

CADES SCHUTTE LLP

CALVERT G. CHIPCHASE 7757-0

CHRISTOPHER T. GOODIN 8562-0

1000 Bishop Street, Suite 1200

Honolulu, Hawai'i 96813-4212

Telephone: (808) 521-9200

Facsimile: (808) 521-9210

E-mail: cchipchase@cades.com
cgoodin@cades.com

Attorneys for Intervenor

KO OLINA COMMUNITY ASSOCIATION

and MAILE SHIMABUKURO

BEFORE THE PLANNING COMMISSION

OF THE CITY AND COUNTY OF HONOLULU

STATE OF HAWAII

In the Matter of the Application of

DEPARTMENT OF ENVIRONMENTAL
SERVICES, CITY AND COUNTY OF
HONOLULU

To delete Condition No. 14 of Special
Use Permit No. 2008/SUP-2 (also
referred to as Land Use Commission
Docket No. SP09-403) which states as
follows:

"14. Municipal solid waste shall be
allowed at the WGSL up to July 31,
2012, provided that only ash and residue
from H-POWER shall be allowed at the
WGSL after July 31, 2012."

FILE NO. 2008/SUP-2

INTERVENORS KO OLINA
COMMUNITY ASSOCIATION AND
MAILE SHIMABUKURO'S EIGHTH
AMENDED EXHIBIT LIST

EXHIBITS K189, K190, K192, K193,
K195, K196, K198, K220, K230,
K247, K251, K255, K256, K257, &
K258

CERTIFICATE OF SERVICE

DEPT OF PLANNING
AND PERMITTING
CITY & COUNTY OF HONOLULU

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RECEIVED

KOCA 31

**INTERVENORS KO OLINA COMMUNITY ASSOCIATION AND MAILE
SHIMABUKURO'S EIGHTH AMENDED EXHIBIT LIST**

Intervenors Ko Olina Community Association and Maile Shimabukuro (together “**Intervenors**”) submit their eighth amended exhibit list. Intervenors reserve the right to amend or supplement this list as additional exhibits are identified:

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K1		1/11/12		March 13, 2003 Findings of Fact, Conclusions, and Decision by the Planning Commission	
K2		1/11/12		June 5, 2003 Decision and Order Approving Amendment to Special Use Permit by the Land Use Commission	
K3		1/11/12		January 16, 2008 Findings of Fact, Conclusions of law, and Decision and Order by the Planning Commission	
K4		1/11/12		March 13, 2008 Findings of Fact, Conclusions of Law, and Decision by the Planning Commission	
K5		1/11/12		October 2008 Final Environmental Impact Statement re Waimanalo Gulch Sanitary Landfill Lateral Expansion by R.M. Towill Corporation (excerpts)	
K6		1/11/12		April 3, 2009 Letter from Abbey Seth Mayer to David K. Tanoue	
K7		1/11/12		June 22, 2009 Transcript of the Contested Case Hearing Before the Planning Commission (excerpts)	
K8		1/11/12		June 24, 2009 Transcript of the Contested Case Hearing Before the Planning Commission (excerpts)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K9		1/11/12		July 1, 2009 Transcript of the Contested Case Hearing Before the Planning Commission (excerpts)	
K10		1/11/12		July 2, 2009 Transcript of the Contested Case Hearing Before the Planning Commission (excerpts)	
K11		1/11/12		July 8, 2009 Transcript of the Contested Case Hearing Before the Planning Commission (excerpts)	
K12		1/11/12		August 4, 2009 Findings of Fact, Conclusions of Law, and Decision and Order by the Planning Commission	
K13		1/11/12		September 22, 2009 Letter from Abbey Seth Mayer to Ransom Plitz	
K14		1/11/12		September 24, 2009 Transcript of Proceedings Before the Land Use Commission (excerpts)	
K15		1/11/12		October 22, 2009 Order Adopting the City and County of Planning Commission's Findings of Fact, Conclusions of Law and Decision and Order with Modifications by the Land Use Commission	
K16		1/11/12		January 22, 2010 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	
K17		1/11/12		April 12, 2010 Appellee Land Use Commission's Answering Brief in <i>Department of Environmental Services v. Land Use Commission</i> , Civ. No. 09-102719-11 (Haw. 1st Cir. Ct.) (excerpts)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K18		1/11/12		April 21, 2010 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	
K19		1/11/12		Dwight E. Miller, PE Resume and Project Litigation and Expert Witness Experience	
K20		1/11/12		September 21, 2010 Order Affirming Land Use Commission's Order Adopting the City and County of Planning Commission's Findings of Fact, Conclusions of Law, and Decision and Order dated October 22, 2009 with Modifications in <i>Department of Environmental Services v. Land Use Commission</i> , Civ. No. 09-1-2719-11 (Haw. 1st Cir. Ct.)	
K21		1/11/12		October 19, 2010 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	
K22		1/11/12		January 2011 Fiscal & Economic Benefits Analysis Prepared for Ko Olina Resort Operators Association Prepared by CBRE Strategic Consulting	
K23		1/11/12		January 13, 2011 News Release re Landfill Flooding Affects Waters Between Ko Olina and Kahe Power Plant by the Department of Health	
K24		1/11/12		Proposed Revised Ewa Development Plan	
K25		1/11/12		January 18, 2011 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K26		1/11/12		January 20, 2011 Meeting No. 1 Materials for the Mayor's Advisory Committee on Landfill Site Selection	
K27		1/11/12		January 20, 2011 Meeting No. 1 Group Memory by the Mayor's Advisory Committee on Landfill Site Selection	
K28		1/11/12		January 26, 2011 Letter from Ronald E. Boyle of AECOM Technical Services, Inc. to Waste Management of Hawaii	
K29		1/11/12		March 10, 2011 Meeting No. 3 Group Memory by Mayor's Advisory Committee on Landfill Site Selection	
K30		1/11/12		March 31, 2011 Meeting No. 4 Agenda and Materials for the Mayor's Advisory Committee on Landfill Site Selection	
K31		1/11/12		March 31, 2011 Meeting No. 4 Group Memory by the Mayor's Advisory Committee on Landfill Site Selection	
K32		1/11/12		April 18, 2011 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	
K33		1/11/12		May 12, 2011 Meeting No. 5 Group Memory by the Mayor's Advisory Committee on Landfill Site Selection	
K34		1/11/12		June 1, 2011 Letter from Timothy E. Steinberger to Vladimir P. Devine	
K35		1/11/12		July 18, 2011 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K36		1/11/12		July 25, 2011 Letter from S.B. Teramoto of the Association of Apartment Owners of the Coconut Plantation in the Ko Olina Resort and Marina the Coconut Plantation to David K. Tanoue	
K37		1/11/12		August 9, 2011 Letter from Mario Beekes to David K. Tanoue	
K38		1/11/12		August 8, 2011 Letter from Ken Williams of Ko Olina Community Association to David K. Tanoue	
K39		1/11/12		August 10, 2011 Letter from Duke Hospodar of Resort Operations-LLC to David Tanoue	
K40		1/11/12		August 10, 2011 Letter from Mona Abadir of Honu Group Communications, LLC to David K. Tanoue	
K41		1/11/12		August 10, 2011 Letter from Ralph F. Harris of Ko Olina Fairways – Association of Apartment Owners to David K. Tanoue	
K42		1/11/12		August 11, 2011 Letter from Alan Nakamura of Ko Olina Golf Course to David K. Tanoue	
K43		1/11/12		August 12, 2011 Letter from Jo Jordan of the Hawai'i House of Representatives to the Department of Planning and Permitting	
K44		1/11/12		August 12, 2011 Letter from Joseph Yamaoka of Resort Management Company LLC to David K. Tanoue	
K45		1/11/12		August 13, 2011 Letter from Masaki Nagamine of Watabe Wedding Corporation to David K. Tanoue	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K46		1/11/12		August 13, 2011 Letter from Colleen Hanabusa to David K. Tanoue	
K47		1/11/12		August 17, 2011 Letter from Leland Ribac for George S. Yamamoto of the Makakilo/Kapolei/Honokai Hale Neighborhood Board No. 34 to David K. Tanoue	
K48		1/11/12		December 7, 2007 Settlement Agreement between the Department of Health, Waste Management of Hawaii, Inc., and the City	
K49		1/11/12		December 15, 2010 Letter from Justin Lottig to Lene Ichinotsubo with Attachment	
K50		1/11/12		December 19, 2010 Incident Alert Form	
K51		1/11/12		December 21, 2010 Email from Justin Lottig to Thomas Miyashiro	
K52		1/11/12		December 23, 2010 Investigation Report by the Department of Health, Clean Water Branch	
K53		1/11/12		December 30, 2010 Email from Justin Lottig to Lene Ichinotsubo with Attachments	
K54		1/11/12		January 12, 2011 Email from Joanna Seto to Timothy Steinberger	
K55		1/11/12		January 12, 2011 Email from Timothy Steinberger to Joanna Seto with Attachment	
K56		1/11/12		January 12 and 13, 2011 Station Summary Palehua Hawaii	
K57		1/11/12		2003 and 2004 Articles regarding R.M. Towill	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K58		1/11/12		December 1, 2003 Report of Mayor's Advisory Committee (Blue Ribbon Committee) on Landfill Site Selection without Attachments	
K59		1/11/12		January 31, 2006 Letter from Laurence K. Lau to Paul Burns and Eric Takamura with Enclosures	
K60		1/11/12		April 5, 2006 Letter from Deborah Jordan to Paul Burns and Eric S. Takamura with Enclosure	
K61		1/11/12		December 18, 2006 Article, Firms land contracts despite donation fines, Honolulu Advertiser, by Rick Daysog	
K62		1/11/12		March 12, 2008 Engineering Report for Landfill Expansion: Waimanalo Gulch Landfill, Ewa Beach, Oahu, Hawaii prepared by Geosyntec Consultants without Appendices	
K63		1/11/12		March 2009 Second 6-Month Report Status of Operations Waimanalo Gulch Sanitary Landfill and Actions Taken to Further Reduce Waste Volumes Disposed of at the Landfill	
K64		1/11/12		September 2009 Third 6-Month Report Status of Operations Waimanalo Gulch Sanitary Landfill and Actions Taken to Further Reduce Waste Volumes Disposed of at the Landfill.	
K65		1/11/12		May 12, 2010 Letter from Wilfred K. Nagamine to Joe Whelan	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K66		1/11/12		May 13, 2010 Letter from Laurence K. Lau to Joe Whelan and Timothy Steinberger with Enclosures	
K67		1/11/12		September 15, 2010 Article, The super \$6K club part II: Engineers vs. Educators: Abercrombie racks up big bucks as election day draws near, by Alan D. McNarie	
K68		1/11/12		March 31, 2011 City & County of Honolulu Mayor's Advisory Committee on Landfill Site Selection Agenda with Attachments	
K69		1/11/12		April 20, 1987 Findings of Fact, Conclusions of Law and Decision and Order by the Land Use Commission	
K70		1/11/12		October 31, 1989 Findings of Fact, Conclusions of Law and Decision and Order by the Land Use Commission	
K71		1/11/12		July 6, 2007 Planning Division Master Application Form (excerpts)	
K72		1/11/12		July 31, 2009 Meeting of the Planning Commission Transcripts (excerpts)	
K73		1/11/12		January 27, 2011 Article, No Paperwork to Back Up Safety of Medical Waste, by Adrienne LaFrance	
K74		1/11/12		November 21, 2011 Article, City Pays Landfill Operator \$2.6M for Spill Cleanup, by Michael Levine, with Attachment	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K75		1/11/12		January 25, 2011 Administrative Order on Consent for Removal Action by the Environmental Protection Agency and Waste Management of Hawaii, Inc.	
K76		1/11/12		May 25, 2005 Letter from Eric S. Takamura to Anthony Ching	
K77		1/11/12		February 2, 2011 Transcript of Proceedings Before the Land Use Commission	
K78		1/11/12		January 28, 2011 Article, Stormwater Released Into Ocean to Avoid Larger Landfill Catastrophe, by Michael Levine	
K79		1/11/12		November 30, 2011 Article, EPA Orders Additional Safeguards at Waimanalo Gulch Landfill, by Adrienne LaFrance	
K80		1/11/12		January 17, 2011 More Medical Waste Wash On West Shores 5 Days After Landfill Spill, by KITV.com	
K81		1/11/12		April 21, 2006 Transcript of Proceedings Before the Land Use Commission (excerpts)	
K82		1/11/12		September 5, 2008 Letter from Thomas E. Arizumi to Joseph Whelan and Eric Takamura	
K83		1/11/12		March 6, 2008 Transcript of Proceedings Before the Land Use Commission (excerpts)	
K84		1/11/12		March 7, 2008 Transcript of Proceedings Before the Land Use Commission (excerpts)	
K85		1/11/12		March 27, 2003 Hearing Transcript Before the Land Use Commission (excerpts)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K86		1/11/12		May 12, 2011 Final Criteria List for the Mayor's Advisory Committee on Landfill Site Selection	
K87		1/11/12		June 22, 2004 Letter from Frank J. Doyle to Anthony J.H. Ching	
K88		1/11/12		July 30, 2004 Letter from Frank J. Doyle to Anthony J.H. Ching	
K89		1/11/12		November 30, 2004 Letter from Frank J. Doyle to Anthony J.H. Ching	
K90		1/11/12		March 1, 2006 Letter from Anthony J.H. Ching to Eric S. Takamura	
K91		1/11/12		July 2010 First Annual Report, Status of Actions Taken to Satisfy the State Land Use Commission's Order Dated October 22, 2009 and Status of Operations Waimanalo Gulch Sanitary Landfill	
K92		1/11/12		June 1, 2011 Second Annual Report, Status of Actions Taken to Satisfy the State Land Use Commission's Order Dated October 22, 2009 and Status of Operations Waimanalo Gulch Sanitary Landfill	
K93		1/11/12		September 2008 6-Month Report Status of Operations, Waimanalo Gulch Sanitary Landfill and Actions Taken to Further Reduce Waste Volumes Disposed of at the Landfill (excerpts)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K94		1/11/12		October 22, 2009 Order Adopting the City & County of Honolulu Planning Commission's Findings of Fact, Conclusions of Law, and Decision and Order with Modifications by the Land Use Commission	
K95		1/11/12		September 23, 2009 Letter from Maeda C. Timson to the Land Use Commission	
K96		1/11/12		August 16, 2011 Draft Regular Meeting Minutes by the Nanakuli-Maili Neighborhood Board No. 36	
K97		1/11/12		May 2, 2011 Letter from Steven Chang to Joseph Whelan and Timothy Steinberger	
K98		1/11/12		December 1, 2011 Article, City Ordered to Improve Monitoring at Landfill, by Gary T. Kubota	
K99		1/11/12		January 2011 Articles from KHON, Hawaii News Now, Star Advertiser re Landfill spill	
K100		1/11/12		July 6, 2009 Declaration of Gary Y. Takeuchi with attached Environmental Impact Statement	
K101		1/11/12		October 25, 2006 Warning letter from Thomas E. Arizumi to Paul Burns & the Honorable Eric Takamura	
K102		1/11/12		Photographs of Ko Olina Lagoons	
K103		1/11/12		Photographs of Ko Olina Clean-Up Efforts (some photographs stamped with dates photographs were taken)	
K104		1/11/12		Photographs of Ko Olina Clean-Up Efforts – Before and After	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K105		1/11/12		Photographs of Debris (photographs stamped with dates photographs were taken)	
K106		1/11/12		Photographs of Empty Beaches (photographs stamped with dates photographs were taken)	
K107		1/11/12		Photographs of Landfill Drainage	
K108		1/11/12		Photographs of Medical Waste (some photographs stamped with dates photographs were taken)	
K109		1/11/12		Photographs of Muddy Waters (photographs stamped with dates photographs were taken)	
K110		1/11/12		Videos of Ko Olina Clean-Up Efforts: K110a: January 20, 2011 Video K110b: January 20, 2011 Video K110c: January 14, 2011 Video K110d: January 14, 2011 Video K110e: January 18, 2011 Video K110f: January 18, 2011 Video K110g: January 20, 2011 Video K110h: January 14, 2011 Video	
K111		1/11/12		Photographs of Trash from the Landfill at Ko Olina (photographs stamped with dates photographs were taken)	
K112		1/11/12		Photographs of Views of the Landfill from Ko Olina (some photographs stamped with dates photographs were taken)	
K113		1/11/12		Photograph of a Warning Sign (photograph stamped with date photograph was taken)	
K114		1/11/12		Photograph of a Wedding (photograph stamped with date photograph was taken)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K115		1/11/12		August 12, 2011 Letter from Alex Duarte to David K. Tanoue	
K116		1/11/12		August 12, 2011 Letter from Lance Jeffery to David Tanoue	
K117		1/11/12		July 20, 2011 Letter from William and Sara Barnes to David Tanoue	
K118		1/11/12		August 1, 2011 Letter from Harriet Bloom to David Tanoue	
K119		1/11/12		August 15, 2011 Letter from James Handsel to David Tanoue	
K120		1/11/12		August 12, 2011 Email from Greg Nichols to David Tanoue	
K121		1/11/12		August 12, 2011 Letter from Chuck Krause to David Tanoue	
K122		1/11/12		August 11, 2011 Letter from Pieter and Claire van Wingerden to David Tanoue	
K123		1/11/12		November 29, 2011 Letter from Alexis Strauss to Timothy Steinberger and Joseph Whelan	
K124		1/11/12		2011 Filings in <i>Confederated Tribes and Bands of the Yamaka Nation v. United States Dep't of Agriculture</i> , No. CV-10-3050-EFS (E.D. Wash.)	
K125		1/11/12		May 3, 2007 Letter from Thomas E. Arizumi to Paul Burns and the Honorable Eric Takamura	
K126		1/11/12		February 24, 2006, 2006 State of the City Address, by Mufi Hanneman	
K127		1/11/12		Photographs of Stones at Waimanalo Gulch Sanitary Landfill (photographs stamped with dates photographs were taken)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K128		1/11/12		November 30, 2011 Petition to Close Waimanalo Gulch Landfill and Locate Landfill Operations Outside District 1	
K129		1/11/12		Photographs of Stones at Waimanalo Gulch Sanitary Landfill (photographs stamped with dates photographs were taken)	
K130		1/11/12		October 9, 2007 Book excerpt by Shad Kane, Waimanalo: Navigational Stones	
K131		1/11/12		March 17, 2011 PBSHawaii.org video on Insights, Where Should Garbage Go	
K132		1/11/12		1981 and 1983 Ewa Development Plans (excerpts)	
K133		1/11/12		News Videos Regarding the January 2011 Spill: K133a: January 14, 2011 KHON 2 Video K133b: January 15, 2011 KHON 2 Video K133c: January 22, 2011 KITV 4 Video	
K134		1/11/12		Letters from Ken Williams to Joe Whelan	
K135		1/11/12		April 13, 2008 E-mail String re Report of Debris Flying from City/County Vehicle	
K136		1/11/12		March 20, 2007 Letter from Edward R. Appleby to Todd Apo	
K137		1/11/12		June 14, 2010 Letter from Ken Williams to Joe Whelan re Foul Odors, dust and Noise	
K138		1/11/12		January 24, 2011 Waimanalo Gulch Landfill Spill Investigation Follow-Up	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K139		1/11/12		April 12, 2011 Invoice from Ko Olina Operations, LLC to Ko Olina Community Association	
K140		1/11/12		January 18, 2011 E-mail String re Landfill Runoff into the Ocean	
K141		1/11/12		January 19, 2011 E-mail String re Procedure for Disposal of Medical Waste and Landfill Concerns	
K142		1/11/12		January 20, 2011 Email string re Procedure for Disposal of Medical Waste and Landfill Concerns	
K143		1/11/12		February 2, 2011 Email string re: Landfill issue	
K144		1/11/12		October 2008 Integrated Solid Waste Management Plan Update Prepared for City & County of Honolulu, Hawaii (excerpts)	
K145		1/11/12		April 2000 New Systems Research for Refuse Disposal, prepared by R.M. Towill Corporation (excerpt)	
K146		1/11/12		Waimanalo Gulch Sanitary Landfill Design and Operation Review Technical Memorandum prepared by Parametrix and approved by Dwight Miller	
K147		1/11/12		Site Selection Evaluation Technical Memorandum prepared by Parametrix and approved by Dwight Miller	
K148		1/11/12		Waimanalo Gulch Landfill Alternatives Analysis Technical Memorandum prepared by Parametrix and approved by Dwight Miller	
K149		1/11/12		July 21, 2010 Status Report on Reducing and/or Continuing the Use of Waimanalo Gulch Sanitary Landfill (WGSL)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K150		1/11/12		February 2, 2011 Land Use Commission Status Report on Waimanalo Gulch Sanitary Landfill	
K151		1/11/12		April 2010 AECOM Surface Water Management Plan Waimanalo Gulch Sanitary Landfill Kapolei, O'ahu, Hawaii	
K152		1/11/12		November 8, 2011 Landfill Meeting 7 Group Memory	
K153		1/11/12		November 8, 2011 Landfill Meeting Handout, Landfill Site Selection Study GIS Assessment, Mayor's Advisory Committee on Landfill Site Selection 2011	
K154		1/11/12		Photos from the Department of Health Clean Water Branch (photographs stamped with dates photographs were taken)	
K155		1/11/12		March 14, 2008 Findings of Fact, Conclusions of Law, and Decision and Order Adopting with Modifications, the City and County of Honolulu Planning Commission's Recommendation to Approve Amendment to Special Use Permit by the Land Use Commission	
K156		1/11/12		December 29, 2011 Letter from Ken Williams to Joe Whelan	
K157		1/11/12		August 30, 2011 Letter from Timothy E. Steinberger to Ronald Ho and John Brock with enclosure	
K158		1/11/12		August 18, 2011 Letter from Justin H. Lottig to John Brock and Ronald Ho	
K159		1/11/12		March 11, 2005 Letter from Thomas E. Arizumi to Eric S. Takamura with Enclosures	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K160		1/11/12		September 28, 2011 Landfill Gas Extraction Assessment by Environmental Information Logistics, LLC (excerpt)	
K161		1/11/12		Planning Division Master Application Form with Attachments (excerpt)	
K162		1/11/12		October 2008 Integrated Solid Waste Management Plan Update Prepared for City & County of Honolulu, Hawaii (excerpts)	
K163		1/25/12		October 2008 Final Environmental Impact Statement re Waimanalo Gulch Sanitary Landfill Lateral Expansion by R.M. Towill Corporation (excerpts)	
K164		1/25/12		January 3, 2012 Intervenor's Request for Issuance of a Subpoena Duces Tecum to the Custodian of Records of Waste Management of Hawaii, Inc. with attachments	
K165		1/25/12		January 20, 2012 Waste Management of Hawaii, Inc.'s Response and Objections to Subpoena Duces Tecum	
K166		1/25/12		2005 eWaste (Electronic Waste) printout from the ENV's website	
K167		1/25/12		March 2010 Hawaii Electronic Waste and Television Recycling and Recovery Law, Consumer Information	
K168		1/25/12		September 2011 Final Environmental Impact Statement, In-Vessel Composting Facility, Waialua, Oahu, Hawaii	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K169		1/25/12		May 11, 2011 Article, Council ends discount on tipping fees for recycling, Star Advertiser, by Star-Advertiser Staff	
K170		3/7/12		February 1, 2012 Mayor's Advisory Committee on Landfill Site Selection City and County of Honolulu: Group Memory and Meeting Handouts	
K171		3/7/12		Figure of the Landfill prepared by Parametrix showing Cell E6's planned limits compared to its actual limits and showing damaged areas in Cell E6	
K173		3/7/12		Photograph taken during a site visit to the Landfill on March 6, 2012	
K174		3/7/12		Photograph taken during a site visit to the Landfill on March 6, 2012	
K175		3/7/12		Photograph taken during a site visit to the Landfill on March 6, 2012	
K176		3/7/12		Photograph taken during a site visit to the Landfill on March 6, 2012	
K178		3/7/12		Photograph taken during a site visit to the Landfill on March 6, 2012	
K179		3/7/12		Photograph taken during a site visit to the Landfill on March 6, 2012	
K191		4/4/12		H.B. No. 2249, House of Representatives Twenty-Sixth Legislature, 2012	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K194		4/4/12		2001 Article, Co-combustion of shredder residues and municipal solid waste in a Swedish municipal solid waste incinerator, by L. Aae Redin <i>et al.</i>	
K208		4/4/12		January 22, 2011 Article, After Landfill Spill, Lots of Questions, Few Answers, Honolulu Civil Beat, by Michael Levine & Adrienne LaFrance	
K215		4/4/12		March 16, 2012 Agenda for Mayor's Advisory Committee on Landfill Site Selection Meeting No. 9	
K217		4/4/12		Mayor's Advisory Committee on Landfill Site Selection, Alternative Landfill Sites, Island of O'ahu	
K218		4/4/12		July 19, 2011 Meeting No. 6 Group Memory, Mayor's Advisory Committee on Landfill Site Selection	
K222		4/4/12		February 27, 2012 Testimony of Ian L. Sandison on Behalf of Schnitzer Steel Hawaii Corp. on HB 2249, HD1, Before the Committee on Finance, House, Hawaii State Legislature	
K223		4/4/12		February 2012 Wai'anae Sustainable Communities Plan, Honolulu Department of Planning and Permitting	
K226		4/4/12		March 16, 2012 Article, Landfill Site Panel Wants Distance From Residents, Honolulu Civil Beat, by Michael Levine, with Photograph	
K227		4/4/12		Aloha 'Aina Recycling 2012 Schedule, Schnitzer Steel Hawaii Corporation	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K189		4/11/12		BIOSOLIDS: Environmental Management System, City of Los Angeles	
K190		4/11/12		About biosolids, King County	
K192		4/23/12		Incineration Medical Waste Services Waste Management	
K193		4/11/12		January 20, 2012 Article, High-Powered Plasma Turns Garbage Into Gas, Wired Magazine, by David Wolman	
K195		4/11/12		December 2009 Article, U.S. Residential Food Waste Collection and Composting, BioCycle, by Rhodes Yepsen	
K196		4/11/12		Sfenvironment.org: our city's programs; Zero Waste	
K198		4/11/12		About S4 Energy Solutions	
K230		4/11/12		March 2012 Technical Memorandum, Sand Island WWTP Evaluation of Sludge Processing Alternatives, by AECOM	
K247		4/11/12		Hari D. Sharma & Krishna R. Reddy, Geoenvironmental Engineering (excerpt)	
K251		4/11/12		May 5, 2011 Notice, H-Power Expansion Hits Halfway Point, by Markus Owens, ENV Public Communications Officer	
K220		4/23/12		July 1, 2009 Transcript of Hearing Before the Planning Commission (excerpts)	
K255		4/23/12		December 23, 2009 Letter from Thomas E. Arizumi to William C. Goldate (excerpts)	

Exhibit No.	Offered for Identification	Received in Evidence	Withdrawn	Description	Date R=Returned D=Destroyed Other Comments
K256		4/23/12		April 20, 2012 City & County of Honolulu Mayor's Advisory Committee on Landfill Site Selection Agenda	
K257		4/23/12		Professional Record of Gregory Richardson, Ph. D., P.E.	
K258		4/23/12		April 20, 2012 Photographs from the Honolulu Mayor's Advisory Committee on Landfill Site Selection Meeting	

DATED: Honolulu, Hawai'i, April 24, 2012.

