuse Derived Fuel) ReCulture Engineering (Fiber Extraction)

VII. RANKING CRITERIA

The Subgroup developed the following technology ranking criteria, which were approved by the MJSWTG on January 9, 2003.

FISCAL VIABILITY

1. Total Net Cost (capital + operating – projected revenues)
   The lower the cost, the higher the score.

DEMONSTRATED ABILITY

2. Demonstrated ability of conversion technology to operate in similar conditions (tons and types of feedstock processed) with minimal intervention and down-time
The greater the demonstrated ability, the higher the score.

MARKET ISSUES

3. Existence of markets
Existing stable markets would receive the highest score, existing volatile or highly probable would receive a medium score, and low probability would receive the lowest score.

4. Product marketing experience
The more experience, the higher the score.

HEALTH, SAFETY & ENVIRONMENTAL STANDARDS AND REGULATORY CONSIDERATIONS

5. Visual impacts of technology
The smaller the size and potential for impacting view-sheds, the higher the score.

6. Design and operational capabilities relative to emissions and odor issues and their relationship to applicable laws and regulations
The higher the probability that laws/regulations can be met, the higher the score.

7. Design and operational capabilities relative to noise, litter, dust problems, and other nuisance issues and their relationship to applicable laws and regulations
The higher the probability that laws/regulations can be met, the higher the score.

8. Design and operational capabilities relative to worker health and safety issues and their relationship to applicable laws and regulations
The higher the probability that laws/regulations can be met, the higher the score.

9. Ability to permit based on compatibility of technology components/functions with current or proposed California regulatory/permitting structure
The more compatible a technology is with the current or proposed structures, the higher the score.

OPERATIONAL CHARACTERISTICS, TECHNICAL AND MECHANICAL SUPPORT

10. Ability to produce minimal amounts of residual waste
The less residual waste produced, the higher the score.

11. Production of residual hazardous wastes
Non-existence or minimization of residual hazardous wastes improve the score

12. Flexibility of system relative to scaling (i.e., increasing/decreasing throughput)
The more flexible the system, the higher the score.

13. Risk of process upset.
The more stable and risk-resistant the conversion technology, the higher the score.

INTRINSIC ELEMENTS

14. Electricity requirements
The lower the requirements, the higher the score.

15. Water usage
The lower the usage, the higher the score.

16. Project air emissions profile
The lower the profile, the higher the score.

VIII. TECHNOLOGY RANKING

Summary of Process

The Subgroup utilized the previously referenced criteria to rank conversion technologies that met the screening parameters. Additionally, each criterion was assigned a pre-determined weighting factor, which the MJSWTG approved on June 23, 2003. The Subgroup developed a second RFI based on the ranking criteria (see **Appendix D**) and circulated the information to the technologies who met the screening parameters. **Table 3** indicates which companies responded to the second request for information.

A Technology Ranking Committee was formed that was made up of interested parties from the Subgroup and the public (see **Table 4**). Each member of the Committee evaluated the information provided by the technology representatives and assigned a "draft" grade to each of the criteria. Following this, each member who provided grades met to discuss his or her impression of each conversion technology with the other members providing evaluations. Members adjusted or changed draft grades, based on additional considerations brought to light in the group discussion and finalized his or her grade for each conversion technology. The grades were then multiplied by the established weighting factor for each respective criterion to determine total scores. Each of the Subgroup members' total scores was calculated and aggregated with the others to determine the final score for each technology (see **Table 5**). Finally, the Subgroup established a short-list based on the final scores (also indicated in **Table 5**) and notified the vendors accordingly.

TABLE 3: VENDORS WHO RESPONDED TO RFI #2	
TECHNOLOGY	***RESPONDED TO RFI #2***
GASIFICATION	
Brightstar Environmental, Inc.	**X**
CR&R, Inc. (Renewable Resources Alliance, LLC)	**X**
Down Stream Systems, Inc.	**X**
Eco Electric Power Company	
Global Energy Solutions	
Recovered Energy, Inc.	**X**
Scientific Utilization, Inc.	**X**
Thermogenics, Inc.	
HYDROLYSIS	
Arkenol, Inc.	**X**
Genehol, Inc.	**X**
Masada OxyNol LLC	
ANAEROBIC COMPOSTING	
Arrow Ecology, LLC	**X**
BLT Enterprises, Inc.	**X**
CCI US Corporation	
ECOCORP	**X**
Waste Recovery Systems, Inc.	**X**
OTHER	
Herhof Umwelttechnik GmbH	**X**
ReCulture Engineering AB	

TABLE 4: TECHNOLOGY RANKING COMMITTEE MEMBERS	
MEMBER	***AFFILIATION***
Joerg Blischke	Public/Metcalf & Eddy
Peter Cantle	Air Pollution Control District
Jon Clark	Public
Peter Jeschke	Public/MEI Power Corporation
Robin Klein	Public
Maurie McGuire	Public
Stephen MacIntosh	City of Santa Barbara
John McInnes	County of Santa Barbara
Dan Predpall	Public/URS Corporation
David Raney	Public
Brian Truatwein	Public/Environmental Defense Center
John Zhao	City of Santa Maria

TABLE 5: WASTE CONVERSION RANKING RESULTS

TECHNOLOGY	*CRITERIA (WEIGHT)*												*TOTAL*
	Fiscal Viability *(20%)*		Demonstrated Ability *(30%)*		Market Issues *(15%)*		H,S&E Standards *(20%)*		Operational Characteristics *(10%)*		Intrinsic Elements *(5%)*		***(RANK)***
	score	*total*	*score*	*total*	*score*	*Total*	*score*	*total*	*score*	*total*	*score*	*total*	
Brightstar Environmental, LLC	7.7	154	7.1	213	6.8	102	5.5	110	6.6	66	4.3	22	**667 (4)**
Renewable Resources Alliance, LLC	7.2	144	6.3	189	9.2	138	8.2	164	6.5	65	7.0	35	**735 (1)**
Down Stream Systems, Inc.	4.2	84	4.9	147	6.5	98	5.4	108	5.6	56	7.0	35	528 (8)
Recovered Energy, Inc.	2.0	40	4.7	141	5.9	89	3.8	76	5.5	55	4.4	22	423 (11)
Scientific Utilization, Inc.	8.4	168	0.9	27	5.7	86	2.6	52	4.0	40	4.0	20	393 (12)
Arkenol, Inc.	6.6	132	2.1	63	4.9	74	5.4	108	2.5	25	4.8	24	426 (10)
Genehol, Inc.	7.8	156	4.4	132	7.0	105	5.2	104	5.9	59	1.7	9	**565 (7)**
Arrow Ecology, Ltd.	8.1	162	5.6	168	6.6	99	7.0	140	6.6	66	7.1	36	**671 (2)**
BLT Enterprises, Inc.	3.0	60	4.9	147	7.6	114	5.6	112	3.3	33	4.5	23	489 (9)
ECOCORP	8.6	172	7.8	234	3.8	57	6.0	120	6.0	60	5.2	26	**669 (3)**
Waste Recovery Systems, Inc.	5.9	118	7.7	231	4.1	62	5.7	114	4.9	49	7.6	38	**612 (5)**
Herhof Umwelttechnik GmbH	1.7	34	9.6	288	4.2	63	5.5	110	8.1	81	6.2	31	**607 (6)**

Notes:

- Scores were determined by aggregating all review committee member scores.
- The seven (7) highest-ranking companies were selected for further consideration and are shown in bold.

