City of Cleveland MSWE Development Chronology of Events

Oct. 2006 CPP's 5 Year Strategic Business Plan (SBP) included recommendations to diversify sources and types of power generation, to increase renewable resources in the portfolio, and to decrease dependence on the grid through local generation projects.

Nov. 2006 One of the initial presentations on waste to energy. Presentation and proposal by Norton Environmental and Medina County SWAC Presentation "Recyclable or MSW?" Focus of meeting: Medina's MRF, Recycling, MSW Central Processing Facility, MSW management plan and processing and other topics. Nov. 16, 2006.

Feb. 2007 CPP created many Special Project Teams to implement the recommendations in the SBP including Green Team #1 the Landfill Gas Team and Green Team #2 the Pump Storage Green Team. Making electricity from landfill gas from MSW dumped in local landfills was the target for Green Team #1.

April 2007 CPP's Landfill Gas Special Project Team was split to form the Landfill Gas Team and a new team called the Municipal Solid Waste to Energy (MSWE) Special Project Team.

CPP Tour of Medina County Material Recovery Facility. Considered technology that offered partial solution including recycling and production of a Refuse Derived Fuel. No power production technology at this location. Meeting April 23, 2007.

May 2007 Beginning of analysis of Municipal Solid Waste as feedstock for electric power generation (incineration and gasification). CPP reviewed many references, such as the one cited below, attended presentations, hosted meetings on technology options, visited facilities and attended conferences. The findings of these efforts were consistent with the conclusions in a study conducted several years earlier by Alameda Power & Telecom of California.

> "Thermal MSW gasification is very different from the incineration technology Alameda P&T investigated and discarded during the 1980s. The chemical reactions in gasification reduce MSW into simpler molecules whereas incineration creates more complex substances, including dioxins and furans whereas these substances are generally destroyed in gasification." Investigation into Municipal Solid Waste Gasification for Power Generation, prepared for Alameda Power & Telecom, prepared by Advanced Energy Strategies, Inc., page ES-1, September 2004.

> "Bio-gasification is a biological process that has been used primarily in the treatment of waste water. Past application is waste water treatment produced quantities of syngas that were only marginally useful. Anaerobic digestion

works only on biological material so it is unable to utilize certain inorganics or the plastic content in MSW. For these reasons it produces significantly less synthetic gas from each ton of MSW than does thermal MSW gasification." Investigation into Municipal Solid Waste Gasification for Power Generation, page 49-50.

May 2007	CPP's Green Team #2 MSW - presentation and report on "Gasification & Engineered Fuel" focus: gasification capacity worldwide, feedstock, industry type, gasification technology, initial payback calculations, mini gasification units, environmental concerns, potential site at the City's Ridge Road Transfer Station next to CPP's substation on the property, refuse derived engineered fuel and more.
June 2007	Landfill gas proposal and presentation to CPP by EMCOR Energy Services, which included power production option, on June 5, 2007.
July 2007	Initial meetings with Peter Tien of Princeton Environmental Group (PEG) on July 16, 2007. Mr. Tien indicated his relationship with Kinsei Sangyo of Takasaki Japan, a gasification technology company at that time and proposed visit to Japan to see the technology.
August 2007	Proposal by EMCOR Energy Services, which included power production option, on August 14, 2007 that ultimately proved cost prohibitive.
November 2007	Legislation authorizing selection of a feasibility consultant for the MSWE facility was introduced Nov. 26, 2007.
January 2008	CPP conducted "MSWE" Workshop on January 3, 2008 for interested City Council Utility Committee members at CPP. MSWE Feasibility Study Consultant Ordinance was heard in Public Utilities Committee on January 16, 2008. MSWE Feasibility Study Consultant Ordinance was heard before the Finance Committee on January 21, 2008. Legislation passed on January 28, 2008. Effective January 30, 2008. Ordinance No. 1924-07.
February 2008	MSWE Feasibility Study Consultant RFP released. February 15, 2008.

May 2008	MSWE Feasibility Study Consultant, Board of Control receives recommendation on May 1, 2008. Consultant team: RNR Consulting, URS Corp., DLZ Ohio Inc. and Cloud & Associates.
August 2008	MSWE Facility Feasibility Study completed August 1, 2008.
Dec. 2008/ Jan. 2009	
March 2009	Initial meeting of Cleveland's MSWE Steering Team. This Team was comprised of local interested parties with related project experience and City employees. The Team was created to guide the development of the City's MSWE Project- March 31, 2009.
April 2009	Legislation authorizing the facility design agreement with PEG, and any needed waste and traffic studies was introduced April 13, 2009. Ord. No. 480-09.
	MSWE Steering Committee and Cleveland's MSWE Development Team Workshop providing a detailed briefing on gasification, Cleveland's system design, PEG's technology, other types of gasification technology used and considered by other communities, recycling, feasibility study findings, economic development and regional impacts, financing and more held April 21, 2009.
May 2009	Cleveland's MSWE Steering Team meeting on May 12, 2009.
	Facility design agreement legislation Ord. No. 480-09 was heard in Utilities Committee with a presentation to the Committee on May 20, 2009.
June 2009	Facility design agreement legislation Ord. No. 480-09 was heard in Finance Committee and passed June 1, 2009.
	Cleveland's MSWE Steering Team meeting on June 9, 2009.
	CPP issues RFP for Waste Composition Study consultant June 30, 2009.
July 2009	CPP MSWE Development Team members attended Ohio SWANA "Overview of Emerging Solid Waste-to-Energy Technology" conference July 23, 2009.
	Cleveland's MSWE Steering Team meeting on July 23, 2009. CRC approves Waste Composition Study consultant, SCS Engineers on July 28, 2009.