CADES SCHUTTE
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CALVERT G. CHIPCHASE
CHRISTOPHER T. GOODIN

Attorneys for Intervenors
KO OLINA COMMUNITY ASSOCIATION
and MAILE SHIMABUKURO



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Overview

From Ocean Disposal
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you should know...

The City is committed to managing its biosolids in an environmentally sound, socially acceptable, and cost-effective manner. We are constantly reviewing the program and incorporating continual improvements. The City has been demonstrating the Terminal Island Renewable Energy project for over three years. The existing permit is set to expire November 2011 and the City has submitted a new permit application to the U. S. EPA to continue demonstrating the project. As part of the new permit application we are requesting some project changes. We have completed a draft subsequent negative declaration to

Overview

The City of Los Angeles, Department of Public Works, **Bureau of Sanitation** is responsible for collection, treatment, and disposal of wastewater and its by-products. The Bureau of Sanitation operates four wastewater treatment facilities (Hyperion, Terminal Island, Donald C. Tillman, and Los Angeles Glendale) within a 600 square-mile area. Managing 550 million gallons of wastewater produced daily by more than four million residents, the City of Los Angeles processes, recycles, and renews 146 billion gallons of this wastewater annually into 21 billion gallons of recycled water for beneficial water conservation purposes and manages the 255 thousand tons of biosolids as a treated valuable commodity. Biosolids are the nutrient-rich organic product of wastewater treatment. During treatment, bacteria and other tiny organisms break sewage down into simpler, harmless organic matter, which contains essential plant nutrients. The City's biosolids, used in growing animal feed as a safe alternative to chemical fertilizer and animal manure, is now considered a potential renewable source of clean energy.

The **Hyperion Treatment Plant (HTP)** and **Terminal Island Water Reclamation Plant (TIWRP)** are responsible for producing approximately 650 and 50 wet tons of Exceptional Quality biosolids per day, respectively. Exceptional Quality biosolids meet the most stringent standards and are treated to above Class A levels, which contain little or no pathogens. Class A biosolids are found in fertilizer sold in home improvement stores and are safe to touch and use in home gardens. The City's Class A biosolids are used as a soil amendment and fertilizer to grow non-food crops and are also used to produce a compost product that is sold to local landscape companies and used on City-owned property as an amendment.

From Ocean Disposal to Beneficial Use

From 1957 to 1987, biosolids produced by the City of Los Angeles at the HTP were disposed in the ocean. Between 1987 and 1989, biosolids were disposed in landfills. Beginning in 1989, the City started an extensive beneficial reuse program and has continued to beneficially reuse all the biosolids produced at HTP and TIWRP since that time.

The tables and charts below detail the history of the City's biosolids management program and the success we have had in implementing a cost-effective and environmentally sound program.

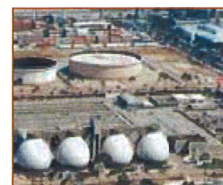
[Biosolids Management Methods updated](#)

[1988 - 1998 Management Options updated](#)

[1999 - 2009 Management Options updated](#)



Digesters at Hyperion



Digesters at Terminal Island



Adobe Acrobat

Many documents on this site require the free Adobe Acrobat Reader, which can be downloaded [HERE](#).

address the changes and are requesting your comments. [Click here](#) for more information.

This site was updated on November 21, 2011

Biosolids Production updated

Biosolids Management Program Cost updated

To guide the City's Biosolids Management Program, the City adopted a policy. The **Biosolids Policy** commits the City to managing the biosolids in a cost-effective, environmentally sound, and socially acceptable manner. The policy outlines the program goals and based on the goals, objectives are set each year to help meet and/or maintain the goals and improve the Biosolids Management Program. Once the objectives are set they are tracked and monitored by the City. At the end of each fiscal year, the City reviews the program goals and objectives and identifies the outcomes achieved. To view current year objectives click the link.

2010-2011 Objectives

To review past year objectives and program outcomes view the links below.

2010-2011 Objectives Achieved <<New

2011 EMS Outcomes <<New

Each year, the City establishes goals and objectives focusing on continual improvements and environmental performance. The City invites you to participate in our goals and objectives setting process. If you have any goal or objective in mind that you want the City to consider, please contact us using the email address and phone number given below. We value your input and would like to hear from you.

– TOP –

CONTACT For more information, call
(310) 648-5877
 or send your questions and comments to
San.BiosolidsEMS@lacity.org

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For more information about the Biosolids Recycling Program, please [send us an email message](#) or [contact us](#) at:

King County Wastewater Treatment Division
Resource Recovery
201 S. Jackson Street
Mail Stop: KSC-NR-0512
Seattle, WA 98104
Phone: 206-684-1247
Fax: 206-684-2057

How biosolids are made

Biosolids are the organic product of the wastewater treatment process. When wastewater goes down the drain in the greater Seattle area, it eventually finds its way into one of our treatment plants. The main facilities are the [West Point Treatment Plant](#) near Discovery Park and the [South Treatment Plant](#) in Renton.

Wastewater is [treated](#) at these facilities to remove solids, then discharged to Puget Sound or used as reclaimed water. The solids recovered from the process of treating wastewater are collected and become the raw material for making biosolids.

The wastewater solids are pumped into large digester tanks. Under elevated temperatures and in the absence of oxygen, beneficial

microbes (bacteria and other microscopic organisms) break down and consume a large portion of the solid material. A major product of this microbial activity is methane gas, the primary component of natural gas. This methane gas is [recovered](#) and used as a source of energy to help operate the treatment plant -- another way we turn a waste into a resource. The process of digestion kills off nearly all (around 90-95%) of the disease causing organisms that might have been present in the raw solids, and reduces the volume of solids. After several weeks of digestion, the solids are centrifuged in a process known as "dewatering." At this point, the biosolids product is a black-grey semisolid soil-like material.

King County's treatment plants produce about 112,000 tons of dewatered biosolids each year.

Biosolids are about 20-28% solid material by weight (the rest is still water). Biosolids contain high concentrations of organic carbon and other nutrients beneficial to soils and plant growth. The

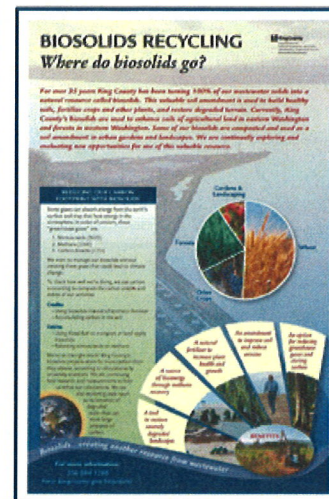


One of the digester tanks used to treat solids to make biosolids



Closeup view of dewatered biosolids

Biosolids program poster



(1.6MB pdf)

Related information

[Animation on how wastewater and biosolids are treated at South Plant Treatment Plant Process](#)
[National Biosolids Partnership](#)

EXHIBIT K190

biosolids are loaded onto trucks at the wastewater treatment plant, and taken to one of our [recycling locations](#).

Recycling biosolids

Biosolids are recycled by using them as a soil amendment and fertilizer. Our project sites include timber forests in eastern King County and agricultural fields in eastern Washington, where crops include wheat, hops, and even canola that will be processed into biodiesel fuel. A small percentage of King County's biosolids are used to make GroCo, a compost used to improve landscape and garden plantings or in restoration projects.

In all cases, the biosolids ultimately find their way back into the soil to improve its physical properties and to provide nutrients such as nitrogen, phosphorus, potassium, sulfur, zinc that are needed by plants.



A tractor spreading King County biosolids on a wheat field in Douglas County, Washington.

The biosolids management program is responsible for activities associated with recycling biosolids: transportation, land application, research, public information, monitoring, acquiring state and federal permits, market development and planning. King County has been partnering with various organizations and farm groups since 1973 to responsibly recycle its biosolids in ways that improve the soil and enhance plant growth. In that time we have gained extensive experience in safely and sustainably recycling biosolids, which is reflected in the awards and certifications the biosolids recycling program has received.

King County's biosolids program is a model for other communities throughout the nation, and our projects have won numerous awards for innovative and environmentally responsible biosolids recycling advancements. King County's biosolids program gained the certification of the National Biosolids Partnership for our biosolids Environmental Management System. In addition, King County has a long history of partnership with university scientists involved in the latest research on biosolids recycling and safety.

Find out more about King County's biosolids recycling program, including:

- [Using biosolids compost \(GroCo\) to improve soils in your garden](#)
- [Current biosolids recycling projects](#)
- [Safety and regulation of biosolids](#)

Updated: March 12, 2012

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Healthcare Waste Treatment Facilities

Waste Management has been encouraging our customers to “Think Green®” for years.

Now, as profitability is becoming more critical to healthcare organizations, we are reshaping and enlarging the waste treatment choices available to you, to help you meet both your business objectives and your environmental ones.

Waste Management offers the full complement of medical waste disposal services, including advanced autoclave and high-combustion incineration technologies.

We also serve our healthcare clients with a nationwide network of facilities that handle materials ranging from solid waste recycling to hazardous waste processing.

As the leading provider of comprehensive waste and environmental services in North America, we also operate the largest network of landfills in our industry, with 273 active sites, many of which transform waste to create clean, renewable energy.

With our focus on reducing, recycling and recovering waste wherever possible, Waste Management continues to develop solutions for healthcare waste that are better for the environment as well as the bottom line.

Waste Management Resource Recovery and Recycling Facility

Our Resource Recovery and Recycling Facility, located in Chambers County, Texas, offers a complete range of sustainable, low-cost options to serve the waste disposal needs of the healthcare industry. Waste Management owns and operates the facility, which is the Southwest's largest high-temperature combustion unit.

Our Chambers County facility:

Surpasses all regulatory requirements applicable to treating and disposing of medical waste.

Is part of a network of nationwide Waste Management regulated medical waste treatment facilities that also include autoclave capabilities.

Employs the most advanced and environmentally responsible methods of disposing of waste.

Is overseen by highly trained technicians whose capabilities meet or exceed standards set by the American Society of Mechanical Engineers.

Safely handling all categories of the waste healthcare facilities generate

As North America's leading environmental services company, Waste Management has the capabilities and expertise to provide the healthcare community with a total solution for all waste services.

We are dedicated to environmental protection and helping ensure that future generations will be able to enjoy a clean, healthy and sustainable planet.

We are a nationally recognized industry leader in using environmentally safe, high-temperature combustion to convert non-hazardous solid waste into electrical energy.

We have been named one of the top 80 most ethical companies in the United States.

Let Waste Management be your progressive provider, working with you to identify opportunities where green, efficient solutions can optimize your facility's bottom line. Together, we can help your healthcare facility be a force for both environmental excellence and business profitability.

Services are provided by WM Healthcare Solutions, Inc., a Waste Management company.

EXHIBIT K192

High-Powered Plasma Turns Garbage Into Gas

· By David Wolman
· [Email Author](#) |
· January 20, 2012 |
· 3:26 pm |
· [Wired February 2012](#)



Photo: Kevin Van Aelst

From the highway, one of the biggest landfills in the US doesn't look at all like a dump. It's more like a misplaced mesa. Only when you drive closer to the center of operations at the 700-acre Columbia Ridge Landfill in Arlington, Oregon, does the function of this place become clear. Some 35,000 tons of mostly household trash arrive here weekly by train from Seattle and by truck from Portland.

Dump trucks inch up the gravel road to the top of the heap, where they tip their cargo of dirty diapers, discarded furniture, lemon rinds, spent lightbulbs, Styrofoam peanuts, and all the rest onto a carefully flattened blanket of dirt. At night, more dump trucks spread another layer of dirt over the day's deposits, preventing trash from escaping on the breeze.

But as of November, not all the trash arriving at Columbia Ridge has ended up buried. On the southwest side of the landfill, bus-sized containers of gas connect to ribbons of piping, which run into a building that looks like an airplane hangar with a loading dock. Here, dump trucks also offload refuse. This trash, however, is destined for a special kind of treatment—one that could redefine how we think about trash.

In an era when it's getting more and more confusing to determine where to toss your paper coffee cup—compost? recycle? trash? arrrgh!—and when no one seems to have a viable solution to the

EXHIBIT K193

problem of humanity's ever-expanding rubbish pile, this plant represents a step toward radical simplification. It uses plasma gasification, a technology that turns trash into a fuel without producing emissions. In other words: a guilt-free solution to our waste problems.

Recycling is all well and good. But it hardly addresses the real problem we have with our household waste: We throw two-thirds of it in landfills while somehow managing to feel virtuous that we put last night's empty wine bottle in the recycling bin. Surely we could do better, environmentally and economically.

There is, in fact, value in trash—if you can unlock it. That's what this facility in northern Oregon is designed to do. Run by a startup called S4 Energy Solutions, it's the first commercial plant in the US to use plasma gasification to convert municipal household garbage into gas products like hydrogen and carbon monoxide, which can in turn be burned as fuel or sold to industry for other applications. (Hydrogen, for example, is used to make ammonia and fertilizers.)

Here's how it works: The household waste delivered into this hangar will get shredded, then travel via conveyor to the top of a large tank. From there it falls into a furnace that's heated to 1,500 degrees Fahrenheit and mixes with oxygen and steam. The resulting chemical reaction vaporizes 75 to 85 percent of the waste, transforming it into a blend of gases known as syngas (so called because they can be used to create synthetic natural gas). The syngas is piped out of the system and segregated. The remaining substances, still chemically intact, descend into a second vessel that's roughly the size of a Volkswagen Beetle.

This cauldron makes the one above sound lukewarm by comparison. Inside, two electrodes aimed toward the middle of the vessel create an electric arc that, at 18,000 degrees, is almost as hot as lightning. This intense, sustained energy becomes so hot that it transforms materials into their constituent atomic elements. The reactions take place at more than 2,700 degrees, which means this isn't incineration—this is emission-free molecular deconstruction. (The small amount of waste material that survives falls to the bottom of the chamber, where it's trapped in molten glass that later hardens into inert blocks.)

The seemingly sci-fi transformation occurs because the trash is blasted apart by plasma—the forgotten-stepsister state of matter. Plasma is like gas in that you can't grip or pour it. But because extreme heat ionizes some atoms (adding or subtracting electrons), causing conductivity, it behaves in ways that are distinct from gas.

Dozens of firms are racing to find the right formula to use plasma to blast garbage into gas. Yet despite incremental improvements in the technology, plasma gasification has proved too energy- and capital-intensive for real-world use on everyday trash. If the value of the syngas produced doesn't offset the amount of energy required to power the furnaces and melt the trash, what's the point?

Now S4 cofounder Jeff Surma may have finally solved that problem. (S4, by the way, refers to the fourth state of matter: plasma.) The 52-year-old chemical engineer is convinced that he can transform garbage from something we toss into something we value—and get it to work on a vast scale. He has already made enough advances with the technology to attract millions of dollars in backing from Waste Management, the \$12.5 billion trash hauling, recycling, and disposal behemoth, which owns the landfill here in Arlington.

Still, it's a long shot. The US generates about 250 million tons of trash a year. Even with recycling and composting facilities tackling an estimated 85 million tons of refuse per year, it would take thousands of new plants much bigger than this one (and another S4 facility being constructed in McCarran, Nevada) to handle the nation's municipal trash output. That's a lot of plasma.



Photo: Kevin Van Aelst

On a summer afternoon, Surma steps out of his Mercury Mariner, replaces tasselled loafers with work boots, and dons a yellow hard hat. He has a runner's physique and a shock of white hair, and wears wraparound sunglasses. Today he's guiding potential customers from the chemical industry around the Arlington plant, explaining how it all works. Later he confides: "If we're still here in two years, telling you what we *plan* to be doing, you can come back and call bullshit on us."

Here's a short history of how Surma's trash blaster came to be: Fresh out of graduate school at Montana State University in 1985, he was hired by Pacific Northwest National Laboratory, a research facility in Richland, Washington. He was there to work on an especially hideous mess: the Hanford Nuclear Reservation, just down the road. Beginning with the Manhattan Project, the US government cooked most of the plutonium for America's nuclear weapons arsenal at Hanford. With its nine nuclear reactors, giant plutonium processing plants, and buried tanks of radioactive sludge, the site has earned the dubious distinction of being one of the most contaminated nuclear waste sites in the Western Hemisphere.

Surma's first project was to work on so-called joule-heated melters, an experimental method for processing nuclear waste. "We basically fed this muddy slurry into a chamber that was heated with coils," he says, "almost like the coils on an electric stovetop." This chemical process, known as vitrification, immobilizes radioactive materials in an inert form of glass. By and large, the system worked; the team was able to convert waste into more than 30 four-foot-tall canisters of vitrified glass.

But that pricey and delicate process made sense for only the worst materials on the site. Hanford also has huge quantities of more heterogeneous trash, much of which contains low-level radioactivity. "It couldn't go to a landfill," Surma says, but it wasn't suited to vitrification, either. Surma went prowling through the literature for other waste-treatment techniques and was soon reading up on tech known as the plasma torch. In the 1960s, scientists at NASA wanted to learn

more about the effect of extreme heat on manned spacecraft reentering the atmosphere. They developed plasma torches to mimic those conditions.

Meanwhile, Surma learned, the practice of using plasma for processing waste had been around for decades, primarily in the metal and chemical industries. Oil refineries, for instance, spend \$2,000 a ton to dispose of their toxic sludge with plasma gasification. But few people ever gave the technology much serious consideration for treating everyday garbage because of the high energy costs and because the heterogeneity of municipal solid waste makes it that much harder to efficiently untangle.

Jeff Surma wants to transform garbage from something we toss into something we value.

And then there's the problem of the toxins in heavy metals—materials from busted televisions, microwave ovens, dead batteries, broken thermometers, old paints—which aren't broken down by plasma. If you don't want hazardous leftovers making their way into, say, the water supply, you have to find a way to safely sequester the stuff. Those especially nasty substances, of course, were Surma's specialty.

Around the same time that Surma was looking into all this, a physicist at MIT's Plasma Science and Fusion Center named Dan Cohn was searching for plasma technology's possible environmental applications. He placed a call to Pacific Northwest, asking if anyone at the lab was doing plasma research, and he was connected with Surma. Before long they were brainstorming how to take the technology beyond merely disposing of specialized toxic waste: They wanted to go after the billions of tons of common household trash.

The next step was to pull in a retired engineer from GE named Charles Titus. He was an expert in high-voltage engineering and had become convinced that metal torches, which tend to get damaged by the very heat they deliver, were the wrong technology. It would be better to create plasma with an electric arc strung between two graphite electrodes. (Titus died in 2007.)

But the trio also knew that if they were going to aim for the massive market in municipal solid waste, they needed a clean system with essentially no byproducts. Otherwise, their technology would look like incineration in disguise. One evening in 1994, over a meat-lover's pizza and another round of Sam Adams at a Bertucci's restaurant near MIT, Surma wondered aloud about combining the plasma attack with the vitrification technology he'd mastered at Hanford to handle the nasty leftovers. The concept was captivating, but they would have to find a way to run that kind of machinery without also needing a dedicated hydroelectric dam to power it.

To combine the vitrification and plasma-zapping processes in the same chamber, they needed to keep the molten glass at the bottom of the vessel from cooling down; continuously having to reheat it would interrupt key chemical reactions and could quickly lead to exorbitant energy costs.

Keep it hot. Sounds straightforward, but it isn't. While the molten soup needs alternating current to maintain steady temperature, the electric arc for the plasma runs on direct current. Titus, the electricity guru, said he could rig the AC/DC combo, and that evening they quickly sketched out details for a system that would enable DC and AC to cohabitate within a plasma gasification furnace jacked up with a melter. This tandem approach, the men realized, promised to provide just enough energy to sustain the plasma and atomize trash, while keeping the glass in a molten state.

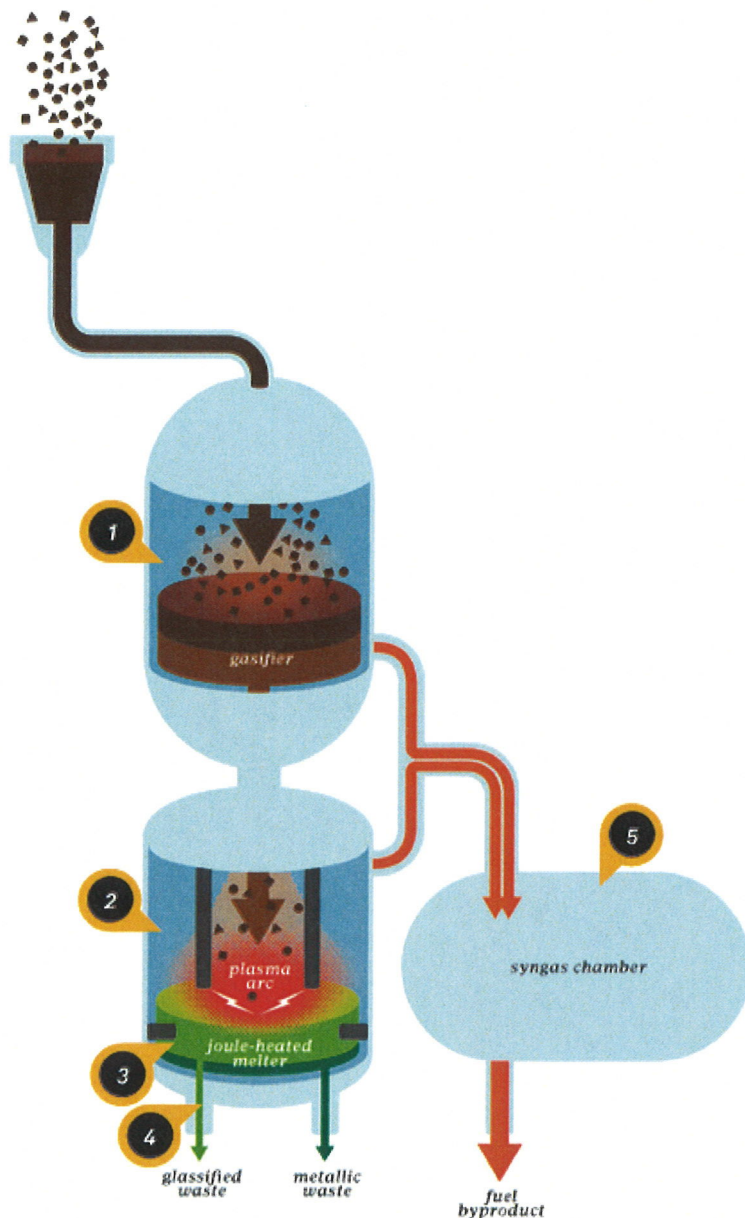
"But no more energy than that!" Surma says. The next day they wrote up the details in an invention disclosure, a kind of shortcut for protecting an idea in advance of filing a full patent.

Within a few months, the three scientists felt ready to launch a company. Cohn knew a guy who had made a killing selling his frozen-dinner company to ConAgra and was looking to invest in promising technologies. So one afternoon in 1994, in a dimly lit room with mahogany walls at Manhattan's Chemists' Club, they presented the melter idea to the frozen-dinner guy, who had brought along a venture capitalist friend to offer advice. Surma, Cohn, and Titus got the money, as well as a complementary booklet of coupons for chicken potpies.

How to Blast Trash

The plasma-enhanced melter now operating in Oregon breaks down everyday garbage into its

constituent atomic elements. Here's how it works.



1/ Gasification

A conveyor belt delivers shredded trash into a chamber, where it's mixed with oxygen and steam heated to 1,500 degrees Fahrenheit. This process, called gasification, transforms about 80 percent of the waste into a mixture of gases that are piped out of the system.