IX. INSTITUTIONAL ARRANGEMENTS

The Subgroup determined that institutional arrangements (e.g., public or private ownership and operational requirements) should be determined once the solid waste planning system is completed and short-listed vendors receive further consideration.

X. SITE REQUIREMENTS

Each of the short-listed companies provided a summary of the likely visual characteristics of their respective technology. As expected, the characteristics varied by technology. It is therefore impractical to determine specific site requirements until a particular technology is selected.

For preliminary planning purposes, the site should include at least 4 developable acres and have adequate existing (or potential) ingress and egress.

XI. COMMUNITY FORUMS

The Subgroup conducted community forums in conjunction with the Disposal Subgroup to gather input from the public. Forums were held as follows:

June 23, 2003 at 6:00 p.m.
County of Santa Barbara
Board of Supervisors Hearing Room
105 East Anapamu Street, 4th Floor
Santa Barbara, CA

June 25, 2003 at 6:00 p.m.
City of Santa Maria
Council Hearing Room
110 East Cook Street
City of Santa Maria, CA

A notification letter (see **Appendix E**) was sent to the 340 individuals who indicated an interest in the previous effort to site a new landfill in Santa Barbara County.

The agenda for each forum can be seen in **Appendix F**. Background information was provided on the history of disposal in Santa Barbara County and specific presentations were made by the Alternatives to Disposal Subgroup and Disposal Subgroup. The Alternatives to Disposal Subgroup presentation can be viewed on-line at the following location:
http://www.countyofsb.org/pwd/swud/MJSWTG/MJPP/WasteConversion_files/frame.htm
The Disposal Subgroup presentation can be viewed on-line at the following location:
http://www.countyofsb.org/pwd/swud/MJSWTG/MJPP/JOHN0603_files/frame.htm

Attendance at both forums was limited; however, all of the input received concerning the work to date was complimentary and supportive. Both Subgroups were encouraged to move forward with their work.

XII. SUBGROUP RECOMMENDATIONS

The Subgroup recommends that the TAC consider the development of a waste conversion facility as part of a long-term solid waste management plan. Such a facility would be initially designed to accept and process MSW being disposed at the Tajiguas Landfill and would offer the following benefits:

1. Approximately 80% (160,000 tons per year) of all tons processed would be diverted from landfill
2. ca 35% (70,000 tons per year) are recyclables captured by up-front MRF and sent to traditional recycling markets
3. ca 45% (90,000 tons per year) are organic materials converted to "green" energy which is a locally sustainable resource
4. The resulting landfill diversion creates long-term disposal scenarios that would otherwise be unavailable (e.g., the projected 15-year life/capacity of Tajiguas Landfill would be transformed to 50+ years)
5. The net cost of conversion (circa $25/ton) is competitive with existing ($35/ton) and future (circa $80/ton) disposal/landfill costs.
6. A conversion facility would require only a fraction of the land necessary for landfill.
7. While approximately 20% (40,000 tons per year) of all the tons processed by a conversion facility must be landfilled, this waste would be converted into an inert state, which would significantly reduce operational costs and potential long-term environmental risks and associated liabilities.
8. A conversion facility could produce "green" electricity thereby contributing towards the achievement of California's renewable portfolio requirements and supporting local sustainability.

The Subgroup has established a short-list of waste conversion technologies for consideration if and when a conversion facility is developed. The short-list of companies that are best suited for application in Santa Barbara County include:

1. **Renewable Resources Alliance, LLC**
2. **Arrow Ecology, Ltd** http://www.arrowecology.com/
3. **Ecocorp** http://www.ecocorp.com/
4. **Brightstar Environmental, LLC** http://www.brightstarenvironmental.com/
5. **Waste Recovery Systems, Inc.** http://www.steinmuller-valorga.fr/index_en.php
6. **Herhof Umwelttechnik GmbH** http://translate.google.com/translate?hl=en&sl=de&u=http://www.herhof.de/inhalt.htm&prev=/search%3Fq%3DHerhof%26hl%3Den%26lr%3D%26ie%3DUTF-8%26oe%3DUTF-8%26sa%3DG
7. **Genehol, Inc.** http://www.genaholincorporated.com/pages/689410/index.htm

These recommendations are based on all of the work to date and encompassed in the TAC's required standardized form (see **Appendix B**).

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APPENDIX A

SUBGROUP WORKPLAN

Multi-Jurisdictional Solid Waste Task Group
Alternatives to Disposal Subgroup
Work Plan

TASKS

TASK 1: DEVELOP GUIDING PRINCIPLES FOR SUBGROUP

Summary:
Principles will be developed that guide the project throughout its duration and are consistent with the Multi-Jurisdictional Solid Waste Task Group guiding principles.

Deliverables/Work Product:
A description of the Subgroup's Guiding Principles.

TASK 2: DEVELOP TECHNOLOGY SCREENING PARAMETERS

Summary:
Technology screening parameters will be developed by a broad range of stakeholders for use in identifying, researching and reviewing technologies. The parameters will address key factors that will be used to identify and review technologies to determine those that may be viable in Santa Barbara County.

Deliverables/Work Product:
A description of Technology Screening Parameters.

TASK 3: IDENTIFY AND RESEARCH TECHNOLOGIES

Summary:
Technologies will be identified based on the subgroup principles developed in Task 1. Information on each technology will be gathered throughout this process according to the screening parameters developed in Task 2.

Deliverables/Work Product:
A database of technologies that includes corresponding technical information.

TASK 4: SCREEN TECHNOLOGIES

Summary:
All technologies identified in Task 3 will be screened using the parameters developed in Task 2.

Deliverables/Work Product:
A summary of the screening process and a corresponding list of technologies meeting the minimum requirements.

TASK 5: DEVELOP TECHNOLOGY RANKING CRITERIA

Summary:
Technology ranking criteria will be developed for evaluating and ranking those technologies meeting the minimum screening criteria. Once the criteria are developed, specific weighted values for each criterion will be established.

Deliverables/Work Product:
A summary of the ranking criteria and corresponding process.

TASK 6: RANK TECHNOLOGIES

Summary:
Based on the availability of technical information gathered in Task 3, technologies meeting the minimum requirements contained in the screening parameters will be ranked according to the criteria developed in Task 5.

Deliverables/Work Product:
A summary of the findings resulting from the ranking process.

TASK 7: DETERMINE INSTITUTIONAL ARRANGEMENTS

Summary:
A summary of institutional arrangements associated with the highest-ranked technologies will be developed that identifies:

- Vendor requirements or desired strategies (i.e., some technology vendors are only interested to participate in projects where they own and operate the respective facility); and
- A general overview of the potential benefits and risks associated with public and private ownership and operational structures for each of the highest-ranked technologies.

Each of the jurisdictions that may provide feedstock to the facility will be contacted and presented with the summary information so that a preliminary determination can be made as to each jurisdiction's interests in owning and/or operating one or more of the highest-ranking technologies. Based on these interests, desired institutional arrangements for each technology will be determined.

Deliverables/Work Product:

- A general summary of the institutional arrangements associated with each of the highest ranked technologies.
- A review of each jurisdiction's desired institutional arrangements for the highest ranked technologies and corresponding conclusions.

TASK 8: IDENTIFY SITE REQUIREMENTS FOR TECHNOLOGY(S)

Summary:
Available information from past solid waste facility siting efforts will be gathered and reviewed to determine potential or preferred sites for each of the highest-ranking technologies.

