Alternative Technology Advisory Subcommittee
Los Angeles County Solid Waste Management Committee/
Integrated Waste Management Task Force

Minutes of June 7, 2007

County of Los Angeles
Department of Public Works
1st Floor Annex Building Conference Room
900 South Fremont Avenue
Alhambra, California

COMMITTEE MEMBERS PRESENT:
Alex Helou, City of Los Angeles Bureau of Sanitation
Kay Martin, Bioenergy Producers Association
Mike Mohajer, Los Angeles County Integrated Waste Management Task Force
Eugene Tseng, Eugene Tseng and Associates
P. Christine Urbach, Los Angeles County Department of Public Health
Michael Theroux, Theroux Environmental Consulting
Jeff Yann, Hacienda Heights Improvement Association

COMMITTEE MEMBERS NOT PRESENT:
Fernando Berton, California Integrated Waste Management Task Force
John McTaggart, Los Angeles County Integrated Waste Management Task Force

COMMITTEE MEMBERS REPRESENTED BY OTHERS
Paul Alva, represented by Coby Skye, Los Angeles County Department of Public Works
Ed Wheless, represented by Mark McDannel, County Sanitation Districts of Los Angeles County

OTHERS PRESENT:
Dorothy Austin, Alternative Resources, Inc.
Jim Binder, Alternative Resources, Inc.
Chip Clements, Clements Environmental
Ben Gibson, Cerrell Associates
Sue Higgins, Alternative Resources, Inc.
Virginia Jauregui, Los Angeles County Department of Public Works
Carlyle A. Johnson, Santa Barbara County
Carl Pederson III, Los Angeles County Department of Public Works
Mark Wittenberg, Cerrell Associates

I. CALL TO ORDER

The meeting was called to order at 1:05 p.m.

II. STATUS OF FACILITATION CONTRACT – SUE HIGGINS

Ms. Higgins provided an overview of the major activities completed for the facilitation contract. As of June 7, 2007, ARI has completed the following assignments:

- initiated Phase II, including MRF tours and meetings with site owners/operators in July 2006;
- assessed and expanded the list of participating technology suppliers between August and September 2006;
- prepared and issued a detailed request for information (RFI), including technical and financial evaluation criteria in October 2006;
- initiated and has continued to monitor funding research in November and December 2006;
- received RFI responses from the shortlisted technology vendors in late December 2006;
- coordinated presentations by the technology suppliers in January 2007;
- coordination and completion of the reference facility visits between February and April 2007; and
- facilitated a meeting with investment bankers in New York City in May 2007.

III. RECAP OF FACILITY REFERENCE TOURS

Mr. Skye provided a recap of the reference facility tours conducted between February and April 2007. The tours are a critical step, allowing the County to independently verify the performance of each technology, assess regulatory/policy differences, compare feedstock composition, and evaluate products and byproducts. Mr. Skye noted that meetings were held with local regulators, community members and other stakeholders impacted by each facility visited. The evaluation team, comprising representatives from the County, the Subcommittee, and the technical consultant (ARI), visited the following facilities:

1. **International Environmental Solutions (IES)** - On February 15, 2007, the team visited IES' 50 TPD facility in Romoland, CA. The facility utilizes a thermal pyrolysis process to produce a syngas for electricity generation, and secondary products including carbon char.

2. **NTech** – March 7-9, 2007, the team visited two NTech facilities: a gasification plant in Poland that has been processing medical waste at 15 TPD for the past three years, and a kinetic steamer in Yorkshire, England operating at 220 TPD for the past two years. The gasifier produces a syngas for electricity generation and secondary products including non-hazardous fly ash.

3. **ArrowBio** – On March 12, 2007, the team visited ArrowBio's 100 TPD facility in Hiriya,Israel which uses water separation and upflow anaerobic blanket digestion to process MSW feedstock. The plant has been in operation for the past three years and produces biogas for electricity generation and secondary products such as recyclables, digestate (soil amendment) and water.

4. **Integrated Waste Technologies (IWT)/ Thermoselect** – IWT/Thermoselct operates seven facilities, processing 330-612 TPD of separated MSW feedstock, which have been operating for four to eight years. April 2-3, 2007, the team visited two of the seven facilities, located in Kurashiki and Chiba, Japan. These facilities utilize thermal pyrolysis/gasification that process MSW feedstock, industrial wastes, sludge, and incinerator ash. The plants produce a syngas for electricity generation and other co-products such as metals and minerals.