2/ Plasma Blasting

Material that doesn't succumb to the initial heat enters a specially insulated cauldron. An 18,000-degree electric arc that runs between two electrodes creates a plasma zone in the center of the container. Exposed to this intense heat, almost all the remaining trash gets blasted into its constituent atomic elements. Again, the resulting gases are piped out and sequestered.

3/ Hazmat Capture

At the bottom of the cauldron sits a joule-heated melter, which is like coils on an electric stove and maintains a molten glass bath that traps any hazardous material left over from the plasma process.

4/ Recycling

Swirling in a taffy-like ooze, the molten glass is drawn out of the system. Now inert, it can be converted into low-value materials such as road aggregate. Metals are captured at this point, too, and later recycled into steel.

5/ Fuel Capture

The sequestered gases, known as syngas—mostly carbon monoxide and hydrogen—are cleaned and can be sold and converted to fuels like diesel or ethanol to produce electricity onsite or elsewhere.

Illustration: James Provost

They called their company Integrated Environmental Technologies (eventually InEnTec), and in 1995 Surma took a leave of absence from Pacific Northwest to run it. It was slow going at first. Surma and his team of three engineers didn't finish the prototype melter until 1997. They sold their first commercial units, geared specifically for hazardous waste, in 1999. Early customers included Boeing and Kawasaki, which produce heaps of hazardous waste and have to pay dearly to deal with it. Manufacturers save big money when they don't have to contract with someone else to dispose of their waste, and gleaning useful materials or gases out of a treatment process only adds to overall savings.

But when InEnTec tried to venture into markets beyond the manufacturing and chemical industries, things always went wrong. Surma sold a unit to a company in Hawaii that used it to process medical waste, but that firm ended up folding. Next, he tried to set up a medical waste processing operation in northern California, this time to be run by InEnTec itself. But a group of impassioned citizens stepped in to oppose the project. They didn't—or refused to—understand the science of plasma gasification and the absence of emissions. All they heard was “medical waste treatment plant” (and some version of “right down the street”). After an 18-month struggle, Surma jettisoned the project in 2007. It was a moment of truth. He realized that the business had somehow drifted from the founders' original vision. “It was always our intent, from the very first patent, to go after the municipal solid waste stream,” he says. “But customer pull drew us into hazardous- and medical-waste treatment.”

Surma decided to retrench—to get back to the goal of processing what he calls the granddaddy of waste streams. Together with InEnTec's chief engineer, Jim Batdorf, he spent three days planted in front of a whiteboard, trying to come up with ways to make it more economically feasible to use the melter on household garbage in all its heterogeneous glory.

The breakthrough alteration they came up with was to stack a conventional gasifier atop the plasma-enhanced melter. The trash undergoes heating and treatment by way of this preliminary gasifier, then moves into the chamber with the plasma zapper and vitrification. It's like partly defrosting a turkey before putting it in the oven. This strategy improves efficiency because it takes less energy for the plasma to blast materials that have already undergone some heating. The leftovers, meanwhile, drop down into the molten soup, which flows in a slow, taffy-like ooze of glass and liquefied metal out the bottom of the system. At the same time, syngas piped out of the plant can be burned as fuel to, in theory, supply all of the power needed to run the melter itself. The actual plant built by S4—a wholly owned subsidiary of InEnTec—is still so new that it remains to be seen whether the quality and quantity of Surma's syngas matches the predictions and test data gathered so far. “The goal is to take waste and produce a product that is used for energy or for some other process,” says Tom Reardon, a vice president with the waste consultancy Gershman, Brickner & Bratton. “They've proven they can produce a syngas. But from it, can they produce the fuel they're supposed to?”

“The easy answer used to be: Store it in a can, put it in a truck, and then send it to a big hole in the ground.”

What Surma didn't know back when InEnTec was retooling for municipal trash was that, starting in 2005, executives at Waste Management had quietly dispatched a team of experts and consultants to study plasma gasification. If it looked like a worthy technology, they would invest. After a review that lasted more than two years, they determined that InEnTec was one of the few firms in the world whose technology looked viable. In 2008, Surma found himself on a flight to Houston to give Waste Management executives a presentation about his plasma-enhanced melter. The company's executives know better than most that we can chuck trash in landfills for only so long. “The easy answer used to be: Store it in a can, put it in a truck, and then send it to a big hole in the ground,” says Carl Rush, a senior vice president at Waste Management. “We're moving away from that as a society.” Why? People don't like it, it's becoming costlier to transport and bury garbage, and—even in the spacious American West—landfills are gradually butting up against more backyards and inching their way toward local water tables.

Trash-to-fuel technology has in fact been around since the 1970s and involves burning waste to generate electricity. But that method, no matter how fancy your emissions scrubbers, invariably produces a stew of byproducts that need to be disposed of. Consequently, environmentalists—and some in the industry itself—have remained skeptical of trash-to-fuel. Nevertheless, Rush and his team suspected that entrepreneurs might have cracked the problem and began searching for experimental technologies to invest in. Among the more than two dozen companies Waste Management has recently added to its portfolio are a startup with a specialized method for producing compost, a firm that uses gasification to turn biomass into synthetic gas, and a company that converts mixed and contaminated waste plastic into synthetic crude oil.

Not all of these startups will make it, and it's possible that most won't. But Waste Management bosses hope they will help accelerate the transition to an era in which the very idea of garbage itself is garbage—and they want to be positioned to profit when that time comes.

The INENTEC Hydrocarbon Conversion Test Facility is located next door to Richland's tiny airport. Inside the cavernous building stands the first prototype of the plasma-enhanced melter, which is less than a third the size of the unit 85 miles away in Arlington. This is where Surma and his team refine and tune the blasting process in an ongoing series of upgrade experiments, melting materials from everyday trash to asbestos, PCBs, hazardous chemical sludge, and discarded electronic equipment. Data gleaned here will help with tweaks at the plant in Arlington and inform the design and operation of S4's next commercial melters.

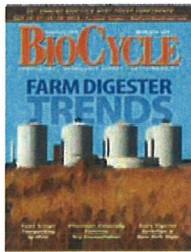
Today they're testing a chemical called toluene, one of the most stable organic compounds there is. That makes it a great substance for assessing the melter's proficiency at busting things apart, since being chemically stable means toluene is not easily changed or altered without some kind of big input, such as a blast of superhigh heat.

Staring through a circular window into the furnace, I see the cherry-red glow of the plasma. It looks like a cross between lava and a supernova. (If you could somehow stick your arm in there, it would be instantly vaporized.)

Back in Arlington, I catch up with Waste Management's point person for S4, Joe Vaillancourt. After a tour of the gasification plant, he sits on a desk in the operations room. Plastic still covers the gray carpet, but flatscreen monitors are aglow. “This plant will provide the data to quiet the naysayers,” Vaillancourt says. Once it's running at full capacity, it will process 25 tons of waste a day.

He stares out the window for a moment, past the S4 facility to the man-made mountain of garbage behind it. Then he nods toward the consoles, where technicians will monitor the machines and chemical brew that will blast tomorrow's trash to smithereens. “If you don't want landfills, how could you not want this?” he asks.

Contributing editor David Wolman (david@david-wolman.com) is the author of The End of Money: Counterfeiters, Preachers, Techies, Dreamers—and the Coming Cashless Society.



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U.S. Residential Food Waste Collection And Composting

BioCycle December 2009, Vol. 50, No. 12, p. 35

More than 90 towns and cities in the U.S. report offering residential food waste collection, showing significant growth.

Rhodes Yepsen

WHILE collection of residential food waste is widespread in parts of Canada and many European countries, the U.S. has lagged behind. However, BioCycle's nationwide survey this year uncovered more than 90 communities that are offering some type of food waste collection, more than double the number of communities identified in 2007, which reported 42 programs (see "Source Separated Residential Composting," December 2007).

Some of this increase is due to more detailed tracking, asking counties to list the separate towns with residential organics collection (e.g. Swift County, Minnesota). But most is actual growth, with dozens of new programs popping up around the country. Temporary pilot programs are being set up to determine whether food waste collection is feasible for a particular city (e.g., State College, Pennsylvania; Hamilton, Massachusetts; Denver, Colorado). Longstanding regional programs have expanded services to new towns (e.g., Alameda County, California; King County, Washington). Two cities, San Francisco and Seattle, have even gone as far as to make residential organics collection mandatory. In past years, BioCycle surveys used the terminology "residential source separated organics (SSO)," defined as municipal programs targeting household organics beyond yard trimmings (e.g., food waste, food-soiled paper, etc.). However, there was debate in one community whether allowing residents to add only raw, preconsumer fruits and vegetables (primarily gleaned from gardens) in their yard trimmings carts should be considered. In another instance, a county differentiated between cocollecting food waste with yard trimmings in the same cart, versus collecting food waste and yard trimmings separately. In an attempt to avoid confusion, BioCycle editors decided to call the programs in this survey "residential food waste collection and composting programs." Table 1 summarizes the data collected for 2009.

CALIFORNIA



Alameda County: Several cities in Alameda County began offering food waste collection in 2002. These were funded by StopWaste.Org, a public agency comprised of Alameda County Waste Management Authority and Alameda County Source Reduction and Recycling Board. There are now 16 towns and cities in Alameda County with residential food waste collection programs. Food waste is cocollected with yard trimmings weekly in green carts, and taken to one of two composting facilities, Grover Landscaping, Inc. or Republic at Newby Island (formerly BFI). "Alameda County finally has 100 percent saturation, with organics collection offered to all 403,000 households," says Brian Matthews, Senior Program Manager for StopWaste.Org. "We audit our cities twice a year, flipping cart lids and checking for food waste in both the green cart and trash bin, and participation rates have been increasing."

This is in no small part because of StopWaste.Org's extensive outreach and promotional campaigns. In the past few years, it has provided outreach materials in more languages. They feature thematic and seasonal outreach. For instance, a green cart says "¿Que te pasa Calabaza?" which translates to "What's going on Pumpkin head?" in an effort to capture

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the rush of pumpkins after Halloween. There has also been a big push to compost more food-soiled paper, with promotions printed on pizza boxes and coffee cup sleeves, two easily targeted items.

Despite the auditing, participation rates are difficult to monitor, notes Mathews. "About 48 percent of households with green carts in Alameda County put food waste in, but it's nearly impossible to determine why some families don't use their green cart," he says. "It could be that they were on vacation when the study was done, or that they forgot to put out the cart that week. We therefore conduct phone surveys about awareness of the food waste program, and ask reasons for not using the green cart. We are very pleased with the results of our most recent study, which shows trends of increased participation and awareness."

Arvin, McFarland and San Fernando: The city of Arvin offers residential food waste cocollection with yard trimmings. About 1,800 tons/year of residential organics are collected, composted at Community Resource and Recycling, Inc.'s facility in Lamont. The city of McFarland had a similar SSO program, but it was discontinued six months ago.

In San Fernando, Crown Disposal (a sister company to Community Recycling) started collecting residential organics in 2002, along with trash and recyclables. Organics are collected weekly from all 5,862 single family households, and taken to Community Recycling's facility in Lamont.

Los Angeles: The City of Los Angeles launched a residential food waste collection pilot program in September 2008. Food scraps and food soiled paper are placed into existing green yard trimmings bins. "The residents received an introductory letter and postcard notifying them of the program," says Rowena Romano, Environmental Engineer Associate, City of Los Angeles Department of Public Works. "During roll-out, the City's recycling ambassadors and maintenance laborers went door to door distributing 2-gallon kitchen pails and brochures to residents, as well as educating them on the program."

Click on the table to view it larger.

The pilot is running in five neighborhoods, involving about 8,720 households. Participation was assessed by visually inspecting the green bin for food and food-soiled paper. Depending on the neighborhood, the green bin set out rate ranged from 32 to 58 percent, and food waste was included in 8 to 27 percent of the green bins.

All food wastes are accepted, cocollected weekly and taken to the city's Central LA Recycling Transfer Station for hauling to Community Recycling's composting facility in Lamont. Average monthly collection for the pilot is 286 tons (wet), about 2.7 percent of which is food or food-soiled paper (a weight-based waste characterization was conducted). "The city's pilot program is ongoing and we're currently planning to expand it," concludes Romano.

Santa Cruz County, Scotts Valley and Capitola: Starting in the summer of 2008, residents in the unincorporated area of Santa Cruz County (not the city itself), and the towns of Scotts Valley and Capitola, can place raw fruits and vegetables in their green waste carts, serviced by GreenWaste Recovery. "The reason for the initiative was to get residents comfortable with the idea of putting food scraps in with yard trimmings," says Melodye Serino, Zero Waste Analyst for Santa Cruz County. "We are in the process of applying for a permanent permit and hope to reconfigure space at the landfill area to increase composting and offer a full residential curbside collection program."

Residential organics are composted at the county's Buena Vista landfill. "The county supplies the space and equipment and we contract services out to Vision Recycling."

San Francisco: Mayor Gavin Newsome passed a mandatory source separation ordinance in June 2009, which came into effect in October. The first of its kind in the U.S., the ordinance requires residents and businesses to separate organics and recyclables from the garbage. "This ordinance essentially makes sure that no matter where you go in San Francisco, you'll have opportunities to recycle and compost through the city's curbside programs," says Robert Reed, Public Relations Manager for Recology (formerly NorCal), which is contracted to haul the city's wastes. "We already had a foothold and tremendous momentum. About half of the city's properties had green bins, and all had blue bins. Since October we've been delivering between 100 to 150 green carts every day, up from about 25 to 50 before the ordinance." Kitchen collectors



are distributed with new green bins to encourage families to divert food waste, which is mixed in the yard trimmings bin.

All told, about 225,000 households and over 4,000 businesses in the city now have green cart service. "About 46 percent of San Francisco's 8,500 apartment buildings are now participating in organics collection," says Reed. "That is more than double the number of apartment buildings a year ago. They were the city's last frontier. We've also increased organics tonnage by 25 percent in the last year, averaging just under 500 tons/day. This has involved adding stops to routes, and we offer a lot of 'inside service' for apartment buildings."

Promotional materials are continually updated. For example, the new lid sticker for the green carts uses only photos to indicate what to place inside, instead of words, to address the city's multilingual population. "We replaced older stickers on all green carts in San Francisco with these new stickers," says Reed. Collected organics are taken to Jepson Prairie Organics (which Recology owns and operates), located in Vacaville. Recology estimates that about 190,000 tons/year of food waste still could be diverted from the city's waste stream for composting.



COLORADO

Boulder and Louisville: The city of Boulder recently regulated that haulers must offer organics collection, bundled at one rate with garbage and recyclables. Western Disposal, a hauling and composting company, services about 95 percent of the city's residential clients, with 30,000 households in Boulder and nearby Louisville. "The new program came online for Boulder starting in August 2008, and was completed in January or February of 2009, with Louisville following in June," says Bryce Isaacson, Vice President of Sales and Marketing for Western Disposal. "The landfill disposal fee in Colorado averages \$13 to 14 per ton, so these are unique programs, because you are not saving by diverting. The government was needed to level the playing field, requiring organics collection to be included with garbage service, at the same base price." Boulder and Louisville have PAYT programs.

Boulder conducted residential organics pilot projects in 2005 and 2006 for about 2,500 households, during which Western Disposal delivered carts, kitchen collectors and two rolls of compostable bags. "The bags and kitchen pails really helped to facilitate the program, limiting flies and odors, but the cost of offering these materials citywide was too high," he adds. The pilot programs were deemed successful, diverting 55 to 69 percent of residential waste.

In the current program, organics are collected every other week, alternating with recyclables. Due to the prevalence of bears in the nearby mountains, the program in Boulder doesn't allow any meat or poultry, just fruits, vegetables, food-soiled paper and compostable products. Louisville is further from the mountains, and allows all food wastes. "On average, we collect 475 tons of organics per month, in addition to 517 tons per month from an organics drop off location, and 71 tons per month of commercial organics," reports Isaacson. "Our residential organics tonnage will most likely increase as everyone comes on board. Just based on curbside collection of organics and recyclables, not including the drop-off, Boulder is now diverting over 50 percent." The organics are hauled to Western Disposal's composting facility, located within Boulder's city limits.

Denver: A residential pilot project was launched in Denver in October 2008 to test the feasibility of curbside collection. Originally intended to run only through June 2009, the program was extended through March 2010. "We selected a few small areas of the city for the pilot project and asked homes to subscribe," says Charlotte Pitt, Recycling Program Manager for Denver Solid Waste Management. "The neighborhoods are spotted throughout the city to ensure we're gathering a representative sample. We only had funding for 3,300 households, giving out kitchen pails and 65-gallon curbside green bins. We received more subscription requests than we could offer."

All food wastes are allowed, including meat and food-soiled paper. Some participants were given two boxes of BioBags at the start of the program. Other BPI-certified compostable bags are also permitted. A1 Organics composites the collected organics at its Rattler Ridge facility in Keensburg, which is about 40 miles northeast of the city.

Collection is weekly during the growing season, and every other week during the winter. About 811 tons were collected from November 1, 2008 through June 30, 2009. "Our services are funded through the City's general fund, which has taken a hit," says Pitt. "We're developing a plan that calls for citywide composting collection of food waste, yard trimmings and nonrecyclable paper, but at this time it's up to the politicians to find the money for it."

IOWA

Dubuque: The city of Dubuque's residential organics collection program started as a two-year pilot in 2006, but is now permanent, offered to all 57,000 residents. During the pilot, 30



tons were collected the first year, and 35 tons the second year. The city provides 13-gallon wheeled Norseman containers with snap-locking lids, plus a 2-gallon kitchen collector. Food waste is collected weekly, commingled with yard trimmings in a solid waste packer truck, and delivered to the Dubuque Metropolitan Area Solid Waste Agency (DMASWA) facility. An estimated two tons/week are processed into compost, which is the current maximum of food scraps allowed under Iowa Department of Natural Resources (IDNR) rules. "We applied for a variance in January to expand to 6 tons/week, with the hopes to expand our food waste collection program to more businesses," says Paul Schultz, Resource Management Coordinator for the city of Dubuque. "Although we offer organics collection to all 20,000 garbage customers, we are limited by the 2 tons rule. Eventually we will probably apply for an MSW composting facility permit, which would require about \$250,000 for site improvements."

Cedar Rapids: Cedar Rapids began allowing residents to place vegetative food waste in their yard trimmings carts in 1999. "This includes materials like coffee filters, vegetable peelings, fruit, etc., along with yard waste," says Stacie Johnson, Education Coordinator for the Cedar Rapids-Lynn County Solid Waste Agency, which operates the city's composting facility. "Organics are composted in windrows, with finished product given to residents for free. We also sell it to landscapers and use it for storm water management. Due to a major flood in 2008, about 1,200 homes will be torn down — we will provide compost free of charge for seeding those plots."

There are currently 38,500 households with garbage collection, 37,651 of which have 95-gallon green carts. "The difference in the total number of customers versus those with green carts is due to condominium complexes not wanting the carts," reports Mark Jones, Superintendent of Cedar Rapids Solid Waste & Recycling Division. From July 2008 to June 2009 (the city's fiscal year), 14,380 tons of curbside organics were collected. "We do not break out the food organics from the other yard waste, but I would say the food organics is still very low," he adds.

MASSACHUSETTS

Hamilton: A residential food waste pilot project was conducted last winter in a neighborhood of Hamilton, Massachusetts. For about two months, all food wastes, including meat and dairy, were collected from 74 families. "Norseman provided us with curbside carts and kitchen collectors, New England Solid Waste collected the material, and Brick Ends Farm composted it," says Gretel Clark, who helped organize the project. "On average, each household set out 10 lbs/week of food waste."

The Hamilton Recycling Committee calculated that with 500 participants, weekly costs for organic waste collection would be \$6.25/month. "We are collecting signatures from interested households, and currently have 300," says Clark. The program, if instituted, would be offered to both the town of Hamilton (2,500 households) and the town Wenham (1,200 households).

Northampton: The Pedal People Cooperative, Inc. is a human-powered hauler offering garbage, recycling and organics collection in the towns of Northampton and Florence. In business since 2002, Pedal People uses bicycles with trailers to collect waste from businesses and residences, and offers rates that are competitive with conventional private haulers. Organics collection began in 2007. "We currently have 385 residential pickups, 128 of which have signed up for organics collection," says Alex Jarretta, a founding member of the cooperative. "However, in the last three months 138 households have actually put out organics, even though some haven't officially signed up for the service."

Collected organics are biked to the Montview Neighborhood Farm, a Community Supported Agriculture (CSA) operation located a few blocks from town. The three-acre farm is set on conservation land, and is also human-powered. "We have diverted 40 tons of organics this year alone, which is composted at Montview and applied to garden beds," says Lisa DePiano of Pedal People.



MICHIGAN

Ann Arbor: The city of Ann Arbor rolled out food waste collection in April 2009, in an effort to pull more materials out of the waste stream. "We had positive experiences with our pilot projects, and thought it was timely to expand the service to our full population," says Tom McMurtrie, with Ann Arbor Public Services. "Residents purchase a cart, and the service is paid for through taxes." There are currently 10,000 households using green carts, out of 24,000 single-family units. Food waste is added to yard trimmings carts; tonnages are affected by seasonal changes.

About 10,000 tons of yard trimmings were collected in 2008 and processed at the city's composting facility. A Morbark tub grinder is used for size reduction, and a Scarab for turning the windrows. "To promote the new service, we sent out an announcement in our WasteWatcher flyer to all households, and ran ads in the local newspaper," says McMurtrie. "Only vegetative food waste is accepted at this point. We may expand to all food wastes in the future, but are trying to be cautious at first. We're doing this project on a budget, using existing collection infrastructure, which has made the cost of implementation affordable."

Mackinac Island: Mackinac Island started collecting source separated organics in 1992. The island is a historical community that prohibits motor vehicles, so horse-drawn trailers are

used to collect wastes. There are just over 500 year-round residents, but during peak tourist season, about 15,000 visitors come to the island. "In the summer months, we collect organics 7 days per week, but this tails off to once a week in the winter months," says Bruce Zimmerman, Director of Public Works on Mackinac Island. "We don't use a scale for measuring the waste, but rather charge per bag, and extrapolate that number for estimated tonnage and cubic yard values."

In 2008, about 635 tons of food waste were collected, as well as 583 tons of yard waste. Residents are charged \$3/bag for garbage, but only \$1.50/bag for organics. "At the composting facility, residential organics bags are opened and hand-sorted for contaminants," says Paul Wandrie, who manages the facility. "The organics then travel via conveyor to a picking station, pass under a magnet for metal removal, and enter a shredder. We mix the shredded waste with manure, yard trimmings and commercial food waste using a front-end loader, and then compost it in aerated concrete bays." All of the finished compost is used on the island.

MINNESOTA

In November, Minnesota finished a stakeholder process for a comprehensive waste management plan, and released a draft report of recommended strategies. "The group isn't coming up with a total state plan, but rather is focusing on major populations centers, or 'centroids,' where the bulk of the waste is generated," says Ginny Black with Minnesota Pollution Control Authority (MPCA). "According to the suggested plan, statewide organics goals will be set, with mandatory diversion. However, rural counties would not be required to recycle organics, even though about 41 of 87 counties are already involved with some level of organics recycling."

Also under consideration is a revision of the state's composting rules to allow for a third category, to increase food waste processing capacity. It would be less stringent than a solid waste permit, but more controlled than a yard trimmings site permit. "If a statewide goal is established for organics diversion, this will create more demand for food waste composting facilities," says Black. The revised rule would most likely focus on compost pad surface type, finding an intermediate level between requiring a landfill lining (solid waste permit) and almost no surface requirement at all (yard trimmings composting site). The rules will probably also involve formalized BMPs, such as minimum buffer zones.

Dakota County: The city of Burnsville rolled out a food waste collection pilot program in 2003, which continued to operate until this year. The program initially had 900 households in the North River Hills housing development, with collected waste sent to Specialized Environmental Technologies, Inc. (SET, formerly Resource Recovery Technologies) for composting. However, participation has dwindled to about 20 or 30 households. Burnsville recently announced that it will stop the program.

Nobody touched Aunt Sally's green bean surprise?



From Thanksgiving to New Year's Day, household waste increases by more than 25%. Much of that waste is food. Instead of scraping burnt cookies, uneaten casseroles and turkey bones in the trash, you can recycle food scraps and food-soiled paper into compost.

Call today! You could have your organics recycling cart delivered by Thanksgiving.

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Hennepin County: Several communities in Hennepin County have residential food waste collection. The city of Wayzata started its program in 2005, whereas Minnetonka, Orono and Loretto came online in 2007. "There are also pilot projects for collecting food waste in Linden Hills, a neighborhood in Minneapolis, and in Medina and Medicine Lake," says John Jaimez, with Hennepin County Department of Environmental Services. "All of Hennepin's programs collect food waste separately from yard trimmings. Although this may reduce hauling efficiency, compared to cocollection, there are several advantages to our system: the ability to accurately measure food waste, to meet specific diversion targets; residents see the existing green cart as primarily for yard wastes, and secondarily for food wastes, which limits use for food waste; and, compost facilities like the clean food waste streams, which are easy to mix for the right C:N ratio."

Most of Hennepin County's organics are taken to SET, which is located in Empire. "SET took over the facility from Resource Recovery Technologies in October 2008, but we've actually been the operator this facility since 2000," says Kevin Tritz

of SET. Since the Governor signed into law a ban on the use of plastic bags for organics collection (effective January 1, 2010), feedstocks have been getting cleaner. "The food waste from programs in Hennepin County already has noticeably less contamination," notes Tritz. "Our finished compost has subsequently improved, and is selling much better than before. Our average monthly throughput of SSO for January through October, 2009 was 439.31 tons, which is a combination of commercial and residential, since it mostly comes in on transfer trailers. This is an increase from 2008, when the average was 137.57 tons/month. This is primarily because the other locations where Hennepin County was sending its organics either closed or were shut down."