Deliverables/Work Product:
A summary of the siting process/information used to determine potential or preferred sites for each of the highest-ranking technologies.

TASK 9: CONDUCT COMMUNITY FORUMS

Summary:
A community forum will be conducted to present all findings and conclusions in Tasks 1 – 8 and receive input from the community.

Deliverables/Work Product:
A summary of all community input and comments.

TASK 10: DETERMINE FEASIBLE TECHNOLOGY(S)

Summary:
Based on the findings of Tasks 7, 8 and 9 above, each of the highest-ranking technologies will be evaluated to determine their feasibility in Santa Barbara County.

Deliverables/Work Product:
A description of each of the highest-ranking technologies' feasibility in Santa Barbara County.

TASK 11: IDENTIFY LEVEL OF INTEREST FROM PARTIES WITH POTENTIAL FEEDSTOCK FOR THE FEASIBLE TECHNOLOGY(S)

Summary:
Each of the jurisdictions that may provide feedstock to the facility will be contacted and presented with the feasibility findings in Task 10. Preliminary determinations will then be made concerning each jurisdiction's interest in participating in the feasible technologies.

Deliverables/Work Product:
A description of each feedstock contributor's response/interest in the feasible technology(s).

TASK 12: DEVELOP AND PRESENT FINAL REPORT TO MJSWTG TAC

Summary:
A report of all work and findings of the Subgroup will be developed and presented to the MJSWTG TAC for their consideration and adoption.

Deliverables/Work Product:
A report of all work and findings of the Subgroup.

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APPENDIX B

TAC EXECUTIVE SUMMARY TEMPLATE

MULTI-JURISDICTIONAL SOLID WASTE TASK GROUP

EXECUTIVE SUMMARY TEMPLATE

CATEGORY:

Diversion / Waste Conversion

TITLE:

Waste Conversion: An Environmentally Superior Alternative to Landfill

MAJOR FEATURES & CHARACTERISTICS:

The Subgroup recommends that the TAC consider the development of a waste conversion facility as part of a long-term solid waste management plan. Such a facility would be initially designed to accept and process MSW being disposed at the Tajiguas Landfill and would offer the following benefits:

1. Approximately 80% (160,000 tons per year) of all tons processed would be diverted from landfill
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4. The resulting landfill diversion creates long-term disposal scenarios that would otherwise be unavailable (e.g., the projected 15-year life/capacity of Tajiguas Landfill would be transformed to 50+ years)
5. The net cost of conversion (circa $25/ton) is competitive with existing ($35/ton) and future (circa $80/ton) disposal/landfill costs.
6. A conversion facility would require only a fraction of the land necessary for landfill.
7. While approximately 20% (40,000 tons per year) of all the tons processed by a conversion facility must be landfilled, this waste would be converted into an inert state, which would significantly reduce operational costs and potential long-term environmental risks and associated liabilities.
8. A conversion facility could produce "green" electricity thereby contributing towards the achievement of California's renewable portfolio requirements and supporting local sustainability.

The Subgroup has established a short-list of waste conversion technologies for consideration if and when a conversion facility is developed. The short-list of companies that are best suited for application in Santa Barbara County include:

1. **Renewable Resources Alliance, LLC**
2. **Arrow Ecology, Ltd** http://www.arrowecology.com/
3. **Ecocorp** http://www.ecocorp.com/
4. **Brightstar Environmental, LLC** http://www.brightstarenvironmental.com/
5. **Waste Recovery Systems, Inc.** http://www.steinmuller-valorga.fr/index_en.php
6. **Herhof Umwelttechnik GmbH** http://translate.google.com/translate?hl=en&sl=de&u=http://www.herhof.de/inhalt.htm&prev=/search%3Fq%3DHerhof%26hl%3Den%26lr%3D%26ie%3DUTF-8%26oe%3DUTF-8%26sa%3DG
7. **Genehol, Inc.** http://www.genaholincorporated.com/pages/689410/index.htm

The recommended facility would, at a minimum, process mixed solid waste (MSW) using a sophisticated material recovery facility (MRF) and a conversion technology. The MRF would 1) recover recyclables not currently captured by source separation programs and 2) produce a homogeneous feedstock for conversion into a fuel product. The conversion technologies include gasification, hydrolysis or anaerobic digestion and are defined as follows:

"The processing, through non-combustion thermal means, chemical means, or biological means of mixed municipal solid waste from which recyclable materials have been substantially diverted and/or removed to produce electricity, alternative fuels, chemicals, or other products that meet quality standards for use in the marketplace, with minimum amount of residuals remaining after processing."

The technologies investigated are defined as follows:

Gasification is a process that uses heat, pressure, and steam to convert materials directly into a gas composed primarily of carbon monoxide and hydrogen. Three primary products result: hydrocarbon gases (also call syngas), hydrocarbon liquids (oils) and char (carbon black and ash). Syngas can be used as a fuel to generate electricity or steam, or as a basic chemical building block for a multitude of uses.

Hydrolysis is a chemical decomposition process that uses water to split chemical bonds of substances. Material in our solid waste that is derived from plants have structural components composed of lignocellulosic fibers, which in turn are comprised of three major fractions: cellulose, hemicellulose, and lignin. Cellulose and hemicellulose are chains of sugar molecules that can be broken down chemically or biologically into the component sugars. The sugars are then fermented using yeast or bacteria to produce ethanol, which is then distilled to a higher concentration for final use.

Anaerobic Digestion is the bacterial breakdown of organic materials in the absence of oxygen. This biological process produces agricultural fertilizer and a gas, sometimes called biogas, principally composed of methane and carbon dioxide, which can be used as a fuel to generate electricity of steam.

TARGETED MATERIAL:

The recommended facility would accept **mixed solid waste (MSW)** entering the Tajiguas Landfill (ca. 200,000 tons per year of MSW generated by the County unincorporated areas in the South Coast and Santa Ynez Valley and cities of Santa Barbara, Goleta, Buellton and Solvang).

Biosolids that are generated in Santa Barbara County could also be accepted and processed by the facility.

Household hazardous waste (HHW) contained within the MSW would likely be recovered at the facility. However, like any program that captures HHW, significant related costs would be realized.

APPLICATION TO GUIDING PRINCIPLES:

The following information describes the general characteristics of the Subgroup's short-listed conversion technologies.

LOCAL CONTROL

Participating jurisdictions would retain their authority to set rates and control the waste flow sent to the conversion facility utilizing any number of institutional arrangements (public or private ownership and operational arrangements).

Additionally, the facility would be located in Santa Barbara County, which would provide additional security related to local control of the program.

REGIONAL SERVICES

The facility would be designed to accommodate the South Coast and Santa Ynez Valley wastesheds. However, all of its components are flexible and could be sized upward should additional jurisdictions or wastesheds wish to participate in the future.

WASTE DIVERSION

The facility would divert a significant quantity of MSW that is currently landfilled. All of the commodities generated would be returned to the economic mainstream (e.g., recyclables, fuel) and would result in new tons of diversion.

As previously stated, approximately 80% (160,000 tons per year) of all tons processed by a conversion facility could be diverted from landfill

- approximately 35% (70,000 tons per year) diversion attributable to recyclables captured by up-front MRF and sent to traditional recycling markets
- approximately 45% (90,000 tons per year) diversion attributable to the conversion of organic materials into "green" energy which is a locally sustainable resource

The permitted capacity of the Tajiguas Landfill is currently projected to provide approximately 15 years of disposal life. By implementing a conversion facility, the same permitted capacity would provide more than 50 years of disposal life.