Aug. 2009	Cleveland's MSWE Steering Team meeting on Aug. 4, 2009.
	BOC approves Waste Composition Study consultant, SCS Engineers on August 5, 2009.
	Sustainability Summit Cleveland, Ohio Aug. 12-14, 2009
	Cleveland delegation visits waste to energy facilities in Japan and China August 23-29, 2009.
September 2009	SCS Engineers Agreement for Waste Composition Study and commences work. Sept. 9. 2009.
	Cleveland's MSWE Steering Team meeting on Sept. 28, 2009
October 2009	SCS Engineers conducts initial waste composition sample study at Ride Road Transfer Station October 5-9, 2009.
November 2009	First report from SCS Engineers on waste composition Nov. 23rd 2009.
Dec. 2009	Commissioner Henderson and Jose Hernandez attend the initial Work Plan Development Meeting, observe demonstrations of the Kinsei gasification technology and direct discussions with Kinsei Sangyo engineers in Japan on Dec. 6th. Kinsei signs *Letter of Intent* committing to locate gasification manufacturing facilities in Cleveland. (Ivan, Jose and James Ferguson go to China Dec 9th for meetings with Sunpu Opto.)
Jan. – Feb. 2010	On separate tracks, independent discussions continue with Kinsei Sangyo Co. and Sunpu Opto Semi Conductor Co. on their respective opportunities.
	CPP forms full time MSWE Development Team. This group is assigned primary responsibility for developing the project and working with the consultants throughout the facility design process.
February 2010	Cleveland's MSWE Steering Team meeting on Feb. 2, 2010
	SCS Engineers conducts final waste composition sample study at Ride Road Transfer Station February 22-26, 2010.
March 2010	Cleveland's MSWE Steering Team meeting on March 16, 2010.

Cleveland and PEG, sign the Facility Design Agreement for the MSWE project. The $1.5 million Cleveland-Princeton MSWE Facility Design agreement provides, among other things, that PEG will not be paid unless Cleveland obtains the air permit for the gasification facility. The actual Facility Design will be used by consultants and contractors of *our choice* to further develop and construct Cleveland's MSWE facility. All payments for PEG are to be held in escrow until Cleveland obtains the air permit. PEG is to contribute an amount equal to 20% of each of Cleveland's payments in the escrow. If Cleveland does not obtain the air permit, Cleveland obtains 100% of the amount in escrow and PEG will not receive anything. Agreement executed on March 30th.

Final study report from SCS Engineers on Cleveland's waste composition received March 31, 2010.

April 2010

Initial meeting with Ohio EPA to discuss the project on April 7, 2010.

First MSWE Work Plan Development meeting in Cleveland with representatives of Kinsei Sangyo, PEG, PEG's sub contractors and the MSWE Development Team guiding the facility design process. April 14-15, 2010.

May 2010

MSWE Development Team members attended the North American Waste to Energy Conference in Orlando FL, May 11-13, 2010.

MSWE Work Plan Development meeting in Cleveland on May 25, 2010.

June 2010

MSWE Work Plan Development meeting in Cleveland on June 18, 2010.

MSWE Development Team members attended a forum on "Innovation Starts Here: Opportunities for Ohio Businesses in a Clean energy Economy" in Columbus, Ohio June 28, 2010.

July 2010

Cleveland's MSWE Steering Team meeting on July 13, 2010.

MSWE Development Team members attended a mandatory ODOD Grant Bidders meeting in Columbus on "Deploying Renewable Energy: Transforming Waste to Value" July 19, 2010.

MSWE Work Plan Development meeting in Cleveland on July 29, 2010.

August 2010	Cleveland's MSWE Steering Team meeting on Aug. 3, 2010. MSWE Development Team members meet to discuss construction debris as feedstock for gasification with Collinwood Iron and Metal Recycling on August 16, 2010.
	Quasar Energy Campus meeting to discuss and observe anaerobic digestion waste to energy technology in Wooster, Ohio on Aug. 16, 2010.
	MSWE Work Plan Development meeting in Cleveland on August 26, 2010.
September 2010	MSWE Work Plan Development meeting in Cleveland on Sept. 22, 2010.
	Sustainability Summit Cleveland, Ohio Sept. 22-23, 2009
	Exhibit at Advance Energy Technology Expo Sept. 24, 2010
	MSWE Development Team member visits Rainbow Disposal Company Inc. and the material recovery and recycling facility in Huntington Beach CA. on Sept. 28th.
October 2010	MSWE Work Plan Development meeting in Cleveland on October 29, 2010.
November 2010	Cleveland's MSWE Steering Team meeting on Nov. 9, 2010.
December 2010	MSWE Work Plan Development meeting in Cleveland on December 1, 2010.
January 2011	MSWE Development Team members attended an "Advance Energy Industry Cluster Road Mapping Workshop: Biomass/Waste to Energy" on January 19, 2011.
	MSWE Work Plan Development meeting in Cleveland on January 27, 2011.
February 2011	Initial public hearings on the MSWE Facility Ohio EPA air permit application.