One of the places that Hennepin had been sending organics to is the University of Minnesota's Landscape Arboretum, a demonstration composting project in Carver County. Due to odors the facility closed this year, with plans to reopen at a different location at the arboretum. "The pilot project started in 2007 to demonstrate cocollection of food waste and yard trimmings, composted at a yard trimmings site," says Marcus Zbinden, Environmental Specialist with Carver County. "However, it became overwhelmed with larger quantities of food waste, processing them in nonaerated static piles that reached 18 feet. The buffer was only about 250 feet, with houses across the road. Another development is that Waste Management, our original partner, has discontinued residential organics collection services."

Hutchinson: The city of Hutchinson continues to collect about 2,500 cubic yards/year of residential organics, composted at Creekside Organics Materials Processing Facility, which the city operates. "We still provide compostable bags at no cost to residents, and are currently using Husky EcoGuard and BagToNature," says Doug Johnson, Compost Site Coordinator for Creekside. "We have 98 percent participation, and if we didn't provide bags, people wouldn't participate as much. There would also be more contamination, and the cost to dispose of black plastic bags would be immense."

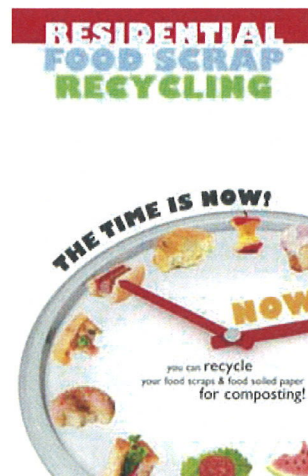
Creekside mixes the residential SSO with yard trimmings and some commercial food waste, composted in Engineered Compost Systems (ECS) in-vessel containers. It has expanded its bagging line from 1.2 million bags/year to almost 2 million.

Swift County: Swift County started its residential SSO program in 2000. About 3,800 households are participating in programs in eight cities: Kerkhoven, Murdock, De Graff, Benson, Clontarf, Danvers, Holloway and Appleton, and about 300 households in other rural communities. "About 62 to 68 percent of households currently subscribe, with the best probably being the city of Kerkhoven, with rates up to 80 percent," says Scott Collins, Solid Waste Officer for Swift County Environmental Services. "We are only able to separate out tonnage data for four of the cities, but all told, our facility receives 20 tons/day, which is small enough that we can baby our compost process, making it very hands on at every step."

OHIO

Huron: The City of Huron offers seasonal yard trimmings collection by subscription (\$8/month), running from April to January. There are 1,579 subscribers, or more than half of the city's 3,000 households. This year, Barnes Nursery worked with Huron to include food waste in the program, and extend collection year round. "This wasn't hard work, because the program was already there; we just added food waste and introduced some good educational programs," says Sharon Barnes of Barnes Nursery, Inc., which composts the organics at its nearby facility. "We were already taking the yard trimmings, so it was a natural fit, and the residents with yard trimmings were already committed to recycling, willing to pay extra for it."

The program is far from formal, with no funds for green bins. "We get the job done, but it doesn't always look pretty," says Barnes. However, the city is considering an all-inclusive program where everyone would have the service at one price. "To encourage more participation, we offered a drastically reduced tip fee to Huron if all residents were signed on," she continues. "This is appealing to the city, the haulers, and ultimately the residents, all who will save money while lightening their environmental footprints."



Luckey: The village of Luckey began a residential food waste program in October. In fact, the faltering recycling program was replaced by organics collection. Only 700 to 1,000 pounds of traditional recyclables were being collected each week, which wasn't enough to pay for hauling costs. NAT Transportation, which collects trash at 350 households, repurposed the recycling bins for organics. Recycling bins are now being used for food waste (including meat and dairy), yard trimmings, and traditionally recyclable paper like newspaper, magazines, cardboard and junk mail. About 130 households have signed on, with organics sent for composting at Hirzel Farms, which was already taking the village's yard trimmings. Mick Torok of NAT Transportation anticipates that they'll be able to collect 2,000 pounds a week. A drop-off location for traditional recyclables has been set up for residents.

"Interest in food waste composting has grown a lot in Ohio, more than we expected," says Angel Arroyo-Rodriguez, Environmental Specialist for Ohio EPA. "For instance, the town of Bexley, near Columbus, is interested in launching residential food waste collection. Yard trimmings are already collected in Bexley, taken to a Class II compost facility that accepts food waste from a Kroger supermarket, so why not add residential food scraps?"

PENNSYLVANIA

State College: The city of State College in central Pennsylvania, home to Penn State University, will be launching a residential food waste pilot program next year in two neighborhoods, with a total of approximately 820 households. "The pilot will go at least 18 months," says Joanne Shafer, Deputy Director/Recycling Coordinator for Centre County Solid Waste Authority. "We will then determine from the testing and evaluation part of the pilot when and how to roll out fully blown residential collection."

A 2003 Waste Composition Study gathered information from neighborhoods across the city. "We have also been getting collection data from the refuse routes in these particular neighborhoods since Sept 1, 2009 to get baseline data," notes Shafer. State College Borough Public Works will collect the organics and compost them with yard trimmings at the Borough's facility.

WASHINGTON

King County: King County (KC) includes 37 cities, with a population of 1.8 million. Seattle is located in KC, but opted out of the county's solid waste programs and is listed separately. Residential organics are collected in 28 cities in KC, all of which are sent to Cedar Grove Composting. KC first launched a residential organics collection pilot project in 2001, and

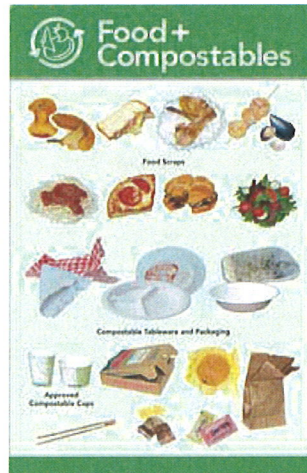
offered a full-scale program in 2004.

A recent organics characterization study revealed several key findings: about two-thirds of households in KC subscribe to organic service; about 50 percent of set outs contain food scraps; food scraps and compostable paper capture rate for participants is approximately 77 percent; the average participant includes about 35 pounds of food waste and soiled-paper each month; and, about 88 percent of all curbside organic materials is yard trimmings.

Olympia: In July 2008, the city of Olympia added food waste to its existing residential yard trimmings green cart service. This boosted curbside organics tonnages by about 400 tons/year to reach 4,000 tons/year. About 6,800 households out of 13,500 are currently subscribed, choosing either a 95-gallon or 35-gallon green cart (same cost). New customers also receive a Norseman kitchen pail. Collection is biweekly, and includes all food waste and food-soiled paper, mixed in with yard trimmings.

The organics are sent to Silver Springs Organics in Rainier, Washington, where they are composted using Engineered Compost Systems (ECS) aerated static piles. Silver Springs provides a list of approved compostable plastics. During the initial roll-out, Olympia held neighborhood meetings, sent out flyers in the mail, used internet promotions, advertised on local public TV and in newspapers, etc.

"The hardest part is trying to get a handle on participation," says Ron Jones, Senior Program Specialist for Olympia Public Works. "We hired a professional firm to help us conduct a telephone survey to learn more about customer behavior — both those who subscribe, and those who do not."



Seattle: Earlier this year, Seattle's mandatory food waste participation program came into effect. "It directs single-family households to participate in either curbside food and yard waste collection or backyard composting," says Brett Stav, Senior Planning and Development Specialist for Seattle Public Utilities (SPU). "Households are exempted from mandatory green cart service if they state they compost their food waste at home. The city has 150,000 households, 140,000 of which now participate in curbside food and yard waste collection." In 2007, BioCycle reported that 103,000 households had signed up for service.

"So far, curbside organics collection is up 30 percent this year over last year," explains Stav. "Last year, residents diverted 56,000 tons. We're also seeing approximately 6 percent of our customers switching to smaller garbage cans." Starting March 30, 2009, SPU began offering three sizes of green cart, adding the smaller Norseman 13-gallon (\$3.60/month) and 32-gallon (\$5.40/month) to its standard offering of 96-gallon (\$6.90/month).

The city also switched to weekly organics collection from biweekly, and began allowing all food scraps, including meat and dairy (vegetative food waste has been allowed since 2005). "Smelly, messy carts have been an obstacle to curbside participation, and weekly collection has helped knock that barrier down," he continues. "Seattle will soon undertake a study on the effectiveness of every other week trash collection." Collected organics are taken to Cedar Grove Composting.

STRICTLY DROP-OFF

In the process of surveying states and counties about residential food waste collection programs, BioCycle came across many instances of drop-off locations that are accepting residential food waste. Although this is not a new category it is an area that deserves more attention, as many rural communities are adopting it as a solution for capturing residential food waste.

In some cases, the communities already have commercial food waste collection, but cannot justify a residential route, such as at the Intervale facility in Burlington, Vermont, which is operated by Chittenden Solid Waste District. In 2008, two residential food waste drop off sites opened in Cambridge, Massachusetts, one at a community recycling center, and the other at a Whole Foods Market. In New Hampshire, municipal yard trimmings sites in Peterborough and Keene are allowing small amounts of residential food waste, such as pumpkins and garden scraps. Table 2 is a partial listing of drop-off programs that allow residential food waste, as BioCycle has just started to collect information on these programs.



Duluth, Minnesota: Western Lake Superior Sanitary District (WLSD), based in Duluth, covers a 530 square mile area in northeastern Minnesota. WLSD provides curbside collection of yard trimmings, and has six residential food waste drop-off sites at local businesses, the WLSD recycling facility and the WLSD composting facility. "The most recently added location is at Chester Creek Café, in the University district of Duluth, which is about 98 percent residential," says Susan Darley-Hill, Environmental Program

Coordinator for WLS. "About 40 tons/month of organics are delivered to our composting facility, but the same hauler services commercial food waste accounts and the drop-off bins, so it is difficult to monitor residential diversion tonnages. However, we know the volume has increased, based on the number of trips required, and the new drop-off site."

WLS purchases compostable bags and provides them free to residents. "This helps us reduce contamination in the compost, but it also keeps the host sites for drop-off bins cleaner," says Darley-Hill. "Cases of the compostable bags are given to the host business, and when residents drop off a bag of food waste, they go into the business or recycling center and ask for another." Several brands are used, but currently they offer Cortec and BagToNature.

The drop sites service the greater Duluth area, which includes the city of Duluth plus five rural townships and two suburban communities, for a total of 43,895 households. Residents in the neighboring city of Superior, Wisconsin also use the drop-off sites, adding another 11,515 households.

New York, New York: The Lower East Ecology Center (LEEC) started a community compost program in 1990, accepting residential food waste at its community garden on East 7th Street. Since 1994, LEEC has also collected residential food waste at the Union Square Greenmarket four days a week. In 2009, LEEC collected 312 tons of vegetative food waste at the two locations. These organics are transported to East River Park and processed using an in-vessel composting system. Finished compost is sold at the Greenmarket, either as compost or as part of a potting soil mix.

Brattleboro, Vermont: Brattleboro's commercial organics program began five years ago, and expanded to include residential food waste in May 2009. "We decided to place a container on site at our MRF to offer the opportunity to residents," says Cindy Sterling of Windham Solid Waste Municipal District (WSWMD). "Participation has noticeably increased this winter, as I think many of the backyard composters are enjoying this alternative for the colder months. And we are getting people that do not have the space for a backyard bin."

Called "Project COW," or Commercial Organic Waste composting, the drop-off site was intended to be a pilot project ending in October, but the Board of Supervisors voted to keep it going until December 31, 2009. "Right now the program is being subsidized by the WSWMD," says Sterling. "It was paid for by a USDA grant through October 2009, so now the Board needs to decide if they want to keep operating it, subsidize it or charge a minimal user fee."

Service is available to all WSWMD residents, which includes 19 towns, or about 37,000 people. One 4 cubic yard dumpster is used, collected monthly. All food wastes are allowed (including meat and dairy), as well as compostable products. "We don't presently invite businesses to take part in this program, only residents," explains Sterling. However, the Vernon Elementary School now hosts a second drop-off site for residential food waste. Organics are currently hauled to Martin's Farm in Greenfield, Massachusetts, but WSWMD is looking to compost the material locally.



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Previous Article: « Brewery Digesters As Power Source For Healthcare Network | Next Article: Performance Guidelines For Sustainable Sites »

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Zero Waste

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Achievements

San Francisco has some of the best waste reduction programs and policies in the country, and we couldn't have done it without the cooperation and support of city agencies, the Norcal Waste System companies, other service providers, businesses and residents. Here's what the city has done so far on its way to zero waste:

- Adopted goals of 75 percent landfill diversion by 2010 and zero waste by 2020;
- Diverted 77% percent (over 1,367,000 tons annually) from landfill;
- Reduced landfill disposal to its lowest level in 29 years;
- Established the first and largest urban food scraps composting collection in the U.S. The program, available to all 335,000 households and serving over 2,000 businesses citywide, collects almost 300 tons per day. Most of the resulting certified organic compost is used locally to grow food and produce wine;

Environment Commission
Biodiesel Access Task Force
Clean Technology
Legislation & Initiatives
Peak Oil Preparedness Task Force
Precautionary Principle
Municipal Green Building Task Force
Urban Environmental Accords
Urban Forestry Council

EXHIBIT K196



"One Call Does It All -
City Services
Simplified"

- Pioneered commingled recycling collection (paper, bottles, and cans together) among private homes, apartments, businesses, and city government locations on the same route;
- Constructed state-of-the-art facilities for the efficient processing and transferring of recyclable materials, construction and demolition debris, and compostable organics;
- Passed policies like the Resource Conservation Ordinance directing all city departments to maximize waste reduction and purchase recycled products, and an Extended Producer Responsibility Resolution urging the passage of state legislation that would hold producers more responsible for the waste they create.



Got recycling questions?
We have answers...



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Legislation & Initiatives

SF Environment, the Commission on the Environment, the Board of Supervisors, and the mayor have all helped create ordinances and resolutions to address the problem of solid waste, including setting the goals of 75 percent landfill diversion by 2010 and zero waste by 2020, various policy initiatives to ensure that government leads by example, and efforts to encourage the private sector to move toward zero waste.



Citywide

Resolution Urging Zero Waste Goal – Passed by the Commission on the Environment urging the mayor and Board of Supervisors to adopt goals of 75 percent landfill diversion by 2010 and zero waste by 2020.

Resolution Adopting Zero Waste Goal – Adopted goals of 75 percent landfill diversion by 2010 and zero waste.

Resolution Setting Zero Waste Date – Set the date of 2020 for zero waste goal.

Mandatory Recycling & Composting Ordinance - Passed by the Board of Supervisors in June of 2009, this ordinance requires all of San Francisco to separate recyclables, compostables and landfilled trash.

City Government

City 75% Goal Resolution – Set the goal of 75 percent landfill diversion by 2010 for all city departments.

Resource Conservation Ordinance– Requires city departments to reduce waste, maximize recycling, and buy products with recycled content.

Mayor's Executive Order on Recycling and Resource Conservation - Summarizes existing zero waste legislation as well as expands on the role of the City's Recycling Coordinators and requires defaults on multi function devices to be set to double-sided printing.

Mayor's Executive Order Enhancing Recycling and Resource Conservation - Requires Departments to purchase 100 percent post-consumer recycled content paper, to reduce paper usage, and to purchase only approved green products.

City Composting Resolution – Urges all city facilities to compost and recycle, and use compostable or recyclable food-service ware. Click [here](#) for more information.

Mayor's Executive Order on Bottled Water - Prohibits San Francisco city departments from using public funds to purchase bottled water.

Plastic Beverage Bottle Resolution – Directs city departments to provide recycling receptacles for beverage containers.

Precautionary Purchasing Ordinance– Requires city departments to purchase products that maximize postconsumer recycled content and recyclable or compostable materials, and that favor durability, repairability, and reuse.

Precautionary Purchasing Regulation – Sets recycled content and other guidelines for commodities regularly purchased by city departments.

Surplus Disposal Ordinance – Establishes a reuse and recycling hierarchy for redistributing excess city equipment and supplies.

Green Building Ordinance – Requires city construction to manage debris and provide adequate recycling storage space in buildings.

Construction and Demolition (C&D)

City Construction Recycled Content Ordinance– Requires recycled content materials to be used in public works and improvement projects.

C&D Debris Recovery Ordinance – Requires C&D projects to use city-registered transporters and processing facilities to increase debris recovery.

C&D Ordinance Summary – A synopsis of the C&D Debris Recovery Ordinance.

C&D Regulation – The regulation adopting the C&D Ordinance.

Registered Facility Application – The form required by the city to register or renew a registered C&D facility.

Registered Transporter Application – The form required by the city to register or renew a transporter of C&D debris.

Demolition Debris Recovery Plan – The form required by the city for full demolitions.

Demolition Notice Ordinance – Provides notice of demolition to recycling companies.

Disaster Debris Recycling Resolution - Policy for City Departments to maximize reuse and recycling of debris in the event of a disaster.

Adequate Space for Trash, Recycling and Compostable Materials (AB-088) - Provides standards for adequate space requirements and chute design for recycling, composting and waste handling systems.

Producer Responsibility

Extended Producer Responsibility Resolution, 2006
Supports statewide efforts to hold producers responsible for product waste and agencies to include producer responsibility language in city purchasing contracts.

Extended Producer Responsibility Framework Resolution, 2010 – Urges State to enact an extended producer responsibility framework.

Checkout Bag Fee Resolution – Urges the mayor and Board of Supervisors to adopt an ordinance requiring a fee on supermarket checkout bags.

Supermarket Bag Reduction Agreement – An agreement between supermarkets and the city to reduce the distribution of checkout bags by 10 million in one year.

Bag Recycling Resolution – Supports mandating the recycling of plastic bags at grocery stores and opposes any state preemption of local fees and other requirements to promote waste reduction.

Plastic Bag Reduction Ordinance – Requires the use of compostable plastic, recyclable paper and/or reusable checkout bags by supermarkets and drugstores.

Food Service Waste Reduction Ordinance – Requires restaurants and food vendors to not use styrofoam food service ware and instead use food ware that is compostable or recyclable. Click [here](#) for more information.

Computer and Electronics Recycling Resolution –

Advocates state legislation requiring computer and electronic manufacturers to take responsibility for reuse and recycling of their products.

Catalog Resource Conservation – Urges the catalog industry to reduce paper use and increase postconsumer recycled content.

Coca-Cola Recycled Plastics Resolution – Urged Coca-Cola to use recycled plastic in their bottles and reintroduce refillable bottles in the U.S. A similar resolution was later passed for Pepsi and Cadbury Schweppes.

Plastic Beverage Bottle Resolution – Urged the mayor and Board of Supervisors to direct city departments to purchase only plastic beverage bottles with recycled content.

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Grants

SF Environment provides up to \$600,000 annually in zero waste grants to nonprofit organizations to support the innovative reuse, recycling, composting, market development, and education that will cost-effectively increase waste diversion in San Francisco. One of the priority areas for funding is recovering the more than 36 percent of the waste "

- [2007-2009 Grant Solicitation](#)
- [2008 Mini-Grants for SF Businesses](#)
- [Grantee operating manual](#)
- [Grantee policy matrix](#)
- [Sample grant agreement](#)

2006 Zero Waste Grant Awards

- [Zero waste grant awards 2006-07](#)

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Reports

The San Francisco Planning + Urban Research Association, SPUR, published a policy paper in February 2010 titled "[Toward zero waste: A look at San Francisco's model recycling policies](#)".

SF Environment conducted a study of the types of materials that are being disposed in landfills by San Francisco residents and businesses, called the [Waste](#)

[Characterization Study.](#)

In an effort to improve the environment for residents in San Francisco, SF Environment conducted a [Street Litter Study](#) to identify the types of materials found on city streets.

SF Environment and the Department of Public Works are planning [Disposal Alternatives](#) for when our current Altamont landfill agreement expires.

Click here for the [Norcal Disposal Alternatives Presentation, May 2007.](#)

Click here for the [Presidio School of Management Report December 2007.](#)

Click here for the Container Recycling Institute [report and scorecard](#) on beverage container recycling

Click [here](#) for the Tobacco Litter Study, which was used to develop the cigarette litter fee. (pdf)

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Partnerships

SF Environment's Zero Waste team works with a wide range of partners to develop efficient programs and policies and to promote waste reduction and reuse, recycling, and composting. Some of our key partners are:

[Norcal Waste Systems](#) operates three businesses in the city: Golden Gate Disposal & Recycling picks up refuse in downtown San Francisco; Sunset Scavenger in the outlying neighborhoods; and SF Recycling & Disposal operates the recycling processing facilities and transfer station.

[The Department of Public Works](#) offers services such as litter abatement and manages the process that sets residential refuse rates.

[The Department of Public Health](#) issues refuse permits and licenses, assists with customer service complaints, and has the power to put liens on customers who don't pay their garbage bills, among other functions.

Hundreds of other for-profit and nonprofit organizations offer waste reduction & reuse, recycling, and composting services to the city, ranging from food redistribution to concrete recycling. Click on the [ecofinderRRR](#) or Zero Waste grants to find out about some of them.

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Public Awareness

Here are links to some of our recent Zero Waste creatives. If you need hard copies or need a different file format

please contact [Deanna Simon](#), (415) 355-3707

- [SF Recycling Guide for Residents and Businesses](#)
- [Compost/Recycle/Landfill flyers with text lists for SF residents and businesses](#)
- [WonderWaste - citywide dropoff sites](#)
- [Composting Sign for Paper Towels](#)
- [Cart/Bin Stickers - Compost, Recycling, Waste](#)
- [Kitchen Pail Compost Sticker](#)
- [Commercial and Residential Posters - Recycle, Compost, Waste - 1/2009](#)
- [Compost poster for special events and cafes](#)
- [Blank Compost Recycle Waste Signs for customizing](#)
- [Recycle/Compost double sided flyer 8.5x11](#)
- [Compost Pail Brochure 12-2009](#)
- ["Apple Boy" residential recycle/compost brochure](#)
- [Business compost service brochure](#)
- [Bring Your Own Bag Ad](#)
- [Bring Your Own Bag Ad low res jpg](#)
- [Flyer Announcing GreenCart Program to Apartments](#)
- [Poster Announcing GreenCart Program to Apartments](#)
- [Table Tent for restaurants/cafeterias](#)

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Links

GRRN (Grassroots Recycling Network) is a resource for additional zero waste information.

The Bay Area [Junk Mail Reduction Campaign](#) and the [Bring Your Own Bag Campaign](#) are collaborative projects of Bay Area cities and counties that encourage the public to take action to reduce the amount of junk mail they receive and to bring reusable bags whenever they shop.

The [Integrated Waste Management Board](#) is the state agency that oversees the California Integrated Waste Management Act (AB 939) and other solid waste activities.

California's [Division of Recycling](#) oversees beverage container recycling according to regulations set down by the California Bottle Bill (AB 2020).

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SFEnvironment is a department of the City & County of San Francisco

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community turn waste
into **clean energy**?

About S4 Energy Solutions

S4 Energy Solutions was established as a joint venture between Waste Management, Inc. and InEnTec LLC to develop, operate and market plasma gasification facilities using Plasma Enhanced Melter (PEMTM) technology. S4 Energy Solutions is now a wholly owned subsidiary of InEnTec Inc. Initially, our projects will process commercial, medical and industrial waste streams to produce a range of renewable fuels and industrial products. Future commercialization plans may include the processing of municipal solid waste, provided our technology proves economical and scalable for such use.

About Waste Management

Waste Management, based in Houston, Texas, is the leading provider of comprehensive waste management services in North America. Our subsidiaries provide collection, transfer, recycling and resource recovery, and disposal services. We are also a leading developer, operator and owner of waste-to-energy and landfill gas-to-energy facilities in the United States. Our customers include residential, commercial, industrial, and municipal customers throughout North America. To learn more visit www.wm.com or www.thinkgreen.com.

About InEnTec Inc.

Based in Bend, Oregon, InEnTec Inc. (formerly Integrated Environmental Technologies LLC) was formed by engineers from MIT, Battelle, and GE. Through its proprietary gasification system, the Plasma Enhanced MelterTM, InEnTec can transform medical, commercial and industrial and hazardous wastes into clean renewable products such as ethanol, methanol, diesel and hydrogen as well as generate electricity. For more information and to see a brief video on InEnTec's process, please visit <http://www.inentec.com/videos.html>.

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BEFORE THE PLANNING COMMISSION
OF THE CITY AND COUNTY OF HONOLULU

STATE OF HAWAII

1
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4 In the Matter of the) FILE NO. 2008/SUP-2 (RY)
5 Application of) AND 86/SUP-5
6)
7 DEPARTMENT OF ENVIRONMENTAL)
8 SERVICES, CITY AND COUNTY)
9 OF HONOLULU)
10)
11 For a New Special Use)
12 Permit to supersede)
Existing Special Use Permit)
to allow a 92.5-acre)
Expansion and Time Extension)
For Waimanalo Gulch Sanitary)
Landfill, Waimanalo Gulch,)
Oahu, Hawaii, Tax Map Key)
Nos. (1)9-2-003:072 and 073)
_____)

TRANSCRIPT OF HEARING

14
15 held on Wednesday, July 1, 2009, at 9:05 a.m., at the First
16 Floor Committee Meeting Room, Kapolei Hale, 1000 Uluohia
Street, Kapolei, Hawaii,

17 APPEARANCES: KARIN L. HOLMA, ESQ.
18 Bays Deaver Lung Rose Holma
19 16th Floor, Alii Place
20 1099 Alakea Street
Honolulu, Hawaii 96813
21 COLLEEN HANABUSA, ESQ.
22 1157 Fort Street Mall
Honolulu, Hawaii 96813
23 GARY Y. TAKEUCHI, ESQ.
24 JESSE K. SOUKI, ESQ.
Deputies Corporation Counsel
City and County of Honolulu
25 Honolulu, Hawaii 96813

1 COMMITTEE MEMBERS PRESENT:

2

3

4

James C. Pacopac
Kerry M. Komatsubara
Vicki Gaynor
Rodney Kim
Andrew M. Jamila, Junior
Beadie K. Dawson
Harold J. Dias, Junior

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1 And what is the boundary, the City and County
2 property boundary line?