Finally, it's important to note that the facility would support and complement other existing waste diversion activities such as source separated collection programs.

ECONOMIC EFFICIENCIES

The facility's net cost per ton would be competitive with existing and future disposal/landfill costs. It is therefore possible to integrate the facility into the existing solid waste system, which recognizes the need for responsible fiscal management and fiscal constraints.

The average net cost per ton for all of the technologies responding to information requests was $23.00.

The average net cost per ton for the short-listed technologies was $19.50.

The net cost per ton for the company that ranked highest in the Subgroup's evaluation process was $15.54. For purposes of this template and the related system planning effort, the highest ranking company's financial information is provided.

Cost Category	*Total Annual Cost*	*Cost Per Ton Processed*
Capital	$5,138,484	$25.69
Operating & Maintenance	$8,003,594	$40.02
Total Costs	*$13,142,078*	*$65.71*

Revenue Category	*Total Annual Revenue*	*Revenue Per Ton Processed*
Recyclable Commodities (paper, glass, metal, etc.)	$3,383,240	$16.92
Electricity	$6,650,582	$33.25
Total Revenues	*$10,033,822*	*$50.17*

	Total Annual Net Cost	***Net Cost Per Ton***
Net Cost	**$3,108,256**	**$15.54**

The above referenced annual capital cost is based on a total facility capital expense of approximately $37,000,000. All of the other short-listed vendors have indicated capital expenses between forty and fifty-five million dollars.

The above referenced annual operating and maintenance cost includes the expense of disposing all resulting residual (at $45 per ton).

Finally, for comparison with other waste management options/programs, the above referenced total annual net cost can be shown in the following units:

- Net cost per ton of all tons processed = $15.54
- Net cost per ton of all tons diverted = $19.43

RELIABILITY

There are typically three major components of such a facility: 1) material recovery and preparation, 2) waste conversion and 3) green energy production. The material recovery component of the facility would have a proven track record of operating for several years in the U.S. and could produce products that are the same as other existing recycling programs. Thus, this component would be capable of providing high-quality and consistent service over the life of the projected operation.

The reliability of the conversion and energy production components of the facility would be largely dependent on which short-listed technology and company is ultimately selected for implementation. Specifically, different technologies produce a variety of end products and have different operating histories. The majority of end products (e.g., electricity, ethanol and other fuels) all have existing and reliable end markets. However, there will likely be fluctuations in the end-market value of materials that are similar to those which are tied to commodities derived from traditional recycling programs.

With regards to the operating history of conversion technologies, all of the short-listed companies have experience. The following cities have an existing conversion facility that is similar to the proposed Santa Barbara facility:

City	***Country***	***Short-list Company***
Wollongong	Australia	Brightstar Environmental, LLC
Tel Aviv	Israel	Arrow Ecology, Ltd
Barcelona	Spain	EcoCorp
Barcelona	Spain	Waste Recovery Systems, Inc.
La Coruna	Spain	Waste Recovery Systems, Inc.
Cadiz	Spain	Waste Recovery Systems, Inc.
Amiens	France	Waste Recovery Systems, Inc.
Berhingen	Germany	EcoCorp
Sagard	Germany	EcoCorp
Lemgo	Germany	EcoCorp
Freiburg	Germany	Waste Recovery Systems, Inc.
Dresden	Germany	Herhof Umwelttechnik GmbH
Rennerod	Germany	Herhof Umwelttechnik GmbH
Mertesdorf	Germany	Herhof Umwelttechnik GmbH
Geel	Belgium	Herhof Umwelttechnik GmbH
Uppsala	Sweden	EcoCorp
Venice	Italy	Herhof Umwelttechnik GmbH
Columbus	Ohio	Genahol, Inc.

Additionally, there are numerous gasification facilities throughout the U.S that are utilizing the technology proposed by Renewable Resources Alliance, LLC. Several of these facilities have operated for more than 20 years using agricultural feedstocks including manures and hulls.

Finally, it's important to note that all of the short-listed companies are credible, reputable and in some cases, world renown, which has a positive effect on the types of institutional arrangements available and the likelihood that the facility will operate successfully. As an example, if local jurisdictions determine that the facility should be privately financed, owned and operated (to reduce the public sector's risk and liability) it is likely that all of the short-listed companies would be capable of entering into such an arrangement. Additionally, it is presumed that reputable companies would involve themselves in facilities that have a high probability of success and mirror their other profitable projects.

FLEXIBILITY

The initial facility design would be based on a given tonnage to be committed to the facility. All of the facility's components are flexible and can be sized upward should additional jurisdictions or wastesheds wish to participate in the future. Such an increase in tonnage could potentially increase overall efficiencies and reduce overall costs. Similarly, the facility could accept less material than provided for in the original design however the overall efficiencies would likely be reduced thereby increasing the costs. It is also conceivable that the components of a facility could be phased in such that the material processing and preparation operations are brought on line in the near term and conversion functions at a later date.

With regard to evolving regulations, the California Integrated Waste Management Board (CIWMB) is currently developing regulations for the permitting of gasification and hydrolysis technologies (regulations for permitting anaerobic digestion facilities already exist). It is expected that all of the technologies on the Subgroup's short-list will be permissible by the time jurisdictions determine their preferred long-term solid waste management plans and relevant infrastructure needs.

Lastly, the facility would contribute to the achievement of higher diversion mandates should they ever be legislated or required by local policy.

ADDITIONAL COMMENTS (Evaluating Positive and Negative Features)

The implementation challenges associated with a conversion facility are significantly less than those attributable to a new landfill scenario. In fact, they are similar to those associated with traditional recycling and composting infrastructure and include:

1. Finding an appropriate site for the facility
2. Securing reliable end markets for the resulting products (i.e., recyclables such as glass and metals, compost, fuel products and green power)
3. Obtaining a waste flow commitment from the participating jurisdictions.

When comparing the benefits and challenges to those associated with long-term disposal, it is apparent that waste conversion should be selected as a component of the long-range solid waste management system for Santa Barbara County.

APPENDIX C

REQUEST FOR INFORMATION #1

SANTA BARBARA COUNTY
MULTI-JURISDICTIONAL SOLID WASTE TASK GROUP

REQUEST FOR INFORMATION:
CONVERSION TECHNOLOGIES

RESPONSE DUE ON OR BEFORE 5:00 P.M. PDT, FEBRUARY 14, 2003

1. INTRODUCTION

The County of Santa Barbara Board of Supervisors and the Santa Barbara City Council established the Santa Barbara County Multi-jurisdictional Solid Waste Task Group (MJSWTG) in June 2001. It has since grown to include all cities within the Santa Barbara County as well as affected special districts.

The purpose of the MJSWTG is to provide the communities within Santa Barbara County with a forum to discuss and plan long-term solid waste management strategies and facilities. As part of this effort, the MJSWTG is investigating the feasibility of developing solid waste conversion technologies that are capable of processing mixed municipal solid waste that is currently being sent to local landfills. This investigation involves a nine-step process of which this Request for Information (RFI) is part of step 3:

1. Develop Guiding Principles
2. Develop Screening Parameters
3. Technology Identification and Research
4. Screen Technologies
5. Develop Technology Ranking Criteria
6. Rank Screened Technologies
7. Identify Facility Siting Requirements
8. Determine Institutional Arrangements
9. Determine Preferred Technology

Guiding principles and screening parameters (steps 1 and 2) are included as part of this document as Attachments 1 and 2 respectively. Additional information can be obtained at the following web site:

http://www.countyofsb.org/pwd/swud/MJSWTG/AltDisp.htm

2. PURPOSE

The purpose of this RFI is to solicit and gather information that will assist the MJSWTG in determining the potential application of such technologies in the region. Information submitted by entities responding to this request will be evaluated using screening parameters and those technologies meeting the minimum requirements will receive further consideration.