5. **Changing World Technologies (CWT)** – The team visited CWT's facility, located in Carthage, Missouri, on April 25, 2007. The 250 TPD thermal depolymerization plant has been in operation for two years. The plant processes poultry waste from an adjacent turkey processing facility and produces an oil product that is sent to a refinery for production of diesel fuel and a solid carbon fuel product.

IV. DISCUSSION ON TECHNICAL EVALUATIONS – DOROTHY AUSTIN

Dorothy Austin provided a technological performance overview of each of the five shortlisted vendor technologies. The primary purpose of the evaluations is to gain a fundamental understanding of the material, energy flow, and the technology processes themselves, and to judge if the information provided was credible. The overview included a breakdown of the supplier's technology type, major products produced, diversion potential, proposed waste capacity, and waste characterization. Suppliers were reviewed on a number of different levels including: development of a complete process; readiness and reliability; processing capability; mass balance; energy balance; diversion potential; generation of marketable products; and the technology's environmental soundness.

The primary commodity produced by these technologies includes biogas, biodiesel, and syngas which can be used for the production of electricity. Secondary products generated from the five vendors also include recyclables, mixed metals, digestades, and inert ash. At present, shortlisted technology suppliers are in various stages of readiness, with NTech, IWT, and CWT having commercial sized facilities in operation, and ArrowBio and IES currently operating demonstration/pilot scale facilities. Mr. Clements added that relationships have been established with the regulators who would oversee a potential project in Southern California, and various permits may have to be revised prior to construction. Discussion on the technical evaluations ensued.

V. EVALUATION OF TECHNOLOGY SUPPLIERS QUALIFICATIONS

Mr. Mackenzie provided an overview of the technology supplier qualifications, including the suppliers' financial and managerial capabilities. Criteria used for financial evaluation include financing approaches, financial security, risk postures and project economics. All technology vendors cited having project financing experience, and all have relationships with experienced financial institutions. Moreover, all companies are owners, licensees, or the sole representative of the proprietary technologies. All the vendors have long-term access to technical support with experienced team members overseas and in the U.S.

Mr. Mackenzie commented that banking institutions involved would be applying an industry standard approach to the project and are comfortable with the technologies and the construction risks involved. The potential facility would most likely be privately financed and owned, which will influence to some extent its financing plan and credit structure. The project would be financed over a period of 15 to 20 years, with the waste supply delivered by either a public sector agency for the full term of the financing, or by a private company with some form of governmental step-in/back-up arrangement. Discussion related to the projects' financing ensued, and included an overview of each technology's financing experience.

VI. SUMMARY OF ECONOMICS – DAVID MACKENZIE

Mr. Mackenzie provided a summary of the project economics for the five shortlisted vendor technologies which included: estimates for design capacity, annual availability, and waste processed; development and capital costs; financing related costs and total capital costs; annual costs including total annual debt service/capital recovery costs, first year and O&M costs. Costing information and commodity price information provided by the companies were reviewed and determined to be internally consistent. Most estimated tipping fees are within the $50 to $70/ton range.

VII. MRF EVALUATIONS – CHIP CLEMENTS

Mr. Clements provided a detailed analysis of the MRF facilities based on their ability to meet primary criteria, including space availability, adequacy of utilities, feedstock quantity, quality and dependability, land use, regulatory, permitting and environmental issues, location, and environmental justice issues. The MRFs were also evaluated on secondary criteria which included CT product markets, cost of construction and constraints, recycling market development zones (RMDZ), accessibility to major transportation routes, competing disposal and diversion options and flagship project potential.

Mr. Clements summarized the information on the candidate MRF/TSs, which included the owner operator, location, capacity, acreage available for CT development, MRF capability, regulatory agencies, known construction constraints, and feedstock for CT. Mr. Clements mentioned that all five MRFs had no fatal flaws, however the Community Recycling facility was significantly constrained in size availability. In addition, Mr. Clements mentioned that Oxnard's interest is currently undetermined due to a conflicting proposal for the available land and the need for approval by public officials. Discussion of the MRF summary ensued.

VIII. DISCUSSION OF NEXT STEPS

Discussion ensued related to the next steps for the facilitation project. Mr. Theroux motioned to have staff proceed with the recommendation for a competition approach, with the MRFs and Technologies identified as recommended. The motion passed unanimously.

IX. OPEN DISCUSSION

No open discussion took place.

X. NEXT MEETING DATE

The next meeting is scheduled for June 21, 2007 at 9 a.m.

XI. ADJOURNMENT

The meeting was adjourned at 6:15 p.m.