3 A. It's the same.

4 Q. It's exactly the same? Okay, so that's what generated
5 the request for the --

6 A. Yes, yes.

7 Q. Okay, thank you.

8 MS. HOLMA: I have nothing further.

9 THE WITNESS: Thank you.

10 (Mr. Von Pein was excused at 3:19 p.m.)

11 MR. TAKEUCHI: Shall we proceed?

12 MS. HOLMA: Yes.

13 MR. TAKEUCHI: Thank you.

14 We are going to call Mr. Frank Doyle, please.

15 (Mr. Doyle approached the witness stand.)

16 MS. HOLMA: Mr. Doyle, good afternoon.

17 THE WITNESS: Good afternoon.

18 MS. HOLMA: Do you solemnly swear or affirm that the
19 testimony you are about to give will be the truth, the whole
20 truth, and nothing but the truth?

21 THE WITNESS: I do.

22 FRANK DOYLE,

23 called as a witness, having been duly sworn to tell the truth,
24 the whole truth, and nothing but the truth, was examined and
25 testified as follows:

DIRECT EXAMINATION

1
2 BY MR. TAKEUCHI:

3 Q. Thank you.

4 Good afternoon. Would you please state your name,
5 place of employment, and business address for the record.

6 A. My name is Frank Doyle. I am employed by the City and
7 County of Honolulu, Chief of Division of Refuse. And I work
8 right here in this building, at 1000 Uluohia Street, Kapolei,
9 Hawaii.

10 Q. Would you please briefly describe your educational,
11 professional background?

12 A. I have a bachelor's degree from the Pennsylvania Military
13 College, in Chester, Pennsylvania, and a master's degree from
14 the University of Hawaii, which I got in 1976.

15 Q. And what were those degrees in? What fields?

16 A. Both of them were in civil engineering, and concentrating
17 on environmental in my masters.

18 Q. And can you briefly describe your professional
19 background?

20 A. On the mainland, after graduation, I worked primarily for
21 chemical companies, building chemical plants throughout the
22 United States and Mexico.

23 And I moved here in 1970 and went to work for a
24 consulting firm, and worked for them for seven years, then
25 came to the city, and I have been here ever since.

1 Q. And, once again, what is your current position with the
2 city?

3 A. I am Chief Division of Refuse.

4 Q. And that's in what department?

5 A. Environmental Services.

6 Q. And how long have you been employed in that position?

7 A. Approximately 26 years roughly -- uh, 32 years, actually.

8 Q. As the chief of refuse?

9 A. As the chief of refuse. But I did do some other work, as
10 the deputy director of Environmental Services, and director of
11 Environmental Services.

12 Q. Okay.

13 As the chief of the Refuse Division, what are your
14 primary duties and responsibilities?

15 A. I oversee the planning and operations for the collection,
16 design -- collection and disposal of city operations. Also,
17 the collection of private operations with respect to
18 licensing, landfilling, and disposal at H-Power.

19 We operate transfer stations, convenience stations
20 and our two major disposal sites are at H-Power and the
21 Landfill.

22 Q. And, more generally, what does the Department of
23 Environmental Services do in addition to the kind of things
24 that the Refuse Division handles?

25 A. In addition to solid waste, the Department of

1 about \$1 million, for improvements to park areas; and the
2 other \$1 million was for nonprofit organizations that
3 submitted money for grants for improvements throughout the
4 community.

5 Q. And when you say the community, what area of that are you
6 referring to?

7 A. The Waianae Coast.

8 Q. Now, in terms of alternatives to landfill disposal, what
9 kind of actions has ENV taken -- and I'm referring the
10 Department of Environmental Services by "ENV" -- what kind of
11 actions has ENV taken to reduce the waste volumes that are
12 going to the landfills?

13 A. Well, the two major efforts, of course, are the H-Power
14 facility and our recycling operations.

15 And, in those two areas, H-Power has been in
16 operation now since 1990, we have done over 10 million tons of
17 refuse.

18 We have saved almost 10 million barrels of oil
19 coming into the state because of the factor that we generate
20 electricity from that material which does not have to be
21 generated by HECO, therefore saving us the oil.

22 We have also saved a lot of space in any landfill
23 because you reduce the volume considerably when you combust
24 it.

25 And it made sense, and we are very happy that we are

1 moving forward with the expansion of 300,000 tons per year.
2 That facility is now in design, some of the equipment is being
3 purchased, and we hope to bring that facility on line in late
4 2011 or early 2012. So that's going to really make a big
5 increase in reducing additional material from going into the
6 landfill.

7 And our recycling efforts, we of course are holding
8 out curbside recycling island-wide, and there will be an
9 increase with that as we move forward.

10 We have a goal of having everything that can have
11 carts, with our automated collection, in place in May of next
12 year. So those two efforts are some of our bigger efforts
13 with respect to reducing the amount of materials.

14 We also have other things that we do. Right now we
15 have bulky item pickup, and bulky item pickup is everything
16 that you see on the curb.

17 And, in the bulky item pickup, a lot of that
18 material had been going to the landfill because it isn't
19 conducive to H-Power.

20 The best example is, if you had, for instance, lawn
21 chairs and furniture, you can't just crunch them all up and
22 put them into the H-Power facility because we refine the fuel
23 there before we burn it.

24 But our new facility is what we call mass burn.
25 With mass burn, you take the fuel and put everything in there.

1 condominiums to do recycling, and we are making some headway
2 with those programs.

3 Over the years we have kind of got to remove things
4 from the landfill. There was a time in the initial part of
5 our operations that we had construction and demolition
6 materials go to landfill. They don't go to our landfill now.

7 There was talk at one time of recovering gypsum
8 board from the landfill because the percentage was fairly
9 high. Now that percentage is quite low, which gives you an
10 understanding that a lot of the C and D material is now out of
11 the landfill.

12 Green waste, we don't accept truck loads with more
13 than ten percent. The same thing with cardboard. So, in
14 general, we think that has pushed a lot of material out of the
15 landfill.

16 And that segues into green waste recycling, along
17 with our mixed recyclables. You have seen our blue cans. We
18 have our green cans out there for green waste. And today we
19 take all of that green waste to a composter, who chops it up
20 into mulch, and then uses some of that mulch, but also turns
21 that mulch into compost.

22 We have a program that we are going to be going out
23 for in September, for a new green waste recycling facility.
24 And, in that facility, we are also going to include food waste
25 sewage sludge. And hopefully that facility -- the program is

1 to get it online in 2012.

2 We also, with that facility, will make a pretty good
3 cut in some of the bio-solids that are presently going to the
4 landfill.

5 Today, at our Sand Island sewage treatment plant,
6 which is our largest plant, we're turning bio-solids into -- I
7 don't have to describe bio-solids, right?

8 Q. No.

9 A. Okay.

10 We're turning bio-solids into pellets. And they
11 look almost like small BB's. And we are hoping that we can do
12 well with that on golf courses, and other areas like that.

13 We had, in the beginning, been sending that material
14 to the landfill. Last year, I understand we did about 50
15 percent product; and now we are shooting for 75 percent
16 product this year.

17 So eventually we will get to 100 percent product for
18 the reuse of that material.

19 But that leaves us all the rest of the sewage
20 treatment plants that presently go to landfill, and that's the
21 material that we're going to be sending to this green
22 waste/food waste sludge facility to either compost it into
23 compost materials, or some people have come to us and said
24 that we are going to have an opportunity to look at turning
25 that into biofuel, or some form of energy, perhaps even

1 Q. When did it change from Public Works to Environmental
2 Services?

3 A. It changed about the second term of the Harris
4 administration.

5 Q. Now, this decision and order, condition number ten, is
6 that, within five years of the date of the special use permit,
7 whichever occurs later, but not beyond May 1, 2008, the --
8 (inaudible) -- acre property shall be restricted from
9 accepting any additional waste material, and be closed in
10 accordance with the -- (inaudible).

11 A. Yes, that's correct.

12 Q. And this permit actually granted a 21 acre expansion,
13 which basically is 14.9 acres of landfill space; correct?

14 A. Correct.

15 Q. Now, my recollection is that it was the position of the
16 City and County of Honolulu at that time that the landfill
17 would close on May 1, 2008; is that also correct?

18 A. That's correct.

19 Q. So this was not a condition which was imposed by the
20 planning commission, it was something that, as I recall, the
21 city basically came forward and said, this is what's going to
22 happen?

23 A. That's correct.

24 Q. And I believe it was you who put forth that position for
25 the City and County of Honolulu?

1 A. To the Land Use Commission, that's correct.

2 Q. And, in fact, if you look at A-17, that is the decision
3 of June 9th, '03, before the Land Use Commission, regarding
4 the addition of -- I think the 21 acres, and also the
5 condition in the Land Use Commission decision, on Page --

6 A. Small numbers on there --

7 Q. I think it's Page 9, condition 12.

8 A. Yeah.

9 Q. And, again, it's the same restriction, on May 1, 200- --

10 A. That's correct.

11 Q. And that was the position of the city that you presented
12 to the Land Use Commission?

13 A. That's correct, on behalf of the administration.

14 Q. And that was the Harris administration at that time?

15 A. That's correct.

16 Q. And I think you heard the testimony of Mr. Von Pein, when
17 he said that he recalls that the original request that --
18 well, the original, I guess, expansion that he worked on, in
19 1999, was for 15 years?

20 A. That's correct.

21 Q. And was my recollection correct? Was it for 60 acres at
22 that time? 60 additional acres at that time?

23 A. I don't recall, but it was for, definitely, greater
24 property.

25 Q. Do you know if it would be what is being requested here,

1 Waimanalo; but, in actuality, you have run out of space
2 sooner, even with the anticipated reduction.

3 Do you have an explanation for why that has
4 happened?

5 A. Well, it could be a number of things. It could have been
6 the rate that we were filling the materials that we had going
7 in, the amount of time -- I would have to check -- that
8 H-Power was on or off. All of those things come into play.

9 Q. Mr. Doyle, can you tell me -- I think Mr. Whelan
10 testified that H-Power is off maybe three weeks, and I think I
11 asked him whether H-Power actually accepted rubbish on
12 Saturdays and Sundays.

13 Do you know if they accept rubbish on Saturdays and
14 Sundays, or --

15 A. We are open half a day on Saturday, and, when necessary,
16 on Sunday, but not very frequently.

17 We do, however -- because we supply HECO with
18 electricity, we are on the grid burning during those periods,
19 24/7.

20 Q. So, on Sundays, for example, if rubbish needed to be
21 disposed of, it would have to be at Waimanalo Gulch?

22 A. Correct, right.

23 But at that time, there's a very reduced amount,
24 because, one, all of our collection trucks are not operating,
25 a lot of the private haulers are not -- we have probably only

1 A. No, I have not.

2 Q. So, H-Power produces how many kilowatts, or --

3 A. We export approximately 45 megawatts.

4 Q. 45 megawatts?

5 A. Correct.

6 Q. Is that on a daily basis?

7 A. Every time we are operating.

8 Q. Okay, so when you say every time you operate --

9 A. We're putting 45 megawatts into the grid, and -- for
10 instance, I think they power at the new place at something
11 like 150, 180, something like that.

12 Q. 100-something?

13 A. Yes. Maybe it's 120.

14 Q. And they are also supposed to burn biofuel. Maybe you
15 can sell them the pellets...

16 A. Maybe we can sell them what comes out of, maybe, the
17 green waste: Food waste and sewage sludge. That would be
18 nice.

19 Q. That would be nice.

20 So, when you said, whenever you're operating, we
21 have already established that you don't usually -- do you
22 operate on Sundays, as well?

23 A. We are burning 24/7. The only time we are not operating
24 is when we go down for our scheduled maintenance, and
25 sometimes when we have to go down because of an unusual

1 repair.

2 Q. And how often do you go down for scheduled maintenance?

3 A. We go down for scheduled maintenance about six weeks a
4 year.

5 Q. And is that a consistent six weeks?

6 A. No. We try to go down one boiler at a time, so that we
7 are always burning on one side. There are some times, though,
8 that we have to, maybe, do some work on our electrical
9 systems, which requires us to shut down both boilers.

10 H-Power originally was designed for 561,600 tons.
11 Our average that we are putting out is 600,000 tons a year, so
12 we are meeting more than our capacity.

13 HECO and us had a little thing about what we call
14 firm energy. Actually, we are getting paid firm energy, which
15 means that we are getting paid because we are there when they
16 want us.

17 They now have -- in discussing some new things with
18 them, when they look at how they perceive energy's value to
19 them, they have what they call dispatchable energy, which
20 means they control, totally, your operation; not that you're
21 there always when you should be there, according to contract,
22 but that they want to be able to push the boiler up or down.

23 So we are working with them to see how they can do
24 that, because that's going to be best for them and best for
25 us.

1 Q. You made a comment about the fact that the solid waste
2 management plan, you are going to begin a new plan -- was it
3 next year? Did I hear you correctly?

4 A. Yes.

5 Actually, we have money in the budget for initiating
6 a study for a secondary landfill.

7 Q. Is that like going through and doing another solid waste
8 management plan, or is this a separate plan?

9 A. No, it's going through another five-year plan.

10 Of course, it takes time to do this, so it's not all
11 going to be done in 2010. The bulk of it will probably be
12 done in 2011.

13 Q. And that's for what time period? The next five years?

14 A. The next five years after our submittal to the Department
15 of Health, which was in June of this year.

16 Q. So --

17 A. Or, June of last year, I'm sorry.

18 Q. So it would be 2008 to -- is the plan that's been
19 approved from 2008 to 2013?

20 A. Well, let's just say the plan will be approved this year,
21 or submitted formally to the Department of Health this year,
22 and then we'll go from there for the next five years.

23 Q. So this solid waste plan that has been accepted is a plan
24 for the past?

25 A. It covered a period of the past, yes.

1 Q. Does the City and County pay --

2 A. The city pays at H-Power; it does not pay at the
3 landfill.

4 Q. So what is it that you pay at the H-Power right now, in
5 terms of tipping fee?

6 A. Approximately \$45 a ton.

7 Q. Does a private entity pay the same tipping fee --

8 A. They pay more.

9 Q. They pay more?

10 A. They pay more.

11 Q. Do they pay the same tipping fee for the landfill as they
12 do for H-Power?

13 A. Yes, they do.

14 Q. And do you know what that tipping fee is?

15 A. I think it's approximately \$81 a ton.

16 Q. I thought it went up?

17 A. It has gone up recently, but you may be thinking about
18 the addition of the 12 percent surcharge, and the money that
19 goes to the state, which gets it to about \$92.

20 Q. \$92? That's the figure I was thinking about.

21 A. Okay.

22 Q. So, a private -- somebody who picks up my rubbish that I
23 have to pay separate for would be charging -- well, would be
24 charging probably a premium, but they would have to pay \$92?

25 A. Correct.

1 questions.

2 MS. HOLMA: Commissioners, any questions for
3 Mr. Doyle?

4 MS. GAYNOR: I have some questions.

5 EXAMINATION

6 BY MS. GAYNOR:

7 Q. Mr. Doyle, I am wondering if you can just tell us -- you
8 know, since back in the eighties, when Waimanalo was
9 identified and permitted as, I guess, Oahu's only landfill
10 then, right?

11 A. No, actually, at that time we were still operating our
12 Kalaheo landfill on the other side of the island.

13 Q. And how much time did we continue to have --

14 A. About a year and a half, roughly, because we had to make
15 the transition.

16 Q. So how long did it take to identify Waimanalo, and permit
17 it, and get it operational?

18 A. Well, we went in there in '87. Took about two-and-a-half
19 years. It's easier to start new sometimes than to add on.

20 Q. Well, Ewa was a different place than it is now.

21 A. That's true.

22 Q. Can you tell us -- we are hearing a lot, and reading a
23 lot, so, can you tell us a little bit more about this
24 discussion, and this promise that was made to the region back
25 in 2003, that the landfill was going to cease to operate in

1 2008?

2 A. Yeah.

3 We were before the planning commission, and it was
4 our intention -- it was the intention of the division at that
5 time, and the department, that we would go for the 15-year
6 extension, which was basically the rest of the landfill that
7 we are looking at today, excluding the part that we got,
8 those 21 acres. And that's what we would have done.

9 There was a lot of discussion at that time, from the
10 community, as well as whatever, to the mayor, and based on
11 whatever his inputs were giving him, and where he decided to
12 go, it was his decision, which I conveyed, that we would only
13 go for a five-year extension.

14 Q. Okay, so --

15 A. So, after that, we did that, and we were instructed at
16 that time as to -- under the conditions of the LUC decision,
17 that we were to go out and find a new landfill. And that that
18 was supposed to be done by the council by a certain date.

19 We weren't able to do it by that certain date, and
20 we went back in and got an extension for about six months, so
21 the county could make their decision.

22 What happened was, when the mayor made that
23 decision, he also, because we were told to go find a new
24 landfill, established the blue ribbon committee. And the blue
25 ribbon committee looked at, has it in their report, a lot of

1 landfills.

2 The blue ribbon committee, based on all that you
3 heard, from Brian, who was involved, about the double-blind
4 tests that went on, had selected Waimanalo Gulch by consensus,
5 and points, and scoring.

6 I understand it, and I wasn't at any of the meetings
7 except, as I said, the very first meeting. At the last
8 meeting, the rules got changed, or whatever, people got
9 persuaded, Waimanalo Gulch was taken out by that committee.
10 They wrote a report, and made the report as to Waimanalo Gulch
11 being not part of the selection process.

12 Q. So, given the fact that you already had a land use
13 condition, and an SUP condition that said Waimanalo couldn't
14 be --

15 A. Right.

16 Q. -- Waimanalo needed to close down, why was the blue
17 ribbon committee ever allowed to even go that far?

18 A. Well, the blue ribbon committee could look at whatever
19 they wanted to.

20 In fact, when we went back to the extension of time,
21 for six months more that the council wanted, that particular
22 question was asked of the Land Use Commission: Could we
23 consider Waimanalo Gulch? And they said, it's up to you.

24 And so, in considering landfills, even the -- you
25 know, one of the -- I forget all of the testimony, but one of

1 That's the kind of decisions that we're going to have to make.

2 And if that's the decision that we make, that's the decision
3 that's made.

4 Q. I think that's pretty clear, that nobody wants the
5 landfill, but nobody wants to pay for it.

6 A. Well --

7 Q. Pay to not have a landfill.

8 A. Well, we are, though. We have made a decision that we
9 wanted to conserve Waimanalo Gulch by building the first
10 H-Power. And that was to conserve that resource for as long
11 as we could conserve it. And we are continuing to do that.

12 Q. So, are there viable sites in the future, if we need
13 another landfill, that ENV is considering?

14 I mean, even if we say 15 years, given how
15 controversial and critical this is, in two years you are going
16 to be working on it.

17 A. We are going to be working on it next year, because we
18 are looking at what we call the secondary landfill. Not that
19 Waimanalo Gulch is going away, but what is the secondary
20 landfill?

21 In fact, we have to look at that and decide whether
22 we want to not only have a landfill for -- what's going into
23 the landfill today, but do we want a separate separate ash
24 landfill? Is there any credibility to having a separate ash
25 landfill somewhere?

1 You know, we consider, well, hauling it over
2 mountains to someplace else may not be as good as what we
3 have, but -- maybe.

4 We can only look, okay.

5 A lot of this is going to be going over what we did
6 for Waimanalo Gulch way back in the seventies. Some of the
7 same sites are now gone because they have been taken over by,
8 actually, developments, in some areas.

9 But we'll look, again, at every nook and cranny that
10 we can. I mean, everybody knows that there are big holes in
11 the ground in different locations.

12 Some of them are beyond Waimanalo Gulch, out towards
13 the windward side, the windward coast. Some of them are over
14 here in Kapaa. Some of them might not be available, like
15 Kapaa, for a certain period of time.

16 Certainly, that's a -- Kapaa quarry is a big barn,
17 with a big hole, so, logically, you'd think about that.

18 So we will look, we will talk, we will ask, we will
19 start this process again in 2010.

20 Q. So, next year, you guys will start looking for a
21 secondary -- I mean you will start studying the possibility of
22 a secondary landfill, and what type of materials it would
23 take, and where it might be?

24 A. Yes. And maybe it's going to be more than one location.

25 MS. GAYNOR: Okay.

Technical Memorandum

Sand Island WWTP Evaluation of Sludge Processing Alternatives

Oahu, Hawaii

Final

March 2012

Prepared for:

City & County of Honolulu
Department of Environmental Services
1000 Uluohia Street Suite 308
Kapolei, Hawaii 96707

Prepared by:

AECOM

1001 Bishop Street, Suite 1600
Honolulu, Hawaii 96813

ACRONYMS/ABBREVIATIONS

BAF	Biological aerated filter
Btu	British thermal unit
CCH	City and County of Honolulu
CFU	Colony forming units
CHP	Combined heat and power
EA	Environmental Assessment
ENV	Department of Environmental Services
EPA	United States Environmental Protection Agency
F	Fahrenheit
IPS	Influent Pump Station
LCCA	Life-cycle cost analysis
mgd	million gallons per day
MPN	Most probable number
MSW	Municipal solid waste
NPDES	National Pollutant Discharge Elimination System
NPV	Net present value
PSRP	Process to significantly reduce pathogens
PFRP	Process to further reduce pathogens
Sand Island Fac Plan	Sand Island Wastewater Facilities Plan
SIWWTP	Sand Island Wastewater Treatment Plant
SMA	Special Management Area
UV	Ultraviolet
WWPS	Wastewater Pump Station
WWTP	Wastewater Treatment Plant
ZOM	Zone of Mixing

EXECUTIVE SUMMARY

The City and County of Honolulu (CCH) Department of Environmental Services (ENV) is in the process of developing the Sand Island Wastewater Facilities Plan (Sand Island Fac Plan) which covers the Sand Island sewer basin. The study area for the Sand Island Fac Plan consists of the Sand Island Wastewater Treatment Plant (SIWWTP) and its wastewater service area serving the eastern half of Oahu. The SIWWTP sewer basin serves a population of over 700,000 and provides preliminary and primary treatment to all flows at present. Currently, SIWWTP treats approximately 60 million gallons per day (mgd) of wastewater from the sewer basin.

AECOM has prepared this preliminary engineering study report for various alternatives to retrofit the existing Sand Island Biosolids Processing System (operated by Synagro). CCH requested a review to evaluate whether alternative options that incorporate incinerating residuals at H-Power are viable and cost effective compared to the construction of a second digester in accordance with the provisions of the existing Synagro contract. An additional driver and goal for CCH is to eliminate landfilling waste materials other than ash in the near future.

EVALUATED OPTIONS

A summary of the options evaluated in this report along with capital and 20 year present worth life cycle Costs (LCC) cost are listed in **Table ES-1** and defined as follows:

- Baseline - Build new digester and continue to operate existing dryer. A sub option incorporating combined heat and power (CHP) was also evaluated.
- Option 1 - Dewater the excess raw undigested primary sludge and transfer the cake material to H-Power for incineration.
- Option 2 - Dewater blended digested and undigested primary sludge and transfer the cake material to H-Power for incineration. A sub option incorporating CHP was also evaluated.
- Option 3 - Dewater and chemically treat undigested sludge and transfer cake to H-Power for incineration
- Option 4 - Dry blended digested and undigested primary sludge using the existing dryer and transfer the dry material to H-Power for incineration.
- Option 5 - Dry blended digested and undigested primary sludge replacing the existing dryer and transfer the dry material to H-Power for incineration. A sub option incorporating CHP was also evaluated.
- Option 6 - Dry undigested sludge using a new dryer and transport the dry material to H-Power for incineration.
- Option 7 - Build a second digester and replace existing dryer with one that operates utilizing waste heat from cogeneration

The above options consider inclusion of CHP where appropriate. CHP is currently intended for future implementation at WWTPs as part of island-wide planning.

A summary and comparison of some of the non-economic factors for each Option is shown in **Table ES-2**. There are non-quantifiable aspects that need to be considered in the decision but

since they are policy-related, CCH should carefully consider the attached table in order to incorporate aspects such as reliability and risk in addition to cost and timing in its decision-making process.

It should be noted that Options evaluated and life cycle costs presented in this report do not account for:

- Increase in solids production due to planned secondary treatment beyond 2035
- Potential revenue from H-Power from energy produced by the sludge used as fuel, as the specific details of this are to be determined based on agreement with the H-Power operator.
- Options for incineration at SIWWTP

Preliminary implementation milestones for the Baseline following a notice to proceed (NTP) are:

- Complete Design: 6 Months from NTP
- Obtain EA/SMA/Permits: 8 Months from NTP
- Procurement and Award: 4 Months from Permit Approval
- Construction Complete: 30 Months from Award
- Total Estimated Duration: 42 Months (3.5 Years)

The engineering, permitting, procurement and equipment supply for all Options would have a similar duration to the Baseline. The construction of the digester is somewhat of a specialty and may take slightly longer than installation of equipment such as an alternate dryer or centrifuge. However, the above timeline should be used for planning purposes regarding any of the evaluated options.