For purposes of this request, solid waste conversion technologies are defined as:

"The processing, through non-combustion thermal means, chemical means, or biological means of mixed municipal solid waste from which recyclable materials have been substantially diverted and/or removed to produce electricity, alternative fuels, chemicals, or other products that meet quality standards for use in the marketplace, with minimum amount of residuals remaining after processing."

Technologies that do not fall within this definition will not receive further consideration as part of this process; however, they may be considered in other MJSWTG planning efforts.

3. INSTRUCTIONS FOR SUBMITTAL OF RESPONSES

Due Date

One copy of each submittal should be received by the County of Santa Barbara Public Works Department (County) no later than 5:00 p.m. Pacific Daylight Time on February 14, 2003. Responses may be submitted via standard or overnight mail, electronic mail, fax or by hand in accordance with the time and date noted. Responses should be addressed to:

Mr. John McInnes, Innovative Programs Manager
County of Santa Barbara Public Works Dept.
123 East Anapamu Street
Santa Barbara, CA 93101
Email: jmcinne@co.santa-barbara.ca.us
Facsimile: (805) 568-3019

Response Requirements

All responses received by the County should include completed responses to questions contained in Section 4 of this RFI.

Contact for Information

All questions regarding this RFI should be directed to:

Mr. John McInnes, Innovative Programs Manager
County of Santa Barbara Public Works Dept.
123 East Anapamu Street
Santa Barbara, CA 93101
Email: jmcinne@co.santa-barbara.ca.us
Telephone: (805) 568-3552
Facsimile: (805) 568-3019

Questions will be accepted via oral communications, electronic mail, standard or overnight mail, or fax and will be answered to the best of the County of Santa Barbara Public Works Department's ability.

Response Preparation

Response preparation costs will not be reimbursed under this RFI. All responses, and the contents therein, will become the property of the County of Santa Barbara Public Works Department.

Commitment

The RFI process does not commit the MJSWTG, its members or the County of Santa Barbara Public Works Department to issue any subsequent Request for Proposal (RFP) or to pay any costs incurred in preparation of a response to this RFI.

4. QUESTIONNAIRE

Please provide completed responses to the following:

Question 1:
Name of Firm: _____
Name of Technology: _____
Principal Contact Person: _____
Address: _____
City: _____ State: _____ Zip: _____
Country: _____
Telephone No.: _____ Fax: _____
E-mail Address: _____

Question 2:
Is your technology capable of processing a minimum of 200,000 tons per year of mixed municipal solid waste? (*A characterization of the applicable mixed municipal solid waste stream in Santa Barbara County is provided in Attachment 3.*) If not, what types of waste is your technology capable of processing and what are the minimum and maximum amounts (tons per year) that are required?

Question 3:
Is your technology modular and/or flexible in its design? If so, please describe the technology's ability to adapt to and accommodate/accept waste that exceeds the initial facility design parameters.

Question 4:
Is your technology capable of operating for a minimum of 20 years? If so, please describe the basis of your conclusions.

Question 5:
If 200,000 tons of mixed municipal solid waste were delivered to a facility that utilized your technology, what are the minimum and maximum amounts of residual waste (waste to be landfilled) that would result after processing? Please describe the nature of the residual waste (i.e., material type, toxicity, density, etc.)

Question 6:
Does your technology require input of feedstock (materials or waste) that is not typically found in mixed municipal solid waste streams? If so, please describe the feedstock(s).

Question 7:
If 200,000 tons of mixed municipal solid waste were delivered to a facility that utilized your technology, please estimate, using a range if desired, the facility's 1) total capital cost (excluding the cost of land) and 2) annual operating and maintenance costs.

Question 8:
If 200,000 tons of mixed municipal solid waste were delivered to a facility that utilized your technology, please describe all of the end products that would be produced (i.e., electricity, alternative fuels, chemicals, etc.).

Question 9:
Based on your answer for question 8 above, please describe the probable, identifiable or existing end markets for all of the products that your technology would produce. Please provide estimated annual revenues for each product.

Attachment 1

MJSWTG Guiding Principles for Conversion Technologies Investigation

The following principles should guide the Subgroup's activities throughout its duration.

Local Control

Local decision making bodies should retain their authority to set rates and control the waste flow that may be sent to conversion technologies.

Regional Services

Conversion technologies should be flexible to allow for various levels of jurisdictional participation (i.e., the inclusion of additional tonnage or waste-streams in the future).

Waste Diversion

Conversion technologies should be capable of diverting a significant quantity of mixed solid waste that is currently landfilled and providing solutions that are environmentally superior to disposal. They should not replace or hinder existing and successful recycling programs.

Economic Efficiencies

Conversion technologies should be viewed as an integral component of local solid waste systems thereby recognizing the need for responsible fiscal management and fiscal constraints.

Reliability

Conversion technologies should be capable of providing high-quality and consistent service over the life of their projected operation.

Flexibility

Conversion technologies should be part of an integrated system, which is flexible to accommodate both advances in technologies and various levels of jurisdictional participation in system components.

Attachment 2

MJSWTG Screening Parameters for Conversion Technologies Investigation

The Subgroup will use the following six parameters to screen conversion technologies for application in Santa Barbara County.

7. A conversion technology should be capable of processing mixed solid waste that is disposed of in county landfills (100,000 – 400,000 tons per year).

8. A conversion technology should be capable of operating for a minimum of 20 years.

9. A conversion technology should be compatible with local solid waste management systems including existing recycling programs.

10. The majority of processed waste from a conversion technology should be diverted from landfill.

11. In consideration of fiscal management and constraints, a conversion technology should be competitive with the costs of siting, developing and operating a new landfill.

12. A conversion technology should produce end products that have probable, identifiable or existing markets.

Attachment 3

Summary of Santa Barbara County South Coast Region

*Waste Disposal Characterization Estimates**

Waste Categories	**Weighted Average Percentage**	**Percentage**	
		Residential	*Commercial*
Paper	30.3%	34.7%	25.8%
Glass	2.8%	3.6%	2.0%
Metal	5.2%	4.2%	6.2%
Plastic	8.4%	8.7%	8.1%
Organics	36.3%	41.5%	30.9%
Construction Debris	14.0%	5.1%	23.1%
Household Hazardous Material	1.1%	0.8%	1.3%
Special Waste	1.7%	1.2%	2.2%
Mixed Residue	0.2%	0.1%	0.3%

* Estimates taken from studies performed in FY 1997/98 and adjusted to account for recycling programs which have since been implemented.

APPENDIX D

REQUEST FOR INFORMATION #2

SANTA BARBARA COUNTY
MULTI-JURISDICTIONAL SOLID WASTE TASK GROUP

REQUEST FOR INFORMATION #2:
Pre-Qualified Conversion Technologies

RESPONSE DUE ON OR BEFORE 5:00 P.M. PDT, MAY 2, 2003

1. INTRODUCTION

The County of Santa Barbara Board of Supervisors and the Santa Barbara City Council established the Santa Barbara County Multi-jurisdictional Solid Waste Task Group (MJSWTG) in June 2001. It has since grown to include all cities within the Santa Barbara County as well as affected special districts.

The purpose of the MJSWTG is to provide the communities within Santa Barbara County with a forum to discuss and plan long-term solid waste management strategies and facilities. As part of this effort, the MJSWTG is investigating the feasibility of developing solid waste conversion technologies that are capable of processing mixed municipal solid waste that is currently being sent to local landfills. This investigation involves a nine-step process of which this Request for Information (RFI) is part of step 6:

10. Develop Guiding Principles
11. Develop Screening Parameters
12. Technology Identification and Research
13. Screen Technologies
14. Develop Technology Ranking Criteria
15. Rank Screened Technologies
16. Identify Facility Siting Requirements
17. Determine Institutional Arrangements
18. Determine Preferred Technology

Steps 1-4 have been completed and corresponding information can be obtained at the following web site:
http://www.countyofsb.org/pwd/swud/MJSWTG/AltDisp.htm
In summary, the MJSWTG contacted and requested information from more than fifty waste conversion technologies worldwide. Twenty-one companies responded to the request and eighteen

met the approved screening parameters (see Attachment 1). These eighteen companies are therefore pre-qualified to respond to this RFI.

2. PURPOSE

The purpose of this RFI is to solicit and gather additional information from the pre-qualified companies in order to establish a short list of technology vendors for further consideration.

3. INSTRUCTIONS FOR SUBMITTAL OF RESPONSES

Only those companies who are pre-qualified may respond to this RFI. A list of the pre-qualified companies can be seen in Attachment 1.

Responses from entities who are not pre-qualified will not be considered and will be returned unopened.

Due Date

One copy of each submittal should be received by the County of Santa Barbara Public Works Department (County) no later than 5:00 p.m. Pacific Daylight Time on May 2, 2003. Responses may be submitted via standard or overnight mail, electronic mail, fax or by hand in accordance with the time and date noted. Responses should be addressed to:

Mr. John McInnes, Innovative Programs Manager
County of Santa Barbara Public Works Dept.
123 East Anapamu Street
Santa Barbara, CA 93101
Email: jmcinne@co.santa-barbara.ca.us
Facsimile: (805) 568-3019

Response Requirements

All responses received by the County should include completed responses to each request contained in Section 5 of this RFI, regardless of previous responses or submittals to the MJSWTG or related jurisdictions (e.g., some vendors submitted portions of the requested information in their responses to the previous RFI).

If a respondent contends the information required by a particular question is a "trade secret" as that term is defined by California Civil Code Section 3426.1 or Penal Code Section 499c[1], the respondent must indicate this contention by writing the words "trade secret" on each response. In addition, the respondent shall list on a separate page the number of each response that is claimed to be a "trade secret." The respondent, under penalty of perjury, shall sign this separate page and shall include it with this Request For Information #2: Pre-Qualified Conversion Technologies. In the event the County receives a written state Public Records Act (PRA) request for the disclosure of any information that the respondent has verified to be a "trade secret," the County will immediately notify the respondent in writing that the County has received a PRA request for the "trade secret." Within five (5) days of the notification by the County that it has received the PRA request, respondent shall either authorize in writing the disclosure of the requested information or it shall direct that the County withhold the disclosure of such information. The County, pursuant to Government Code Section 6255, shall then provide written notification to the person requesting the disclosure of the PRA information that such information will not be disclosed and the reasons thereto. **Each respondent, by designating certain information contained herein to be a "trade secret," hereby expressly agrees, without reservation, to indemnify and defend the County against any and all claims against the County for failure of the County to disclose the requested "trade secret" information**.

Contact for Information

All questions regarding this RFI should be directed to:

Mr. John McInnes, Innovative Programs Manager
County of Santa Barbara Public Works Dept.
123 East Anapamu Street
Santa Barbara, CA 93101
Email: jmcinne@co.santa-barbara.ca.us
Telephone: (805) 568-3552
Facsimile: (805) 568-3019

[1] Civil Code § 3426.1 (d) and Penal Code Section 499c (d): "Trade Secret" means information, including a formula, pattern, compilation, program, device, method, technique, or process, that: (1) Derives independent economic value, actual or potential, from not being generally known to the public or to other persons who can obtain economic value from its disclosure or use; and (2) Is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

Questions will be accepted via oral communications, electronic mail, standard or overnight mail, or fax and will be answered to the best of the County of Santa Barbara Public Works Department's ability.

Response Preparation

Response preparation costs will not be reimbursed under this RFI. All responses, and the contents therein, will become the property of the County of Santa Barbara Public Works Department.

Commitment

The RFI process does not commit the MJSWTG, its members or the County of Santa Barbara Public Works Department to issue any subsequent Request for Proposal (RFP) or to pay any costs incurred in preparation of a response to this RFI.

4. EVALUATION OF RESPONSES

Ranking Criteria have been established to evaluate all responses to this RFI (see Attachment 2). On May 5, 2003, the MJSWTG will consider weighting factors for each of the criteria. Once the weighting factors are approved, a review committee will evaluate and grade each response to this request using the approved ranking criteria and weighting factors. The grades will determine the ranking of the responses. Based on these rankings, a short list of technology vendors will be established for further consideration.

5. QUESTIONNAIRE

Please respond to the following requests assuming that 200,000 tons of mixed municipal solid waste will be delivered to a facility utilizing your technology (a characterization of the applicable mixed municipal solid waste stream in Santa Barbara County is provided in Attachment 3).

Request 1:

Confirm or update the following information:

1) Name of Firm
2) Name of Technology
3) Principal Contact Person
4) Mailing Address
5) Telephone Number
6) E-mail Address

Request 2:

Describe your technology, its key components and how they work.

Request 3:

Complete the cost form provided in Attachment 4 using the following assumptions:

a) Land costs $1,000,000 per acre
b) The cost of land is amortized over 30 years with an annual interest rate of 6%
c) The facility site is level, readily accessible and has adjacent utilities
d) All building and site improvements are amortized over 20 years with an annual interest rate of 6%.
e) All fixed equipment is amortized over 7 years with an annual interest rate of 6%
f) All rolling equipment is amortized over 5 years with an annual interest rate of 6%
g) Weighing system(s) are amortized over 7 years with an annual interest rate of 6%
h) All office equipment is amortized over 5 years with an annual interest rate of 6%
i) The cost of hauling and disposing residual material is $45 per ton
j) The cost of hauling refuse-derived fuel to a biomass power facility is $20 per ton
k) The cost of hauling and disposing/processing leaves, grass and other landscape & agricultural organic material is $20 per ton
l) Power shall be provided to the perimeter of the site at a cost of $60 per megawatt
m) Water shall be provided to the perimeter of the site at a metered rate of $3.92 per one hundred cubic feet (748 gallons)
n) All operating and maintenance costs should be adjusted annually at a rate of 3%.

Request 4:

Complete the revenue form provided in Attachment 5.

Request 5:

Describe up to five similar reference facilities. Each facility description should include:

- Name and Location
- Owner
- Operator
- Technology Utilized
- Capital Cost
- Throughput: Types and Quantities of Waste Accepted/Processed
- Types and Quantities of Products/Commodities Produced
- Amount of Residual Sent to Landfill
- Experience with facility breakdowns, maintenance and operability

Request 6:

Based on the quantities shown in your completed revenue form, prepare an analysis of the potential markets for the sale of the anticipated recovered products. The analysis should describe the stability or volatility of the end-markets and include the following:

- Definition of any financial assumptions used in the analysis
- Assumed end product characteristics used in study
- Sources of information and basic data
- Identification of the potential purchasers of the end products
- Estimated size of the market of potential purchasers
- Geographic boundaries assumed for the market
- Description of selling prices of products currently purchased by potential purchasers
- Extent to which local markets will be utilized or expanded

Request 7:

Describe your materials marketing experience and specify types of end-use materials handled. Provide the quantities and types of materials marketed in 2001/2002.