It should be noted that the time needed for the front end of the procurement process, prior to the NTP, may vary considerably depending on whether an existing contract is amended or a new procurement process is started. The difference in the two processes varies but can potentially be significant, perhaps up to a full year difference in the time required.

CONCLUSION

The 20 year life cycle cost estimates for the Baseline Options and Options 1, 2b, 4, 5, 5b and 7 are all within approximately 10% of one another. With the accuracy of cost estimation available for this level of planning purposes it is possible that the actual ranking may vary with detailed planning, design, construction and implementation. There are specific limitations that were identified for some of these options:

- Options 2b - The H-Power operator has indicated to CCH that undigested sludge product (Options 2b) would not be an acceptable product other than on a short term emergency basis.
- Option 4 – The existing dryer manufacturer highly discourages the drying of blended sludge (Option 4) and may not warranty operation of their equipment in such a manner.
- Option 5 – The 20 year life cycle cost is similar to that for implementing the Baseline Option with CHP. However, the lack of a second digester reduces the overall process reliability when compared to the Baseline Options and would require disposal of large amounts of undigested cake during maintenance or repair of the existing digester.

Additionally, the lower quality blend of digested and undigested sludge may limit marketability as a fertilizer product.

- Option 7 – The overall cost and process reliability is similar to that of the Baseline Option. However, the dry product will not have the same uniformity characteristics as the existing pellets and may reduce marketability as a fertilizer product.

Based on the above, the Baseline Option and Option 7 have the highest level of process reliability, while meeting the requirements of the dryer manufacturer (Andritz) and acceptability by the H-Power operator (Covanta). Options 1 or 2 may be accepted by H-Power on emergency or short term interim basis dependent on quality and quantity of material.

Table ES-1: Options Summary

Option	Digestion	Dewatering	Chemical Treatment	Drying	Biogas Use	Offsite Incineration	Fertilizer Product	Capital Costs ¹	20 Year LCC ²
Baseline	Additional digester	All as digested	None	Existing direct dryer for all (digested)	Digester heating and drying, excess flared	None	Continue existing pellets w/ digested	\$25.7 MM	\$94.1 MM
Baseline (With CHP)³	Additional digester	All as digested	None	Existing direct dryer for all (digested)	Digester heating and drying, excess to CHP cogen	None	Continue existing pellets w/ digested	\$34.2 MM	\$93.8 MM
Option 1	Existing digester only	Digested and undigested separately	Undigested cake portion	Existing direct dryer for only digested portion	Digester heating and drying, excess flared	Dewatered cake undigested	Continue existing pellets w/ digested	\$8.7 MM	\$99.6 MM
Option 2	Existing digester only	Digested and undigested separately	Undigested cake portion	None	Digester heating, excess flared	Dewatered cake blended	None	\$8.7 MM	\$111.9 MM
Option 2 b (With CHP)	Existing digester only	Digested and undigested separately	Undigested cake portion	None	Digester heating and CHP cogen	Dewatered cake blended	None	\$22.1 MM	\$99.0 MM
Option 3	No digestion	All as undigested	All as undigested cake	None	None	Dewatered cake undigested	None	\$11.2 MM	\$184.7 MM
Option 4	Existing digester only	Digested and undigested separately	Potential backup	Existing direct dryer for all (blended)	Digester heating and drying, excess flared	Dried pellets blended	Lower quality pellets w/ blended	\$9.0 MM	\$95.4 MM
Option 5	Existing digester only	Digested and undigested separately	Potential backup	New indirect dryer for all (blended)	Digester heating and drying, excess flared	Dried granular blended	Lower quality granular solids w/ blended sludge	\$17.0 MM	\$85.7 MM
Option 5b (With CHP)	Existing digester only	Digested and undigested separately	Potential backup	New indirect dryer for all (blended)	CHP cogen w/ waste heat for digester heating and drying	Dried granular blended	Lower quality granular solids w/ blended sludge	\$30.4 MM	\$102.2 MM
Option 6	No digestion	All as undigested	Potential backup	New indirect dryer for all (undigested)	None	Dried granular undigested	Lower quality granular solids w/ undigested primary sludge	\$22.4 MM	\$144.7 MM
Option 7 (Incl. CHP)	Additional digester	All as digested	None	New indirect dryer for all (digested)	CHP cogen w/ waste heat for digester heating and drying	None	Less uniform product than direct dryer w/ digested	\$53.0 MM	\$97.3 MM

1. The carrying costs associated with construction of the original digester and bioconversion facility are not included as part of the Capital Costs or LCC. Issues such as remaining bond repayment and remaining contractual arrangements are not included or accounted for as part of these costs and may alter final rankings if and when considered. Capital costs are based on February, 2011 costs ENR₂₀ Cities Index = 9,000.

2. Operating costs of the solids processing facilities are based on existing operations as well as typical operating costs associated with the representative processing technologies and may vary based on contractual conditions with third party operators. Section 5.1 provides additional information regarding third party operating costs.

3. CHP: Combined Heat and Power cogeneration using digester biogas

Table ES-2: Non-Economic Factors

Option	Process Risk	Back-up Processes	Operational Complexity	Comparison to Typical Industry Practice	Dryer Manufacturer Acceptability	H-Power ¹ Acceptability
Baseline	Low - well proven	Second Digester and Chemical Treatment	Medium	Commonly used	Accepted by existing dryer manufacturer	Acceptable as dry pellets or digested cake
Baseline (with CHP)	Low - well proven	Second Digester and Chemical Treatment	Medium	Commonly used	Accepted by existing dryer manufacturer	Acceptable as dry pellets or digested cake
Option 1	Low - well proven	Chemical Treatment	Medium to High	Both processes commonly used	Accepted by existing dryer manufacturer	Not acceptable as undigested cake
Option 2	Low - well proven	Chemical Treatment	Low to Medium	Both processes commonly used	No Drying	Not acceptable as undigested cake
Option 2b (with CHP)	Low - well proven	Chemical Treatment	Medium	Both processes commonly used	No Drying	Not acceptable as undigested cake
Option 3	Low - well proven	Chemical Treatment	Low	Commonly used	No Drying	Not acceptable as undigested cake
Option 4	High - against vendor recommendation	Chemical Treatment	Medium	Uncommon	Discouraged by existing dryer manufacturer	Acceptable as dry pellets or digested cake
Option 5	Medium - limited successful applications	Chemical Treatment	Medium	Uncommon	Accepted by multiple manufacturers	Acceptable as dry pellets or digested cake
Option 5b (with CHP)	Medium - limited successful applications	Chemical Treatment	Medium	Uncommon	Accepted by multiple manufacturers	Acceptable as dry pellets or digested cake
Option 6	High - No reference sites	Chemical Treatment and Dryer	Medium	Uncommon	Discouraged by several manufacturers	Acceptable as dry pellets or digested cake
Option 7 (with CHP)	Low - well proven	Second Digester and Chemical Treatment	Medium	Commonly used	Accepted by multiple manufacturers	Acceptable as dry pellets or digested cake

¹ H-Power would consider the acceptance of undigested cake on an emergency short term basis only.

RECOMMENDATION

There are several key issues that are driving the future for sludge processing and disposal locally:

- The changing demographics of the island land use away from agricultural activities toward residential and tourism could eventually limit the future market of land application for soil amendment and fertilizer purposes. The currently available and planned facilities that CCH intends to use for creation of fertilizer and compost product should be adequate to meet future market demands. The current pelletized fertilizer product produced by Synagro is currently supplied to users at no charge and the market demand for such product does not appear to have a strong future growth opportunity. The demographic of residential and tourism typically prefer other soil amendment products that do not use wastewater biosolids and often require significant engagement to prove that it has equivalent aspects to other market products.
- There is a relatively high cost of both fossil fuels and electrical power locally and a national trend for energy costs to continue to grow at a greater pace than inflation. Due to the rising cost of power and recent technology developments, the implementation of waste to energy and energy reduction improvements at wastewater and solids handling facilities is growing rapidly. These technologies typically consist of combined heat and power cogeneration using combustible biogas gas from anaerobic digesters as well as thermal oxidation of solids, which also greatly reduces the amount of waste material for disposal.
- Due to the limitation of available land there is a strong desire locally to limit or eliminate the amount of material that is required for disposal at a landfill. A goal for CCH is the elimination of landfilling of materials other than ash in the near future. The ongoing operation and expansion of the H-Power waste to energy facility plays a key role in this by greatly reducing the amount of material that is land filled while generating electricity from the municipal solid waste it receives.
- There are existing and established sludge processing assets in place at the three largest WWTPs. Many of these assets are relatively new and provide a consistent and reliable treatment process. Consideration of the potential operational benefits and capital investment already in place will be part of any future planning considerations.

Based on these key issues and available opportunity it is recommended that CCH pursue a long term strategy for the processing and disposal of sludge that focuses on cost effective recovery of energy and minimization of sludge solids through generation of an ash product by thermal oxidation. Additionally, CCH should retain the ability to have multiple processing and outlet sources available in the future to ensure continued and reliable service in the event of the unforeseen. Any changes to in plant processing or end use/disposal should be focused on establishing an overall level of risk and reliability that is equal to or better than current operations.

Available industry established technologies and strategies that either recover energy and/or reduce waste include:

- Anaerobic digestion reduces the volatile solids portion of sludge and creates a combustible biogas. The biogas can be used to generate both heat energy for use in treatment processes and electrical energy that can be using in the plant or returned to

the power grid. The digested end product is reduced in mass but would require subsequent thermal oxidation to convert to an ash product.

- Digested, undigested or blended sludge can be dewatered to create a cake product with approximately +/-30 percent solids concentration and thermally oxidized either onsite or off site. This material would burn autogenously (energy to remove water equals energy recovery from solids) generating no additional energy other than what is required to reduce the material to ash. It should be noted that digestion reduces the thermal energy available and would require a dryer cake product to burn autogenously, however, it reduces the incinerator mass throughput so the equipment sizing can be reduced.
- Digested, undigested or blended sludge can be dewatered and then dried to create a solid product with approximately +90 percent solids concentration and thermally oxidized either onsite or off site. This incinerated material has a high thermal value and may be capable of generating both heat and electrical energy while reducing the material to ash. As with incineration of cake material, digestion reduces the thermal energy available. Additionally there is heat energy required for drying of the material from the +/-30 percent solids to the +90 percent solids that would need to be taken into consideration of net energy benefit.

This strategy of waste minimization and energy recovery is aligned with that for municipal solids waste and there may be opportunities for pursuit of solutions that are mutually beneficial to both. The H-power facility is one potential outlet opportunity and should be fully pursued and developed along with other available outlets. H-Power is an operating and permitted facility that is currently planned to have the capability to receive 90 tons per day of +/-30 percent solids sludge cake material. It is unknown if or how much +90 percent dry sludge material H-Power could receive but this would represent a significant opportunity for energy recovery and waste reduction. It is recommended that this issue be fully investigated prior to making any long term decisions regarding sludge handling operations at any of the WWTPs.

CCH is currently engaged in an Island-wide Biosolids Master Plan, which will outline future needs and solutions for all nine CCH WWTPs in an integrated manner. Maintaining a diverse sludge management portfolio that allows for multiple disposal options such as land application, thermal processing (such as H-Power), or landfill disposition will provide the greatest flexibility to deal with market fluctuations and equipment outages.

With regards the current sludge processing facilities at SIWWTP the determination of modifications to the existing operation should be based on the final determination of the type and amount of material that can be received at H-Power. Additional considerations include the determination of cost effectiveness related to digestion and beneficial use of biogas to either generate electricity and/or provide thermal energy for drying and process operations. When comparing capital costs, consideration should be given to providing adequate redundant process equipment and/or back-up processes. If a second digester is not installed then a sufficient number of centrifuges and chemical treatment system should be installed sufficient to dewater and handle the undigested sludge flow. Additionally it should be ensured that a disposal outlet is capable of receiving undigested, chemically treated sludge in the quantity anticipated if the existing digester is out of service.

Based on the key aspects discussed, the life cycle cost comparison and keeping potential risk at or below current conditions it is recommended that a second digester be pursued that can maintain process reliability with a range of outlet opportunities. Furthermore the options available for incineration of cake and/or dried sludge at H-Power should be further evaluated and developed to provide opportunities for SIWWTP as well as the other eight CCH WWTPs.

Final determination of a long term outlet for the digested sludge from SIWWTP should be part of the Island-wide Biosolids Master Plan, which will consider the opportunities as H-Power and other potential outlets.

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GEOENVIRONMENTAL ENGINEERING

SITE REMEDIATION, WASTE CONTAINMENT,
AND EMERGING WASTE MANAGEMENT TECHNOLOGIES

HARI D. SHARMA
KRISHNA R. REDDY

EXHIBIT K247

100

100-239305 MPRCB-205017

100-239305

GEOENVIRONMENTAL ENGINEERING:

Site Remediation, Waste Containment,
and Emerging Waste Management Technologies

100-239305

5/8/87

Hari D. Sharma, Ph.D., P.E., G.E.

GeoSyntec Consultants
Oakland, California

Krishna R. Reddy, Ph.D., P.E.

University of Illinois at Chicago
Chicago, Illinois

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Honolulu, Hawaii 96813



WILEY

JOHN WILEY & SONS, INC.

LLW. LLW wastes include the remainder of the radioactive waste materials. They constitute over 80% of the volume of all the nuclear wastes but only about 2% of the total radioactivity. Sources of LLW include all of the previously cited sources of HLW and TRU, plus hospitals, industrial plants, universities, and commercial laboratories. LLW is much less dangerous than HLW, and NRC regulations allow some very low level wastes to be released to the environment. LLW may also be stored or buried until the isotopes decay to levels low enough that it can be disposed of as normal waste. LLW disposal is managed by the states, but requirements for operation and disposal are established by the EPA and NRC. The Occupational Safety and Health Administration (OSHA) is the agency in charge of setting the standards for workers that are exposed to radioactive materials.

Mill Tailings. Mill tailings are basically residues from the mining and extraction of uranium from its ore. There are more than 200 million tons of radioactive mill tailings in the United States, and all of it is stored in sparsely populated areas of such western states as Arizona, New Mexico, Utah, and Wyoming (Dolan and Scariano, 1990). These wastes emit low-level radiation, and much of it is buried to reduce dangerous emissions.

15.3.4 Infectious (Medical) Waste

The major governmental agencies concerned with medical waste include the EPA, OSHA, the Center for Disease Control (CDC) of the U.S. Department of Health and Human Services, and the Agency for Toxic Substances and Disease Registry (ATSDR) of the Public Health Service, U.S. Department of Health and Human Services. In 1988, when medical wastes washed up on beaches along the east coast, Congress passed the Medical Waste Tracking Act (MWTa) to evaluate management issues and potential risks related to medical waste disposal. The seven types of wastes listed under MWTa include:

1. Microbiological wastes (cultures and stocks of infectious wastes and associated biologicals that can cause disease in humans)
2. Human blood and blood products (including serum, plasma, and other blood components)
3. Pathological wastes of human origin (including tissues, organs, and body parts removed during surgery or autopsy)
4. Contaminated animal wastes (i.e., animal carcasses, body parts, and bedding exposed to infectious agents during medical research, pharmaceutical testing, or production of biologicals)
5. Isolation wastes (wastes associated with animals or humans known to be infected with highly communicable diseases)
6. Contaminated sharps (includes hypodermic needles, scalpels, broken glass)
7. Uncontaminated sharps

All medical wastes represent a small fraction of the total waste stream, and it is estimated that it is a maximum of about 2%. It is important to understand whether or not infectious medical wastes are much worse than typical MSW wastes that also contain pathogens. Pathogens in MSW may be contributed from sanitary napkins, disposable diapers, tissues, and so on; however, medical wastes contain much higher concentrations of pathogens.

The current trend for disposal of medical wastes is through incineration, because, as with most wastes, it greatly reduces the volume, and it assures the destruction and sterilization of infectious pathogens. Disadvantages of incineration include the potential air pollution risks from dioxins or the disposal of hazardous ash wastes. New options for disposal of medical (infectious) wastes are still being explored as well as some other technologies, including irradiation, microwaving, autoclaving, and mechanical or chemical disinfection (OTA, 1990).

15.4 WASTE CHARACTERIZATION

The variation of waste characteristics within the United States is quite significant, due to the wide range of



H-POWER EXPANSION HITS HALFWAY POINT

(Thur., May 5, 2011) – The H-POWER Expansion Project, which is adding a third boiler and other improvements to the City-owned waste-to-energy facility, has reached its halfway point while on schedule and on budget.

In May 1990, the City and County of Honolulu placed into service the Honolulu Program of Waste to Energy Recovery or H-POWER. For the past 20 years, H-POWER reliably met the City's municipal solid waste disposal needs and provided an economic return to the City. H-POWER currently generates sufficient electrical energy to power 50,000 homes.

During those 20 years, Oahu's population has substantially increased, our dependency on foreign oil has grown, and residents have become more sensitive to the environment.

In response, the City implemented a number of initiatives: instituting curb-side recycling; completing a complex financial transaction wherein favorable tax treatment markedly improved the financial return of the City's initial investment in H-POWER; reinvesting in the existing facility including a refurbishment plan that will ensure reliable and continuing successful performance for the next 20 years; and expanding the facility in line with both the population growth and the types of waste handled allowing the City to divert 90 percent of all municipal solid waste from the landfill through the combination of recycling and energy recovery.

The City has accomplished a number of noteworthy achievements:

- Curbside recycling is now island-wide,
- Existing H-POWER debt is nearly paid off,
- After a very favorable 17 year sale leaseback period, the City reacquired H-POWER at a fully depreciated value,
- The aging boilers are being rebuilt, re-establishing their service life,
- At H-POWER, a \$50 million capital improvement project was recently completed employing the most achievable air pollution control technology enhancing the health and safety of our residents and workers,
- In late 2009, the City negotiated a \$300 million contract to expand H-POWER,
- Also, in late 2009, the City renegotiated its contract with Covanta Honolulu Resource Recovery Venture to operate H-POWER facility for an additional 23 years,
- Covanta, and their environmental consultant, AMEC of Honolulu, completed all permit requirements and entered into a construction contract with Parsons RCI, a Honolulu based general contractor;
- Construction commenced in early 2010.

Now, almost 18 months later, the expanded facility is taking shape:

- Design as performed by Covanta's Engineer of Record, Burns and Roe, as supported locally by Kai, Hawaii is now complete,
- All major equipment has been purchased and delivered,
- Concrete construction performed by the General contractor, Parsons, and their supplier, Island

EXHIBIT K251

Concrete, is virtually complete,

- Building steel framework as erected by Parsons and their subcontractor, Swanson Steel, is “topping out,”
- Boiler support steel as erected by Parson’s Honolulu based subcontractor, American Pipe and Boiler, is nearing completion,
- All major boiler components have been staged in place including the Martin Combustion Grate system and the power boiler as fabricated by Jing Ding,
- The turbine generator, as supplied by Siemens, has been placed on its elevated pedestal;
- The refuse handling crane has been set in place atop the receiving pit,
- Electrical work as performed by American Electric has commenced.

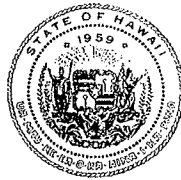
A work force of nearly 400 skilled local area craftsmen has been busy achieving these noteworthy accomplishments. However, much remains to be done. Over the coming year, the City and their contractors expect to complete all mechanical work, including the boiler and steam turbine generator, along with miles of interconnecting piping, tubing, ductwork, and electrical cables that comprise a modern waste-to-energy fueled power plant.

When complete in mid-2012, H-POWER will be capable of powering 75,000 Oahu homes, contributing eight percent of Oahu’s power using a renewable source, and diverting nearly 90 percent of our non-recyclable household opala from the landfill.

-30-

Contact: Markus Owens, ENV Public Communications Officer, 768-3454

LINDA LINGLE
GOVERNOR OF HAWAII



CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH

P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

December 23, 2009

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
(7004 2510 0004 3155 9475)

09-1099E CAB
File No. 0255

Mr. William C. Goldate
Vice President, Engineering and Construction
Covanta Energy
40 Lane Road
Fairfield, New Jersey 07004

Dear Mr. Goldate:

Subject: Covered Source Permit (CSP) No. 0255-01-C
Application for Modification No. 0255-05
Covanta Honolulu Resource Recovery Venture (CHRRV)
Honolulu Program of Waste Energy Recovery (H-POWER)
H-POWER Municipal Waste Combustor Facility
Located at: 91-174 Hanua Street, Kapolei, Oahu
UTM - 592,618 Meters East and 2,356,415 Meters North, Zone 4 (NAD-27)
Date of Expiration: February 27, 2011

The subject covered source permit is issued in accordance with Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control and 40 Code of Federal Regulations (CFR) §52.21, Prevention of Significant Deterioration (PSD). The issuance of this permit is based on the plans, specifications, and information that you submitted as part of your application for modification on October 24, 2008 to expand the facility by adding a 900 ton per day mass-burn municipal waste combustor (MWC) boiler to the existing facility. Existing equipment for the facility includes two (2) 854 ton per day refuse derived fuel (RDF) MWC boilers. The issuance of this permit is also based on the additional information received on March 4 and 9, April 3 and 14, May 18, 22, and 26, August 10, 17, 19, 20, 25, and 31, September 1, 2 and October 5, 6, 8, and 12, 2009 as part of your application.

The conditions of this permit modification supersede all conditions contained in all prior permits. Permit conditions pertaining to each of the two electrostatic precipitators in Attachment IIB shall remain valid until the fabric filter baghouse replacements for the applicable unit are installed and initially operated.

EXHIBIT K255 at 1

Mr. William C. Goldate
December 23, 2009
Page 2

The covered source permit is issued subject to the conditions/requirements set forth in the following attachments:

Attachment I: Standard Conditions
Attachment IIA: Special Conditions – Mass-Burn MWC Boiler
Attachment IIB: Special Conditions – RDF MWC Boilers
Attachment IIC: Special Conditions – Waste Processing Facility
Attachment IID: Special Conditions – Cooling Towers
Attachment II - INSIG: Special Conditions - Insignificant Activities
Attachment III: Annual Fee Requirements
Attachment IV: Annual Emissions Reporting Requirements

The following forms are enclosed your use and submittal as required:

Compliance Certification Form
Excess Emission and Monitoring System Performance Summary Report
Annual Emissions Report Form: MWC Boilers
Annual Emissions Report Form: Waste Processing Facility Baghouses
Annual Emissions Report Form: Cooling Towers
Monitoring Report Form: MWC Boiler Fuel Consumption
Monitoring Report Form: MWC Boiler Operation
Monitoring Report Form: Waste Processing Facility Baghouses
Monitoring Report Form: Cooling Towers

The following plans are enclosed for compliance assurance monitoring requirements:

Compliance Assurance Monitoring Plan: Fluorides and Sulfuric Acid Mist
Compliance Assurance Monitoring Plan: PM, PM₁₀, PM_{2.5}, and MWC Metals

This permit: (a) shall not in any manner affect the title of the premises upon which the equipment is to be located; (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment; and (c) in no manner implies or suggests that the Hawaii Department of Health, or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

Sincerely,



THOMAS E. ARIZUMI, P.E., CHIEF
Environmental Management Division

MM:nn
Enclosures

c: Robert Webster, H-POWER
CAB Monitoring Section

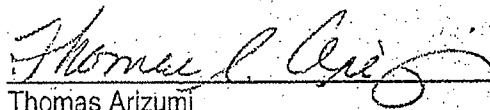
EXHIBIT K255 at 2

APPROVAL TO CONSTRUCT A STATIONARY PSD SOURCE
(CSP NO. 0255-01-C)
COVANTA HONOLULU RESOURCE RECOVERY VENTURE
H-POWER FACILITY EXPANSION, KAPOLEI, OAHU

In compliance with the provisions of the Clean Air Act, as amended, and the PSD delegation agreement of August 15, 1983, as amended on January 5, 1989, between the U.S. Environmental Protection Agency (EPA), Region 9, and the State of Hawaii, CHRRV is hereby granted approval to construct a stationary source for the H-POWER facility expansion which includes a 900 ton per day mass-burn MWC boiler, associated air pollution control equipment and systems, and three-cell cooling tower. Air pollution control for the new boiler will include a spray dryer absorber to minimize (sulfur dioxide (SO₂), hydrochloric acid (HCl), sulfuric acid mist (H₂SO₄), and hydrogen fluoride (HF)), baghouse for particulate removal, baghouse combined with carbon injection to control MWC metals, spray dryer absorber and baghouse combined with carbon injection and good combustion control to minimize MWC organics, good combustion control for reducing carbon monoxide (CO) emissions, and selective non-catalytic reduction (SNCR) combined with Covanta very low-NO_x (VLN) system to minimize nitrogen oxide (NO_x) emissions. Approval to construct is granted in accordance with the plans submitted with the application and with the federal regulations governing the prevention of significant air quality deterioration (40 CFR §52.21) and other conditions attached to this document and made part of this approval.

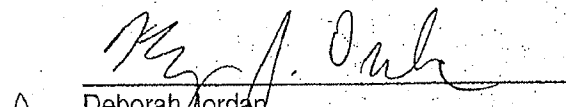
Failure to comply with any condition or term set forth in this approval will be considered grounds for enforcement action pursuant to Section 113 of the Clean Air Act.