Request 8:

Describe the likely visual characteristics (size of footprint, height of buildings, number and size of stacks, vapor clouds, etc.) of a facility that incorporated your technology and was built on a level site.

Request 9:

Discuss the design and operational capabilities of your technology as they relate to California laws and regulations pertaining to air and water emissions and odor issues.

Request 10:

Discuss the design and operational capabilities of your technology as they relate to California laws and regulations pertaining to noise, litter, dust problems and other nuisance issues.

Request 11:

Discuss the design and operational capabilities of your technology as they relate to California laws and regulations pertaining to worker health and safety issues.

Request 12:

Describe how your technology (design and operations) interfaces with the current or proposed California regulatory/permitting structure.

Request 13:

Utilizing the waste characterization data in Attachment 3, provide a mass balance diagram of your facility that estimates all outputs including the amount of residual waste to be sent to a municipal solid waste landfill.

Request 14:

Describe any residual waste that will result from your process that cannot be disposed of in a municipal solid waste landfill.

Request 15:

Describe the flexibility of your technology relative to increasing or decreasing the amount of throughput.

Request 16:

Describe the potential hazards and safety risks that your technology presents. This should include, but not be limited to, a description of any storage or pressurized containment of hazardous, noxious, or explosive materials, the volume of such materials, any transport of such materials, and the system safety design considerations that are inherent in the processes you propose.

Request 17:

Indicate the amount of power your facility would require from offsite sources each year.

Request 18:

Indicate the type and amount of water your facility would require from offsite sources each year.

Request 19:

While your technology must meet existing air pollution control regulations, describe in detail any innovative or advanced air pollution prevention or control methods, techniques and designs that are inherent in the processes you propose. Explain and provide an engineering basis for any advantages your processes possess in the way of advancing air pollution control measures.

Request 20:

Provide any information that you believe is pertinent to your technology and that was not addressed in the previous requests herein.

Attachment 1

Pre-Qualified Conversion Technology Companies

The following companies have demonstrated that their respective technologies have met the MJSWTG minimum screening parameters for waste conversion:

GASIFICATION
Brightstar Systems, Inc. CR&R, Inc. Down Stream Systems, Inc. Eco Electric Power Company Global Energy Solutions Recovered Energy, Inc. Scientific Utilization, Inc. Thermogenics, Inc.
HYDROLYSIS
Arkenol, Inc. Genehol, Inc. Masada OxyNol LLC
ANAEROBIC COMPOSTING
Arrow Ecology LLC BLT Enterprises, Inc. CCI US Corporation ECOCORP Waste Recovery Systems, Inc.
OTHER
Herhof Umwelttechnik GmbH ReCulture Engineering AB

Attachment 2
MJSWTG Ranking Criteria for
Waste Conversion Technologies

FISCAL VIABILITY

1. Total Net Cost (capital + operating – projected revenues)
The lower the cost, the higher the score.

DEMONSTRATED ABILITY

2. Demonstrated ability of conversion technology to operate in similar conditions (tons and types of feedstock processed) with minimal intervention and down-time
The greater the demonstrated ability, the higher the score.

MARKET ISSUES

3. Existence of markets
Existing stable markets would receive the highest score, existing volatile or highly probable would receive a medium score, and low probability would receive the lowest score.

4. Product marketing experience
The more experience, the higher the score.

HEALTH, SAFETY & ENVIRONMENTAL STANDARDS AND REGULATORY CONSIDERATIONS

5. Visual impacts of technology
The smaller the size and potential for impacting view-sheds, the higher the score.

6. Design and operational capabilities relative to emissions and odor issues and their relationship to applicable laws and regulations
The higher the probability that laws/regulations can be met, the higher the score.

7. Design and operational capabilities relative to noise, litter, dust problems, and other nuisance issues and their relationship to applicable laws and regulations
The higher the probability that laws/regulations can be met, the higher the score.

8. Design and operational capabilities relative to worker health and safety issues and their relationship to applicable laws and regulations
The higher the probability that laws/regulations can be met, the higher the score.

9. Ability to permit based on compatibility of technology components/functions with current or proposed California regulatory/permitting structure
The more compatible a technology is with the current or proposed structures, the higher the score.

OPERATIONAL CHARACTERISTICS, TECHNICAL AND MECHANICAL SUPPORT

10. Ability to produce minimal amounts of residual waste
The less residual waste produced, the higher the score.

11. Production of residual hazardous wastes
Non-existence or minimization of residual hazardous wastes improve the score

12. Flexibility of system relative to scaling (i.e., increasing/decreasing throughput)
The more flexible the system, the higher the score.

13. Risk of process upset.
The more stable and risk-resistant the conversion technology, the higher the score.

INTRINSIC ELEMENTS

14. Electricity requirements
The lower the requirements, the higher the score.

15. Water usage
The lower the usage, the higher the score.

16. Project air emissions profile
The lower the profile, the higher the score.

Attachment 3

Summary of Santa Barbara County South Coast Region

*Waste Disposal Characterization Estimates**

Waste Categories	Weighted Average Percentage	Percentage	
		Residential	*Commercial*
Paper	**30.3%**	**34.7%**	**25.8%**
OCC & Paper Bags	5.6%	4.9%	6.5%
Newspaper	3.7%	5.3%	2.0%
High Grade	0.6%	0.6%	0.6%
Office Pack	1.0%	1.1%	0.9%
Magazines	2.8%	4.3%	1.3%
Phone Books	0.4%	0.3%	0.6%
Mixed Paper	6.2%	8.0%	4.4%
Remainder Composite Paper	9.9%	10.4%	9.5%
Glass	**2.8%**	**3.6%**	**2.0%**
Clear Glass Containers	1.2	1.3%	1.1%
Colored Glass Containers	0.8	1.0%	0.5%
Flat Glass	0.1	0.1%	0.1%
Remainder Composite Glass	0.8	1.3%	0.3%
Metal	**5.2%**	**4.2%**	**6.2%**
Ferrous Metals	2.8	1.8%	3.7%
Appliances	0.2	0.2%	0.3%
Non-Ferrous Metals	1.4	1.4%	1.4%
Remainder Composite Metals	0.8	0.8%	0.9%
Plastic	**8.4%**	**8.7%**	**8.1%**
Pet #1	0.5	0.5%	0.5%
HDPE #2	0.6	0.5%	0.6%
Other Plastics #3-7	0.5	0.6%	0.3%
Film Plastic	3.2	3.4%	3.1%
Durable Plastic	0.9	0.8%	1.1%
Remainder Composite Plastic	2.7	2.9%	2.5%
ORGANICS	**36.3%**	**41.5%**	**30.9%**
Food	12.3	10.8%	13.8%
Leaves and Grass	6.1	8.9%	3.3%
Other Landscape & Agriculture	14.5	18.2%	10.7%
Miscellaneous Organic	1.7	2.6%	0.8%
Remainder Composite Organic	1.6	1.0%	2.3%
Construction Debris	**14.0%**	**5.1%**	**23.1%**
Concrete	0.3	0.1%	0.5%
Asphalt Paving	0.1	0.0%	0.2%
Asphalt Roofing	1.0	0.5%	1.6%
Lumber	7.2	3.2%	11.3%
Gypsum Board	1.8	0.5%	3.1%
Rock, Soil & Fines	0.6	0.1%	1.1%
Remainder Composite C&D	3.0	0.7%	5.3%
Household Hazardous Material	**1.1%**	**0.8%**	**1.3%**
Special Waste	**1.7%**	**1.2%**	**2.2%**
Mixed Residue	**0.2%**	**0.1%**	**0.3%**

* Estimates taken from studies performed in FY 1997/98 and adjusted to account for recycling programs which have since been implemented.