This approval to construct and operate a stationary PSD source grants no relief from the responsibility for compliance with any other applicable provisions of 40 CFR, Parts 52, 60, 61, 63, and 64 or any applicable federal, state, or local air quality regulations.



Thomas Arizumi
Chief, Environmental Management Division
Hawaii Department of Health

Date: 12/15/09



for Deborah Jordan
Director, Air Division
U.S. Environmental Protection Agency, Region 9

Date: 12/23/09

**ATTACHMENT IIA: SPECIAL CONDITIONS – MASS-BURN MWC BOILER
COVERED SOURCE PERMIT NO. 0255-01-C**

Issuance Date: December 23, 2009

Expiration Date: February 27, 2011

In addition to the standard conditions of the covered source permit, the following special conditions shall apply to the permitted facility:

Section A. Equipment Description

1. Attachment IIA of this permit encompasses a 900 ton per day Martin mass-burn waterwall MWC boiler with Covanta VLN system, feed chute, moving grate, integrated furnace/boiler, associated ash collection systems, 277 feet high x 7.3 feet diameter exhaust stack, and the following post combustion controls;
 - a. SNCR system;
 - c. Powdered activated carbon injection system;
 - d. Lime injection system;
 - e. Spray dryer absorber; and
 - f. Fabric filter baghouse.

(Auth.: HAR §11-60.1-3)

2. The permittee shall permanently attach an identification tag or name plate on the 900 ton per day MWC boiler, SNCR system, powdered activated carbon injection system, spray dryer absorber, and fabric filter baghouse which identifies the applicable model no., serial no., and manufacturer. The identification tag or name plate shall be permanently attached to the equipment at a conspicuous location.

(Auth.: HAR §11-60.1-5)

Section B. Applicable Federal Regulations

1. The mass-burn MWC boiler and associated equipment are subject to the following federal regulations:
 - a. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart A, General Provisions;
 - b. 40 CFR Part 60, Standards of Performance for New Stationary Sources, Subpart Eb, Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification or Reconstruction is Commenced After June 19, 1996;
 - c. 40 CFR Part 64, Compliance Assurance Monitoring; and
 - d. 40 CFR Part 52, §52.21, Prevention of Significant Deterioration of Air Quality.

2. The permittee shall comply with all applicable provisions of these standards, including all emission limits and all notification, testing, monitoring, and reporting requirements. The major requirements of these standards are detailed in the special conditions of this permit.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.50b; §64.2)¹

Section C. Operational and Emissions Limitations

1. Fuel Limits

- a. Except as provided in Attachment IIA, Special Condition No. C.12, the mass-burn MWC boiler shall be fired only on municipal solid waste (MSW), fuel oil No. 2, and used cooking oil.
- b. The maximum firing rate of the mass-burn MWC boiler shall not exceed 1,200 gallons per hour for the total combined firing of fuel oil No. 2 and used cooking oil auxiliary fuels.
- c. The total combined fuel oil No. 2 and used cooking oil auxiliary fuel consumption for the mass-burn MWC boiler shall not exceed 869,250 gallons in any rolling twelve-month (12-month) period.
- d. The maximum sulfur content of the fuel oil No. 2 auxiliary fuel fired by the mass-burn MWC boiler shall not to exceed 0.05% by weight.
- e. The mass-burn MWC boiler shall only be fired on fuel oil No. 2 auxiliary fuel during warm-up periods.
- f. The mass-burn MWC boiler shall only be fired on fuel oil No. 2 auxiliary fuel and MSW during start-up and shut-down periods.

(Auth.: HAR §11-60.1-3, §11-60.1-38, §11-60.1-90; 40 CFR §52.21)¹

2. Warm-up, Start-up, Shut-down, and Malfunction

- a. Except as provided in Attachment IIA, Special Condition No. C.2.b, the duration of start-up, shut-down, or malfunction periods for the mass-burn MWC boiler shall be limited to three (3) hours per occurrence. A start-up period commences when the boiler begins the continuous burning of MSW and does not include any warm-up period. A warm-up period is when the boiler is combusting fossil fuel or other nonmunicipal solid waste fuel, and no MSW is being fed to the combustor. Continuous burning is the continuous, semi-continuous, or batch feeding of MSW for purposes of waste disposal, energy production, or providing heat to the combustion system in preparation for waste disposal or energy production. The use of MSW solely to

provide thermal protection of the grate or hearth during the start-up period when MSW is not being fed to the grate is not considered to be continuous burning. Shut-down commences when the MSW feed is stopped and fuel oil No. 2 auxiliary fuel is added to burn the remaining MSW in the mass-burn MWC boiler.

- b. For purposes of compliance with the carbon monoxide emission limit specified in Attachment IIA, Special Condition No. C.8.d, if a loss of boiler water level control (e.g., boiler waterwall tube failure) or loss of combustion air control (e.g., loss of combustion air fan, induced air fan, combustion grate bar failure) is determined to be a malfunction, the duration of the malfunction period is limited to fifteen (15) hours per occurrence.
- c. The duration of warm-up periods for the mass-burn MWC boiler shall not exceed 12 hours at a time.
- d. Except for compliance calculations for opacity and mass emission limits specified in Attachment IIA, Special Condition Nos. C.8.a, C.8.b, and C.8.c, during periods of warm-up, start-up, shut-down, or malfunction of the mass-burn MWC boiler, continuous monitoring system (CMS) data shall be dismissed or excluded from compliance calculations, but shall be recorded and reported pursuant to Attachment IIA, Special Condition No. D.14. Monitoring data to determine compliance with the limits specified in Attachment IIA, Special Condition Nos. C.8.a, C.8.b, C.8.c, and C.9 shall not be excluded from compliance calculations.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.58b(a)(1))¹

3. Combustion Temperature

In any 4-hour block arithmetic average, except during warm-up, start-up, shut-down, or malfunction, the combustion temperature of the mass-burn MWC boiler shall be maintained at or above 1,800 °F. Combustion temperature is defined as the temperature of combustion gases at a point above the grate and below secondary air injection. Compliance with this criterion shall be established based upon correlated furnace roof thermocouple measurements. The correlated roof thermocouple temperature (based upon an average of thermocouples across the furnace width) shall be established during initial performance testing.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21)¹

4. Air Pollution Control Equipment and Systems

- a. The permittee shall continuously operate and maintain the following air pollution control equipment and systems to minimize air emissions:

- 1) Covanta VLN system;

- 2) SNCR system;
- 3) Powdered activated carbon injection system;
- 4) Lime injection system;
- 5) Spray dryer absorber; and
- 6) Fabric filter baghouse.

b. Post combustion air pollution control systems shall be placed into service as follows:

- 1) On a continuous basis for the fabric filter baghouse;
- 2) Prior to initiation of waste combustion for the Covanta VLN system, SNCR system, powdered activated carbon injection system, lime injection system, and spray dryer absorber; and
- 3) Until cessation of continuous MSW combustion for the Covanta VLN system, SNCR system, powdered activated carbon injection system, lime injection system, and spray dryer absorber.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-140; 40 CFR §52.21)¹

5. Operating Loads

- a. In any 4-hour block arithmetic average, the mass-burn MWC boiler shall not operate at a load, based on steam or feedwater flow rate, greater than 110 percent of the highest 4-hour arithmetic average load as measured during the most recent dioxin/furan performance test that shows compliance with the emissions limit for MWC organics.
- b. Attachment IIA, Special Condition No. C.5.a is not applicable during the dioxin/furan or mercury performance test, 2 weeks preceding the dioxin/furan or mercury performance test, and as provided in Attachment IIA, Special Condition No. C.5.c.
- c. The mass-burn MWC boiler load limit may be waived in writing by the Department of Health for purpose of evaluating system performance, testing new technology or control technology, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21, §60.53b(b))¹

6. Baghouse Inlet Temperature

- a. In any 4-hour block arithmetic average, the flue gas temperature at the inlet of the baghouse servicing the mass-burn MWC boiler shall not exceed 17 °C (approximately 30.6 °F if the temperature change is determined in °F) above the highest 4-hour arithmetic average temperature measured during the most recent dioxin/furan performance test demonstrating compliance with the emissions limit for MWC organics.

- b. Attachment IIA, Special Condition No. C.6.a is not applicable during MWC boiler warm-up, start-up, shut-down, and malfunction, the dioxin/furan or mercury performance test, 2 weeks preceding the dioxin/furan or mercury performance test, and as provided in Attachment IIA, Special Condition No. C.6.c.
- c. The flue gas temperature limit at the inlet of the baghouse servicing the mass-burn MWC boiler may be waived in writing by the Department of Health for purpose of evaluating system performance, testing new technology or control technology, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21, §60.53b(c))¹

7. Activated Carbon Mass Feed Rate

- a. In any 8-hour block average, the activated carbon mass feed rate in pounds per hour for the activated carbon injection system shall equal or exceed the carbon mass feed rate established during the most recent performance test of the MWC boiler demonstrating compliance with the mercury and dioxin/furan emission limits specified in Attachment IIA, Special Condition No. C.8.d.
- b. Attachment IIA, Special Condition No. C.7.a is not applicable during MWC boiler warm-up, start-up, shut-down and malfunction, the dioxin/furan or mercury performance test, 2 weeks preceding the dioxin/furan or mercury performance test, and as provided in Attachment IIA, Special Condition No. C.7.c.
- c. The activated carbon mass feed rate limit may be waived in writing by the Department of Health for purpose of evaluating system performance, testing new technology or control technology, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21, §60.53b, §60.58b)¹

8. Maximum Emission Limits

- a. For each warm-up period, the mass-burn MWC boiler shall not exceed the following emission limits:

Pollutant	Maximum Emission Limit
SO ₂	102 lbs
CO	72 lbs
NO _x	346 lbs

- b. For each start-up period, the mass-burn MWC boiler shall not exceed the following emission limits:

Pollutant	Maximum Emission Limit
SO ₂	98 lbs
CO	414 lbs
NO _x	579 lbs

- c. For each shut-down period, the mass-burn MWC boiler shall not exceed the following emission limits:

Pollutant	Maximum Emission Limit
SO ₂	98 lbs
CO	414 lbs
NO _x	579 lbs

- d. Except during warm-up, start-up, shut-down, and malfunction, the mass-burn MWC boiler shall not exceed the following emission limits:

Pollutant	Maximum Emission Limit ^{1,2}
SO ₂ Annual ^{3,9}	26 ppmdv
24-hour ^{4,9}	26 ppmdv
3-hour ^{5,9}	44 ppmdv
PM (filterable only)	12 mg/dscm
PM ₁₀ (filterable + condensable)	32 mg/dscm
PM _{2.5} (filterable + condensable)	30 mg/dscm
NO _x Annual ³	90 ppmdv
24-hour ⁶	110 ppmdv
CO 4-hour ⁷	100 ppmdv
30-day ⁸	80 ppmdv
VOC (as CH ₄)	10 ppmdv
Ammonia (from ammonia slip)	15 ppmdv
Cadmium	10 ug/dscm
Lead	140 ug/dscm
Mercury ¹⁰	28 ug/dscm
Fluorides (as HF)	3.5 ppmdv
H ₂ SO ₄	5 ppmdv
HCl ¹¹	25 ppmdv
MWC Metals (as PM)	12 mg/dscm
Dioxin/Furans	13 ng/dscm

Table Notes:

- Emission limits shall not be exceeded for the mass burn MWC boiler except for warm-up, start-up, shut-down, and malfunction.
- All emission limits are referenced to 7% O₂, dry gas basis.
- Annual arithmetic average emissions limit.
- 24-hour daily geometric average emissions limit.

5. 3-hour block arithmetic average.
 6. 24-hour daily arithmetic average.
 7. 4-hour block arithmetic average.
 8. 30-day rolling average.
 9. Maximum emissions limit indicated or at least 80% reduction by weight or volume (whichever is less stringent).
 10. Maximum emissions limit indicated, or at least 85% reduction by weight (whichever is less stringent).
 11. Maximum emissions limit indicated or at least 95% reduction by weight or volume (whichever is less stringent).
- e. For applicable limits specified in Attachment IIA, Special Condition Nos. C.8.b and C.8.c, a minimum concentration of 5.0% CO₂ and a maximum concentration of 14.0% O₂ may be substituted for the measured diluent gas concentration values during hours when the hourly average concentration of CO₂ is less than 5.0% CO₂ or the hourly average concentration of O₂ is greater than 14.0% O₂.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21, §60.52b, Part 75 Appendix F)¹

9. MWC Boiler Opacity Limits

The mass-burn MWC boiler shall not exhibit greater than 10 percent opacity for any six (6) minute averaging period, except as follows: during warm-up, start-up, shut-down, or malfunction the mass-burn MWC boiler may exhibit visible emissions greater than twenty (20) percent opacity but not exceeding sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minute period.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-32, §11-60.1-90; SIP §11-60-24; 40 CFR §52.21, §60.52b)^{1,2}

10. Fugitive Emission Limits

- a. The permittee shall take measures to control fugitive dust throughout the facility that includes sweeping access roads, maintaining enclosures for the ash conveying systems, conditioning the fly ash, and covering haul trucks. The Department of Health may at any time require the permittee to further abate fugitive dust emissions if an inspection indicates poor or insufficient control.
- b. The permittee shall not cause or permit fugitive dust to become airborne without taking reasonable precautions and shall not cause or permit the discharge of visible emissions of fugitive dust beyond the lot line of the property boundary on which the emissions originate.
- c. The permittee shall not cause to be discharged to the atmosphere visible emissions of combustion ash from an ash conveying system (including conveyor transfer points) in excess of 5% of the observation period (i.e., 9 minutes per 3 hour period).

- d. The fugitive emission limit specified in Attachment IIA, Special Condition No. C.10.c applies to visible emissions discharged to the atmosphere from buildings or enclosures of an ash conveying system.
- e. The fugitive emission limit specified in Attachment IIA, Special Condition No. C.10.c does not apply to:
 - 1) Visible emissions discharged inside buildings or enclosures of an ash conveying system; and
 - 2) During maintenance and repair of an ash conveying system.

(Auth.: HAR §11-60.1-3, §11-60.1-33, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.55b)¹

11 Operation and Maintenance

The permittee must operate and maintain the mass-burn MWC boiler, air pollution control equipment and systems, and monitoring equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times including warm-up, start-up, shut-down, and malfunction. Scheduled inspections and maintenance shall be conducted as recommended by the manufacturer and as needed.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21)¹

12. Alternate Operating Scenario

- a. The mass-burn MWC boiler may combust supplemental waste defined as discrete deliveries of waste components normally found in MSW, but delivered to the facility in quantities greater than those normally found in MSW. For combusting the supplemental waste, the permittee shall blend and mix the supplemental waste with MSW to ensure compliance with the permit limits specified in Attachment IIA, Special Condition Nos. C.8 and C.9. The following supplemental wastes and conditions apply to the alternate operating scenario:
 - 1) Commodity Wastes – Waste generated by commercial operations or retail outlets and are accumulated as a result of material being off-specification, outdated, or deemed no longer fit for distribution, sale, or consumption. Commodity waste includes, but is not limited to, food products, health care products, cosmetics, and other store products.
 - 2) Pharmaceutical Wastes – Waste that include prescription and non-prescription pharmaceuticals, controlled substances, and pharmaceutical waste regulated by the U.S. Drug Enforcement Agency (DEA). The waste is accumulated by pharmaceutical manufacturers, wholesalers, retailers, and hospitals or confiscated by law enforcement officers.

- 3) Manufacturing Wastes – Waste generated as a result of industrial and manufacturing processes. This category of waste would include floor sweepings, nonhazardous sludge, industrial filters (e.g., paint filters, air filters, etc.), adhesives, paints, and inks. No bulk liquid manufacturing wastes shall be accepted.
- 4) Oily Wastes – Include any of the following waste categories: (1) filters, (2) solid wastes containing "virgin oil", and (3) solid wastes containing used oil. The oily waste streams include, but are not limited to, rags, paper towels, granular or fiber absorbents, fabric pads and booms. Booms and pads shall be prepared as needed for processing. Commercial businesses such as spill cleanup companies and automobile repair shops generate oily wastes. Filters shall only be accepted if classified as nonhazardous, punctured, and drained of free liquids (40 CFR Part 261). Solid wastes containing "virgin oil" shall only be accepted if certified as a nonhazardous waste and if the waste contains no free liquid.

Solid wastes containing used oil are considered Hawaii Special Waste and shall be managed as such. The used oil waste shall also be managed in accordance with federal standards outlined in 40 CFR Part 279 (EPA Standards for the Management of Used Oil). Waste oil products containing equal to or greater than 2 ppm of polychlorinated biphenyls (PCBs) shall not be accepted.

- 5) Used Cooking Oil – Waste generated primarily by restaurants. The used cooking oil shall be transported and decanted by contractors to remove water and particles.
- 6) Triple-Rinsed Containers – Waste containers comprised primarily of high density polyethylene plastic (HDPE) and may include polystyrene and polyurethane containers. Containers used to store pesticides are the major component of this waste type. Prior to delivery, the containers shall be cut into halves. The containers shall also be triple rinsed according to federal regulation 40 CFR Part 261.7 or the definition set forth in the Hawaii Solid Waste Management Control Regulations (Title 11), whichever is less stringent. The supplier shall provide a statement certifying that the containers were triple-rinsed according to acceptable rinsing methods.
- 7) Shredded Tires and Automobile Shredder Residue – Tire and automobile shredder residue are both considered Hawaii Special Wastes and shall be managed as such. Shredded tires shall be blended with other MSW prior to charging the MWC boiler with the waste. Mitigation of effects from tire sulfur content shall be accomplished by materials management and blending. Automobile shredder residue consists of items such as foam rubber, seat covers, gaskets, plastics, etc. Prior to acceptance, the supplier must analyze representative samples of automotive shredder residue for hazardous constituents, such as PCBs and heavy metals. Automobile shredder residue shall be blended with MSW prior to charging the MWC boiler if the automobile

shredder residue is determined to be nonhazardous and acceptable for processing.

- 8) Treated Medical Wastes – Treated medical wastes include sterilized waste generated from medical, veterinary, or other health care facilities and are considered Hawaii Special Wastes. Waste components include bandages, dressings, syringes, cultures, injectables, and infectious or pathological wastes that have been subject to sterilization (i.e., autoclave). The supplier is required to provide a statement that the treated medical wastes were sterilized appropriately.
- 9) Treated Foreign Wastes – Treated foreign wastes include sterilized solid waste generated by carriers leaving foreign ports and entering Hawaii and are considered Hawaii Special Wastes. Waste components include airline carrier garbage or solid waste from sea-going vessels. Foreign waste must comply with regulations set forth by the U.S. Department of Agriculture. In addition, foreign waste shall be processed in a manner similar to that for the management and processing of medical wastes in accordance with Hawaii regulations. The supplier is required to provide a statement certifying that the treated foreign wastes were sterilized appropriately.

- b. The terms and conditions under the alternate operating scenario shall meet all applicable requirements including all conditions of this permit.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)

13. Operator Certification

No later than six (6) months after initial start-up of the mass-burn MWC boiler and associated equipment, each chief facility operator and shift supervisor shall:

- a. Obtain and maintain a current provisional operator certification from the American Society of Mechanical Engineers (ASME) QRO-1-1994, or from an equivalent certification program approved by the Department of Health; and
- b. Have completed full certification or shall have scheduled a full certification exam with ASME QRO-1-1994, or with an equivalent certification program approved by the Department of Health.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §60.54b)¹

14. Staff on Duty

One of the following persons must always be on duty for operating the mass-burn MWC boiler: a fully certified chief facility operator, a provisionally certified chief facility operator who is scheduled to take the full certification exam according to the schedule specified in Attachment IIA, Special Condition No. C.13(b), a fully certified shift supervisor, or a provisionally certified shift supervisor who is scheduled to take the full certification exam according to the schedule specified in Attachment IIA, Special Condition No. C.13(b).

**ATTACHMENT IIB: SPECIAL CONDITIONS – RDF MWC BOILERS
COVERED SOURCE PERMIT NO. 0255-01-C**

Issuance Date: December 23, 2009

Expiration Date: February 27, 2011

In addition to the standard conditions of the covered source permit, the following special conditions shall apply to the permitted facility:

Section A. Equipment Description

1. Attachment IIB of this permit encompasses the following equipment and associated appurtenances:
 - a. 854 ton per day Combustion Engineering RDF MWC boiler, model no. VU-40, serial no. 28185-01 with 290 feet high x 6.3 feet diameter flue stack in common stack for both RDF MWC boilers and the following post combustion controls:
 - 1) Combustion Engineering spray dryer absorber, model no. C-E ESD, serial no. 85187-01 with 189,500 acfm capacity and 14,000 rpm spray nozzles;
 - 2) Lime injection system servicing the spray dryer absorber;
 - 3) SPE-Amerex baghouse, model no. RA-35-180-D12, serial no. 1921-01 with 8-10 modules and 175-200 bags per module; and
 - 4) Combustion Engineering electrostatic precipitator, model no. 1P1C3D5F, serial no. 34185-01 with 174,155 acfm capacity.
 - b. 854 ton per day Combustion Engineering RDF MWC boiler, model no. VU-40, serial no. 28185-02 with 290 feet high x 6.3 feet diameter flue stack in common stack for both RDF MWC boilers and the following post combustion controls:
 - 1) Combustion Engineering spray dryer absorber, model no. C-E ESD, serial no. 85187-02 with 189,500 acfm capacity and 14,000 rpm spray nozzles;
 - 2) Lime injection system servicing the spray dryer absorber;
 - 3) SPE-Amerex baghouse, model no. RA-35-180-D13, serial no. 1921-02 with 8-10 modules and 175-200 bags per module; and
 - 4) Combustion Engineering electrostatic precipitator, model no. 1P1C3D5F, serial no. 34185-02 with 174,155 acfm capacity.

(Auth.: HAR §11-60.1-3; 40 CFR §52.21)

2. An identification tag or name plate shall be displayed on the equipment listed above which identifies the model no., serial no., and manufacturer. The identification tag or name plate shall be permanently attached to the equipment at a conspicuous location.

(Auth.: HAR §11-60.1-5)

Section B. Applicable Federal Regulations

1. The RDF MWC boilers and associated equipment are subject to the provisions of the following federal regulations:

- a. 40 CFR Part 60 Standards of Performance for New Stationary Sources, Subpart A - General Provisions;
- b. 40 CFR Part 60 Standards of Performance for New Stationary Sources, Subpart Cb - Emission Guidelines and Compliance Times for Municipal Waste Combustors Constructed on or Before September 20, 1994;
- c. 40 CFR Part 60 Standards of Performance for New Stationary Sources, Subpart Eb - Standards of Performance for Large Municipal Waste Combustors for which Construction is Commenced after September 20, 1994 or for which Modifications or Reconstruction is Commenced after June 19, 1996 (as referenced by Subpart Cb);
- d. 40 CFR Part 62 Subpart FFF - Federal Plan Requirements for Large Municipal Waste Combustors Constructed on or before September 20, 1994; and
- e. 40 CFR Part 52, §52.21, Prevention of Significant Deterioration of Air Quality.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60, §62)¹

2. The permittee shall comply with all applicable provisions of these standards, including all emission limits, notification, testing, monitoring, and reporting requirements. The major requirements of these standards are detailed in the special conditions of this permit.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60, §62)¹

Section C. Operational Limitations

1. General

a. Facilities Operation

All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this CSP shall at all times be maintained in good working order and be operated as efficiently as possible to minimize air pollutant emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90; 40 CFR §52.21)¹

b. Malfunction

The Department of Health (DOH) shall be notified by telephone within 48 hours following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above any allowable emissions limit as stated in Section D., Emission Limitations. In addition, the DOH shall be notified in writing within five (5) days of any such failure. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed under Section D., Emission Limitations, and the methods utilized to restore normal operations. Compliance with this

malfunction notification shall not excuse or otherwise constitute a defense to any violations of this permit or of any law or regulations which such malfunction may cause. Malfunction periods shall not exceed 3 hours per occurrence except as follows: if a loss of boiler water level control (e.g., boiler waterwall tube failure) or a loss of combustion air control (e.g., loss of combustion air fan, induced draft fan, combustion grate bar failure) is determined to be a malfunction, the duration of the malfunction period is limited to 15 hours per occurrence for carbon monoxide emission limits.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.58b(a)(1))¹

c. Right to Entry

The Director for the DOH, the Regional Administrator for the Environmental Protection Agency (EPA), Region 9 and/or their authorized representatives, upon the presentation of credentials, shall be permitted:

- 1) To enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this CSP;
- 2) At reasonable times, to have access to and copy any records required to be kept under the terms and conditions of this CSP;
- 3) To inspect any equipment, operation, or method required in this CSP; and
- 4) To sample emissions from the source.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90)

d. Fugitive Emissions

- 1) The permittee shall take measures to control fugitive dust throughout the facility, including but not limited to the following precautions with the ash handling system: the pugmill, conditioning the flyash, sweeping access roads, and covering haul trucks. The DOH may at any time require the permittee to further abate fugitive dust emissions if an inspection indicates poor or insufficient control.
- 2) The permittee shall not cause or permit fugitive dust to become airborne without taking reasonable precautions and shall not cause the discharge of visible emissions of fugitive dust beyond the lot line of the property on which the emissions originate.