Attachment 4

Cost Form

ITEM *ANNUAL COST*

CAPITAL COSTS:

- Land $_____
- Building & Site Improvements $_____
- Fixed Equipment $_____
- Rolling Equipment $_____
- Weighing system $_____
  - Scale
  - Scale House
- Office Equipment $_____
  - Furniture
  - Computer System
  - Misc.
- Other (specify_____) $_____

TOTAL ANNUAL CAPITAL COSTS ***$_____***

OPERATING & MAINTENANCE COSTS:

- Operational Labor $_____
- Operating Labor Fringes $_____
  - Payroll taxes
  - Workers compensation insurance
  - Group benefits
  - 401K
  - uniforms
  - safety equipment
  - employee activities
- Other Direct Operating $_____
  - Haul and disposal of MSW
  - Haul and processing of Refuse Derived Fuel offsite
  - Haul and processing of leaves and grass offsite
  - Haul and processing of other materials
  - Equipment Fuel
  - Property & Liability Insurance
  - Operating Supplies
  - Utilities
  - Vector Control
  - Other

Attachment 4
(continued)

Cost Form

ITEM *ANNUAL COST*

OPERATING & MAINTENANCE COSTS *cont.*

- Direct Maintenance $_____
  - Parts-equipment
  - Shop Supplies
  - Other
- General & Administrative $_____
  - Administrative salaries
  - Clerical
  - Overtime
- General & Administrative Fringes $_____
  - Payroll taxes
  - Worker's compensation insurance
  - Group benefits
  - 401K
  - Other
- Miscellaneous General & Administrative $_____
  - Charities
  - Building Maintenance
  - Postage/delivery
  - Telephone
  - Printing
  - Supplies
  - Legal
  - Travel
  - Public relations
  - Misc.

TOTAL ANNUAL OPERATING & MAINTENANCE COSTS $_____

Attachment 5

Revenue Form

MATERIAL TYPE/PRODUCT	QUANTITY RECOVERED	x UNIT VALUE*	= TOTAL REVENUE
OCC	_____	_____	$_____
Newspaper	_____	_____	$_____
High Grade Paper	_____	_____	$_____
Office Pack Paper	_____	_____	$_____
Magazines	_____	_____	$_____
Phone Books	_____	_____	$_____
Mixed Paper	_____	_____	$_____
Other Paper	_____	_____	$_____
Clear Glass Containers	_____	_____	$_____
Colored Glass Containers	_____	_____	$_____
Mixed Glass	_____	_____	$_____
Ferrous Metals	_____	_____	$_____
Appliances	_____	_____	$_____
Non-Ferrous Metals	_____	_____	$_____
Composite Metals	_____	_____	$_____
Pet #1 Plastic	_____	_____	$_____
HDPE #2 Plastic	_____	_____	$_____
Pig Iron	_____	_____	$_____
Compost	_____	$5/ton	$_____
Fertilizer	_____	_____	$_____
Ethanol	_____	_____	$_____
Methanol	_____	_____	$_____
Refuse Derived Fuel	_____	_____	$_____
Electricity	_____	$.055/kWh	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____
Other (specify)	_____	_____	$_____

TOTAL REVENUES $_____

*freight-on-board delivered

APPENDIX E

COMMUNITY FORUM NOTIFICATION LETTER

COUNTY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT
123 East Anapamu Street
Santa Barbara, California 93101
805\568-3000 FAX 805\568-3019

PHILLIP M. DEMERY
Director

June 9, 2003

To all interested parties:

Two years ago, the County of Santa Barbara conducted a siting study for a new regional solid waste landfill. Numerous locations were considered and, based on property owner input, less than five sites emerged as having development potential. Since new landfills are very costly to develop and may in fact require regional governmental partnerships, the County of Santa Barbara halted the landfill siting effort and formed the Multi-jurisdictional Solid Waste Task Group. The Task Group includes all of the cities in the County and its purpose is to develop a long-term solid waste management plan that identifies necessary countywide facilities.

To develop a long-term plan, the Task Group has conducted extensive research and identified several options for managing solid waste, including emerging technologies that convert waste to energy, developing new landfill sites, and shipping waste to remote disposal locations.

Two public meetings will be held to discuss the Task Group's work to date, the new technologies being considered and criteria to be used for selecting appropriate disposal systems. The meetings will occur at the following times and locations:

June 23, 2003 at 6:00 p.m.
County of Santa Barbara Board of Supervisors Hearing Room
105 East Anapamu Street, 4th floor
Santa Barbara, CA

June 25, 2003 at 6:00 p.m.
City of Santa Maria Council Hearing Room
110 East Cook Street
City of Santa Maria, CA

If you have any questions regarding these meetings, please call John McInnes at 568-3552. I hope you will be able to join us in this very important discussion of our solid waste management future.

Sincerely,

Phillip M. Demery
Director

AA/EEO Employer

Thomas D. Fayram, Deputy Director Scott D. McGolpin, Deputy Director Mark A. Schleich, Deputy Director
Rochelle Camozzi, Business Manager Michael B. Emmons, County Surveyor
www.publicworkssb.org

APPENDIX F

COMMUNITY FORUM AGENDA

Multi-Jurisdictional Solid Waste Task Group

Co-Chairs

Gail Marshall
County of Santa Barbara

Dan Secord, MD
City of Santa Barbara

Members

Carlos Aguilera
City of Guadalupe

Lupe Alvarez
City of Guadalupe

Jean Blois
City of Goleta

John Carter
Goleta Sanitary District

Dick DeWees
City of Lompoc

Iya Falcone
City of Santa Barbara

Greg Gandrud
City of Carpinteria

Larry Lavagnino
City of Santa Maria

Ed Skytt
City of Solvang

Alice Patino
City of Santa Maria

Naomi Schwartz
County of Santa Barbara

Mike Siminski
City of Lompoc

Bill Traylor
City of Buellton

Jonny Wallis
City of Goleta

Diane Whitehair
City of Buellton

Disposal Subgroup & Alternatives to Disposal Subgroup

COMMUNITY MEETING AGENDA

Monday, June 23, 2003 ◆ 6:00 p.m.

Santa Barbara County Board of Supervisors Hearing Room

Fourth Floor, 105 E. Anapamu St., Santa Barbara

1) Call to Order & Introductions	Phil Demery
2) Background Information	Phil Demery
• Tajiguas Landfill Expansion	
• New Landfill Siting Study	
• MJSWTG Purpose and Structure	
3) Alternatives to Disposal Subgroup Presentation	John McInnes
4) Disposal Subgroup Presentation	John Zhao
5) Discussion and Public Input	Paul Karp

GUIDING PRINCIPLES

Local Control

Regional Services

Waste Diversion

Economic Efficiencies

Reliability

Flexibility