(Auth.: HAR §11-60.1-3, §11-60.1-33, §11-60.1-90)²

e. Air Pollution Control Equipment

The permittee shall continuously operate and maintain the following air pollution controls to minimize air emissions:

- 1) Each MWC shall be equipped with a fabric filter for the control of particulate emissions;
- 2) Each MWC shall be equipped with a spray dryer absorber (SDA) to control of sulfur dioxide and acid gas emissions;
- 3) Each primary shredder shall be equipped with a baghouse to control particulate emissions; and
- 4) Each of the RDF processing lines shall be equipped with a baghouse to control particulate emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-90; 40 CFR §52.21)¹

2. MWCs

- a. The MWC boilers shall be fired only on RDF, fuel oil no. 2, specification (spec) used oil, used cooking oil, or any combination thereof, except for the Alternate Operating Scenarios listed in Attachment IIA, Special Condition No. C.2.i.

(Auth.: HAR §11-60.1-3, §11-60.1-90; 40 CFR §52.21)¹

- b. The maximum firing rate of fuel oil (fuel oil no. 2, spec used oil, and used cooking oil) per MWC shall not exceed 1,770 gallons per hour.

(Auth.: HAR §11-60.1-3, §11-60.1-9; 40 CFR §52.21)¹

- c. The total fuel oil (fuel oil no. 2, spec used oil, and used cooking oil) consumption of each MWC shall not exceed 1,738,500 gallons in any rolling twelve (12) month period.

(Auth.: HAR §11-60.1-3, §11-60.1-90; 40 CFR §52.21)¹

- d. The MWCs shall be fired only on fuel oil no. 2 with a maximum sulfur content not to exceed 0.5 percent by weight.

(Auth.: HAR §11-60.1-3, §11-60.1-38, §11-60.1-90; 40 CFR §52.21)¹

e. Combustion Temperature

In any 4-hour block average, the combustion temperature in the MWCs shall be maintained at or above 1800°F (except during MWC warm-up, start-up, shut-down, or malfunction). Combustion temperature is defined as the temperature of combustion gases at a point above the grate and below secondary air injection. Compliance with this criterion shall be established based upon correlated furnace roof thermocouple measurements. The correlated roof thermocouple temperature (based upon an average of thermocouples across the furnace width) shall be established during initial performance testing.

Combustion temperature monitoring shall be done according to Attachment IIA, Special Condition No. E.3.

(Auth.: HAR §11-60.1-3, §11-60.1-90; 40 CFR §52.21)¹

f. Fabric Filter Inlet Temperature

- 1) In any 4-hour block average (except during and 2 weeks preceding the dioxin/furan performance tests and during MWC warm-up, start-up, shutdown, or malfunction), the flue gas temperature at the inlet of the fabric filter shall not exceed 17°C (approximately 30.6 °F if the temperature change is determined in °F) above the highest 4-hour arithmetic average measured during the most recent dioxin/furan performance test.
- 2) Upon DOH approval, this condition may be waived for the purpose of evaluating system performance, testing new technology or control technologies, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-90; 40 CFR §52.21, §60.34b(b), §60.53b(c))¹

g. MWC Load Level

- 1) In any 4-hour block average (except during and 2 weeks preceding the dioxin/furan performance tests), the MWCs shall not operate at a load based on steam (or feedwater) flow rate greater than 110 percent of the highest 4-hour arithmetic average measured during the most recent dioxin/furan performance test.
- 2) Upon DOH approval, this condition may be waived for the purpose of evaluating system performance, testing new technology or control technologies, diagnostic testing, or related activities for the purpose of improving facility performance or advancing the state-of-the-art for controlling facility emissions.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.34b(b), §60.53b(b))¹

h. Spec Used Oil

- 1) The permit conditions prescribed herein may be revised at any time by the DOH to reflect state or federal promulgated rules on used oil.
- 2) This permit shall not release the permittee from compliance with all applicable state and federal rules and regulations on the handling, transporting, storing and burning of used oil.

- 3) The used oil generated within the HPOWER facility may be burned in accordance with the procedures specified in this permit. Used oil may also be obtained from other sources, provided a written notification identifying the new source is submitted to the DOH, and approved, prior to the acceptance of the used oil.
- 4) The total amount of spec used oil fired in the MWCs shall not exceed 430,000 gallons in any rolling twelve (12) month period.
- 5) Samples shall be taken of the used oil from the onsite facility emptied into each 55-gallon drum. The samples shall be taken in such a manner that the composite sample obtained is representative of all the oil in the drums. Samples taken in this manner shall be composited for analysis. The composite sample shall represent no more than 1,500 gallons of spec used oil or all of the oil collected in any three (3) month period, whichever is less.
- 6) Each composite sample shall be submitted in a timely manner to a qualified laboratory and an analysis report shall be obtained for the constituents/properties for which limits are given in Attachment IIA, Special Condition No. C.2.h.8).
- 7) This permit does not authorize the permittee to burn hazardous waste. The permittee shall not burn the used oil if declared or determined to be a hazardous waste.
- 8) The following constituents/properties of the specification used oil shall not exceed the specified limits listed below:

<u>Constituent/Property</u>	<u>Allowable Limit</u>
Arsenic	5 ppm maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Total Halogens	1000 ppm maximum
Sulfur	0.5% maximum by weight
Flash Point	100°F minimum
Polychlorinated Biphenyls (PCB)	<2 ppm

- 9) Should the results of any used oil analyses exceed the limits specified in Attachment IIA, Special Condition No. C.2.h.8), the contaminated containers shall be identified and isolated from the non-contaminated containers and properly disposed of.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-38, §11-60.1-90, 40 CFR §52.21, §279.11)

- i. Alternate Operating Scenarios

- 1) Terms and conditions for reasonably anticipated alternate operating scenarios identified by the permittee in the covered source permit application and approved by the DOH are as follows:

- a) Supplemental Waste

Supplemental waste is defined as discrete deliveries of waste components normally found in MSW, but delivered to the facility in quantities greater than those normally found in MSW.

The facility shall blend and mix the supplemental waste with MSW so that maximum emissions will not differ from those described in Attachment IIA, Section D for the processing of garbage. At a minimum, records shall be kept on the dates, the type and detailed description of supplemental waste, the amount in tons, and the supplier of each supplemental waste that is received. Each type of supplemental waste is defined below:

Commodity Wastes - Generated by commercial operations or retail outlets, and are accumulated as a result of the material being off-specification, outdated, or deemed no longer fit for distribution, sale, or consumption. Includes but not limited to: food products, health care products, cosmetics, and other retail store products.

Pharmaceutical Wastes - Includes prescription and non-prescription pharmaceuticals, controlled substances and pharmaceutical waste regulated by the US Drug Enforcement Agency (DEA). The waste will be accumulated by pharmaceutical manufacturers, wholesalers, retailers and hospitals, or confiscated by law enforcement officers.

Manufacturing Wastes - Generated as the result of industrial and manufacturing processes. This category would include floor sweepings, non-hazardous sludge, industrial filters (paint filters, air filters, etc.), adhesives, paints, and inks. No bulk liquids of this type shall be accepted.

Oily Wastes - Includes any of the following three categories: (1) filters, (2) solid wastes containing "virgin oil," and (3) solid wastes containing used oil. The oily waste streams include, but are not limited to rags, paper towels, granular or fiber absorbents, fabric pads and booms. Booms and pads would be prepared as needed for processing. Commercial businesses such as spill clean-up companies and automobile repair shops generate these types of wastes.

Filters will only be accepted if classified as non-hazardous, punctured and drained of free liquids (40 CFR Part 261). Solid waste containing "virgin oil" will only be accepted if certified as non-hazardous solid waste and if it contains no free liquid. Solid wastes containing used oil is considered a Hawaii Special Waste and will be managed as such. The used oil waste will also be managed in accordance with Federal standards outlined in 40 CFR Part 279 (EPA Standards for the Management of Used Oil). Waste oil products containing equal to or greater than 2 ppm of PCBs shall not be accepted in any form by the permittee.

Used Cooking Oil - Generated mainly by restaurants. The used cooking oil will be transported and decanted by contractors to remove water and unwanted particles.

Triple-Rinsed Containers - These containers will mainly be comprised of high density polyethylene plastic (HDPE). Polystyrene and polyurethane containers may also be included in waste deliveries. Containers that were initially used to store pesticides are the major component of this waste type. Prior to delivery, the containers shall be cut into halves. Also, they shall be triple-rinsed according to Federal Regulation 40 CFR Part 261.7 or the definition set forth in the Hawaii Solid Waste Management Control Regulations (Title 11), whichever is more stringent. The supplier is required to provide a statement certifying that the containers were triple-rinsed according to acceptable rinsing methods.

Shredded Tires and Automobile Shredder Residue - Tires and automobile shredder residue are both considered Hawaii Special Wastes and will be managed as such. Shredded tires will be blended with other MSW prior to charging to the combustors. If the sulfur content of the tires is high, mitigation shall be accomplished by materials management and blending.

Automobile shredder residue consists of items such as foam rubber, seat covers, gaskets, plastics, etc. Prior to acceptance, the supplier must analyze representative samples of automobile shredder residue for hazardous constituents, such as PCBs and heavy metals. After being determined acceptable for processing, it will be blended with other MSW prior to combustion.

Treated Medical Wastes - Includes sterilized waste generated from medical, veterinary or other health care facilities and considered a Hawaii special waste. Components include bandages, dressings, syringes, cultures, injectables, infectious or pathological wastes that has been subjected to sterilization (i.e., autoclave). The supplier is required to provide a statement certifying that the treated medical wastes were sterilized appropriately.

Treated Foreign Wastes - Includes sterilized solid waste generated by carriers leaving foreign ports and entering Hawaii. Considered a special waste in Hawaii. Components include airline carrier garbage or solid waste from sea-going vessels. Foreign waste received by the permittee must comply with regulations set forth by the U.S. Department of Agriculture. In addition, foreign waste would be processed in a manner similar to that for the management and processing of medical wastes, in accordance with Hawaii regulations. The supplier is required to provide a statement certifying that the treated foreign wastes were sterilized appropriately.

b) MWC Warm-Up

During periods of warm-up, not to exceed 12 hours at a time, the SDAs need not be operated until the SDA inlet temperature reaches 250°F. At this temperature, the MWCs and the SDAs shall be brought up to normal operating temperatures and efficiencies simultaneously. During these warm-ups, the MWCs shall be fired on fuel oil only, and shall not exceed 63 lb/hr of SO₂. Records during these periods shall be kept on the CEMS reading and corresponding calculations.

c) MWC Start-Up

Start-up, not to exceed 3 hours at a time, shall follow the warm-up period. Start-up commences when RDF is added gradually to the fuel stream and the fuel oil is decreased at a rate which insures the MWC temperatures remain in the normal operating condition range until full-load, steady-state conditions can be reached. The start-up period does not include any warm-up period.

d) MWC Shut-Down

Shut-down, not to exceed 3 hours at a time, shall follow normal operating conditions. Shut-down commences when the RDF feed is stopped and fuel oil is added to burn remaining RDF in the MWCs.

- 2) The permittee shall contemporaneously with making a change from one operating scenario to another, record in a log at the permitted facility the scenario under which it is operating and, if required by any applicable requirement or the DOH, submit written notification to the DOH.
- 3) The permittee shall maintain invoices and supplier certifications for each delivery of supplemental wastes as listed in Attachment IIA, Special Condition No. C.2.i.1)a).
- 4) The terms and conditions under each alternative operating scenario shall meet all applicable requirements including all conditions of this permit.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-161; 40 CFR §60.38b(a), §60.58b(a)(1), 40 CFR Part 261, 40 CFR Part 279)¹

j. Operator Certification

1) Provisional Certification

Each chief facility operator and shift supervisor shall obtain and maintain a current provisional operator certification from the American Society of Mechanical Engineers (ASME) QRO-1-1994 (or equivalent certification program with approval from the DOH).

2) Full Certification

Each chief facility operator and shift supervisor shall have completed full certification or have scheduled a full certification exam from the ASME QRO-1-1994 (or equivalent certification program with approval from the DOH).

3) Staff on Duty

One of the following must always be on duty: a fully certified chief facility operator, a provisionally certified chief facility operator who has scheduled a full certification exam, a fully certified shift supervisor, or a provisionally certified shift supervisor who has scheduled a full certification exam.

If one of the above must leave during a shift, a provisionally certified control room operator may fulfill the requirement for Attachment IIA, Special Condition No. C.2.j.3) using the following guidelines ("stand-in" provisions):

- a) No notification is required if a control room operator is "standing-in" for 8 hours or less.
- b) If a control room operator is "standing-in" between 8 hours and 2 weeks, then the permittee shall notify the DOH by phone within the first 24 hours and notify the EPA and the DOH in writing within the first five (5) working days. At a minimum, the notification shall include date and time of the expected "stand-in," the person who is "standing-in," person's qualifications, and the reason for the "stand-in."
- c) If a control room operator is "standing-in" for 2 weeks or more, then the permittee shall fulfill the requirements of Attachment IIA, Special Condition No. C.2.j.3)b) plus provide corrective actions and expected date of return of a fully certified operator. The permittee shall submit the written status summary every two weeks up until the return of a fully certified operator. The DOH may impose stricter conditions as necessary.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-161; 40 CFR §60.35b, §60.54b(a) - (c))¹

k. Operator Training

- 1) All chief facility operators, shift supervisors, and control room operators must complete the EPA MWC operator training course (or equivalent training course with approval from the DOH) as of January 3, 2002. This condition does not apply to those who have obtained full certification from ASME.

The permittee may request that the DOH waive the EPA training course requirement for those who have obtained provisional certification from ASME (or equivalent training course with approval from the DOH).

- 2) The permittee shall develop and update on an annual basis a site-specific operating manual that shall, at a minimum, address the elements of MWC unit operation specified as follows:
 - a) A summary of the applicable standards under 40 CFR 60 Subparts Cb and Eb;
 - b) A description of basic combustion theory applicable to a MWC unit;
 - c) Procedures for receiving, handling, and feeding MSW;
 - d) MWC warm-up, start-up, shut-down, and malfunction procedures;
 - e) Procedures for maintaining proper combustion air supply levels;
 - f) Procedures for operating the MWC unit within the standards established by 40 CFR 60 Subparts Cb and Eb;
 - g) Procedure for responding to periodic upset or off-specification conditions;
 - h) Procedures for minimizing particulate matter carryover;
 - i) Procedures for handling ash;
 - j) Procedures for monitoring MWC unit emissions;
 - k) Reporting and recordkeeping procedures; and
 - l) Include all sample forms used for reporting and recordkeeping as required by this CSP.
- 3) The permittee shall establish an annual training program to review the operating manual and conduct the initial training program with each person who has responsibilities affecting the operation of an affected facility including, but not limited to, chief facility operators, shift supervisors, control room operators, ash handlers, maintenance personnel, and crane/load handlers. These persons shall undergo initial training no later than the date prior to the day the person assumes responsibilities affecting MWC unit operation.
- 4) The operating manual shall be kept in a readily accessible location for all persons required to undergo training.

(Auth.: HAR §11-60.1-3, §11-60.1-5, §11-60.1-90, §11-60.1-161; 40 CFR §60.35b, §60.39b(c)(4), §60.54b(d) - (g))¹

Section D. Emission Limitations

1. Visible Emissions

- a. Each RDF MWC boiler shall not exhibit visible emissions greater than ten (10) percent opacity, for any six (6) minute averaging period, except as follows: during warm-up, start-up, shut-down, or malfunction each RDF MWC boiler may exhibit visible emissions greater than twenty (20) percent opacity, but not exceeding sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minute period.
- b. The permittee shall not cause to be discharged to the atmosphere visible emissions of combustion ash from an ash conveying system or enclosure (including conveyor transfer points) in excess of 5 percent of the observation period (i.e., 9 minutes per 3-hour period). This condition does not apply for the following:
 - 1) Visible emissions discharged inside buildings or enclosures of ash conveying systems; and
 - 2) During maintenance and repair of ash conveying systems.

(Auth.: HAR §11-60.1-3, §11-60.1-32, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.33b(a)(1)(iii), §60.36b, §60.55b(a) - (c))¹

2. Each MWC shall not exceed the following emission limits at all times (except during periods of warm-up, start-up, shut-down, or malfunction):

Table No. 1
Emission Limits¹

Pollutant	Emission Limits ^{2,8}
SO ₂ 24-hr ^{3,4}	29 ppmv
8-hr ³	70 ppmv
PM	27 mg/dscm
NO ₂ 24-hr ⁵	250 ppmv
CO 24-hr ⁵	200 ppmv
VOC	21 ppmv
Pb	0.20 lb/hr
Be	0.0009 lb/hr
Hg ⁶	0.080 mg/dscm
HF	2.6 lb/hr
HCl ⁷	29 ppmv
Dioxin/Furan	60 ng/dscm
Cd	0.040 mg/dscm

Table No. 1 Notes:

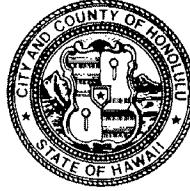
- Emission limits shall not be exceeded by each MWC (except during warm-up, start-up, shut-down, or malfunction).
- All emission limits are corrected to 7% O₂ except for Pb, Be, and HF.
- 24-hr daily and 8-hr block geometric average.
- Or 75% reduction by weight or volume (whichever is less stringent).
- 24-hr daily arithmetic average.
- Or 85% reduction by weight (whichever is less stringent).
- Or 95% reduction by weight or volume (whichever is less stringent).
- Before April 29, 2011, all emission limits identified in Table No. 1 shall remain in effect. On and after April 29, 2011, the following revisions to the emission limits for each RDF MWC boiler with a fabric filter takes into effect: PM reduced to 25 mg/dscm, Cd reduced to 0.035 mg/dscm, Hg reduced to 0.050 mg/dscm, dioxin/furan reduced to 30 ng/dscm, and Pb reduced to 0.400 mg/dscm @ 7% O₂.

(Auth.: HAR §11-60.1-3, §11-60.1-90, §11-60.1-161; 40 CFR §52.21, §60.33b, §60.34b, 60.58b(a)(1))¹

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
REFUSE DIVISION

1000 ULUOHIA STREET, SUITE 201, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 768-3401 • FAX: (808) 768-3434 • WEBSITE: <http://envhonolulu.org>

PETER B. CARLISLE
MAYOR



TIMOTHY E. STEINBERGER, P.E.
DIRECTOR

SILVESTRE L. ULEP, P.E.
INTERIM ASSISTANT CHIEF

IN REPLY REFER TO:

CITY AND COUNTY OF HONOLULU
MAYOR'S ADVISORY COMMITTEE ON LANDFILL SITE SELECTION
MISSION MEMORIAL CONFERENCE ROOM – 1ST FLOOR
MEETING NO. 10
FRIDAY, APRIL 20, 2012
9:00 A.M. – 12:00 P.M.

AGENDA

1. Welcome and Introduction

Purpose: To report to the Committee the findings regarding additional sites and new federal sites for further consideration per the Committee's instructions. The alternative sites will be evaluated using the Committee's Community Criteria, weighted, and presented to the Committee.

Outcome: To have a list of ranked sites for presentation to the Administration in the final report.

2. Review of Meeting No. 9

3. Public Comments

4. Consultant's Report on Committee's Request for the Reevaluation of Sites

6. Application of Weights to Achieve Ranking

7. Discussion on the Draft Executive Summary and Final Report

8. Thank You and Adjournment

Professional Record

Professional Synopsis:

Dr. Richardson has directed solid waste containment and geosynthetic design projects over the past two decades for national clients that include: U.S. Environmental Protection Agency, U.S. Department of Defense, New York State Department of Environmental Control, the CECOS Division of Browning Ferris Industries (BFI), Waste Management, Inc., Waste Industries, Inc., Tennessee Eastman, International Paper, and Dow Chemical.

Dr. Richardson's background in geosynthetics dates to 1976. He was a founding member of ASTM D-35 Committee on Geosynthetics and the Geosynthetics Research Institute. Dr. Richardson co-authored a book on the design of geotextiles for IFAI. In 1985, Dr. Richardson co-authored a geosynthetic design manual for U.S. EPA on the design of hazardous waste landfills and surface impoundments (EPA/600/S2-87-097), taught three national landfill design courses for EPA, and co-authored a landfill seismic design manual for U.S. EPA (EPA/600/R-95/051).

For municipal solid waste landfills, Dr. Richardson provided design review and CQA for the first lined municipal solid waste (MSW) landfill constructed in North Carolina (1989 at Rowan County). Also, within North Carolina, he has been responsible for the design and permitting of Subtitle D landfills for Alamance County, Halifax County, Johnston County, Robeson County, Sampson County, and the City of High Point. In 1997, he designed a piggy-backed lined landfill for Winston-Salem. This was the first piggyback MSW landfill operating in North Carolina. Currently, he has permitted a similar piggy-back landfill for Johnston County, NC. Dr. Richardson has assisted in the design of 13 piggyback landfills in the southeast. Outside of North Carolina, he has designed and permitted Subtitle D landfills in South Carolina, Virginia, New York, and Pennsylvania.

Dr. Richardson's industrial landfill design experience includes design of a hazardous waste landfill for the Tennessee Eastman Company at Kingsport, TN., and a composite lined industrial landfill for Mead Paper in Tennessee. This landfill site was the first to be permitted in Karst geology since the new and more rigorous landfill laws were passed in Tennessee. In North Carolina, he designed the first lined coal ash disposal facility in the State for Westmoreland Energy and designed and permitted a double

Gregory Richardson, Ph.D., P.E. Senior Engineer

Academic Credentials:

B.S., California State University at Los Angeles, 1969
M.S.C.E., University California at Los Angeles, 1973
Ph.D., University of California at Los Angeles, 1976

Professional Credentials:

Professional Engineer - California, North Carolina,
South Carolina, Virginia, Tennessee, Michigan,
Connecticut, Georgia, New York (inactive),
West Virginia (inactive)

Employment Record:

1994-present - Richardson Smith Gardner & Associates
(formerly G.N. Richardson & Associates, Inc.)
1993-1994 - Harding Lawson Associates, Inc.
1992-1993 - Hazen & Sawyer, P.C.
1991-1992 - G.N. Richardson & Associates, Inc.
1980-1990 - Westinghouse Environmental &
Geotechnical (formerly S&ME)
1976-1980 - North Carolina State University

Principal Areas of Expertise:

Landfill design, permitting, and operations
Geosynthetic design and testing

Professional Activities:

American Society of Civil Engineers
North American Geosynthetics Association
International Geosynthetics Society
American Society for Testing and Materials

Professional Awards:

ASCE, J. James R. Cross Medal - 1978
North Carolina Consulting Engineers Council -
Research Award - 1989

RICHARDSON SMITH GARDNER & ASSOCIATES, INC.

Engineering and Geological Services

lined landfill within what had been a wastewater treatment pond for International Paper's Riegelwood (NC) Mill. Dr. Richardson also completed the design and construction of a lined landfill expansion for International Paper's Franklin (VA) Mill.

Additionally, Dr. Richardson has directed RI/FS activities at NPL sites in both South Carolina and Washington. This work included remedial design (RD) and construction oversight/CQA for a Superfund site in Lexington, South Carolina. This facility has recently successfully passed its mandatory agency 5-year review.

Dr. Richardson is also involved in the design and permitting of mixed waste storage facilities at U.S. Department of Energy facilities at Hanford, WA; Oak Ridge, TN; and Savannah River, SC. This work has included evaluation of storage vault facilities, the design of interim (30 year) closure systems, and long-term (1000 year) isolation systems. This work was key to the permitting of the Monticello mixed waste repository in Utah and the Bear Creek mixed waste repository under construction in Oak Ridge, Tennessee.

Dr. Richardson has also provided guidance to landfill operators with regards to extinguishing landfill fires and leachate disposal alternatives. He developed the strategy that successfully extinguished a deep fire at the Killingsworth Fast Disposal Landfill in Portland, Oregon and has assisted landfills in Maryland and Guam in putting out similar landfill fires.

Dr. Richardson is currently directing one of the largest leachate recirculation programs being performed in the USA. This facility receives more than 4,000 ton/day and treats no leachate. Work is ongoing to define the impact of recirculation on long term waste properties and the serviceability of the leachate collection system.

His current research is focused on the role of GCL's in landfill systems and in the development of more economical final covers. This may lead to a strategy of tying the from of final closure to the presence of active gas recovery systems and adequacy of the collector system design. It is hoped that this research will reduce the cost of closure so resources can be more focused on energy recovery and the potential of cover failure lessened.

Gregory Richardson, Ph.D., P.E. Senior Engineer

Selected Publications:

"Design of Geosynthetic Systems for Water Disposal" (Koerner, R.M. and Richardson, G.N.), ASCE-GT Specialty Conference, Geotechnical Practices for Waste Disposal, Ann Arbor, MI, 1987.

"Geosynthetic Design Considerations for Double Liner Systems" (Richardson, G.N. and Koerner, R.M.) 13th Annual Hazardous Waste Seminar, U.S. EPA, Cincinnati, OH, 1987.

EPA/600/S2-87/097, Geosynthetic Design Guidance for Hazardous Waste Landfill Cells and Surface Impoundments (Richardson, G.N. and Koerner, R.M.), EPA Guidance Document, 1988.

"Design of State-of-the-Art Landfill" (Richardson, G.N. and Horton, G.W.), Proceedings - First Annual Southeastern Regional Solid Waste Symposium, Savannah, GA, 1990.

EPA/540/R-92/073, Construction Quality Management for Remedial Action and Remedial Design Waste Containment Systems.

EPA/625/4-89/022, Requirements for Hazardous Waste Landfill Design, Construction and Closure, (Richardson, G.N.), Chapters on Flexible Membrane Liners, 1989.

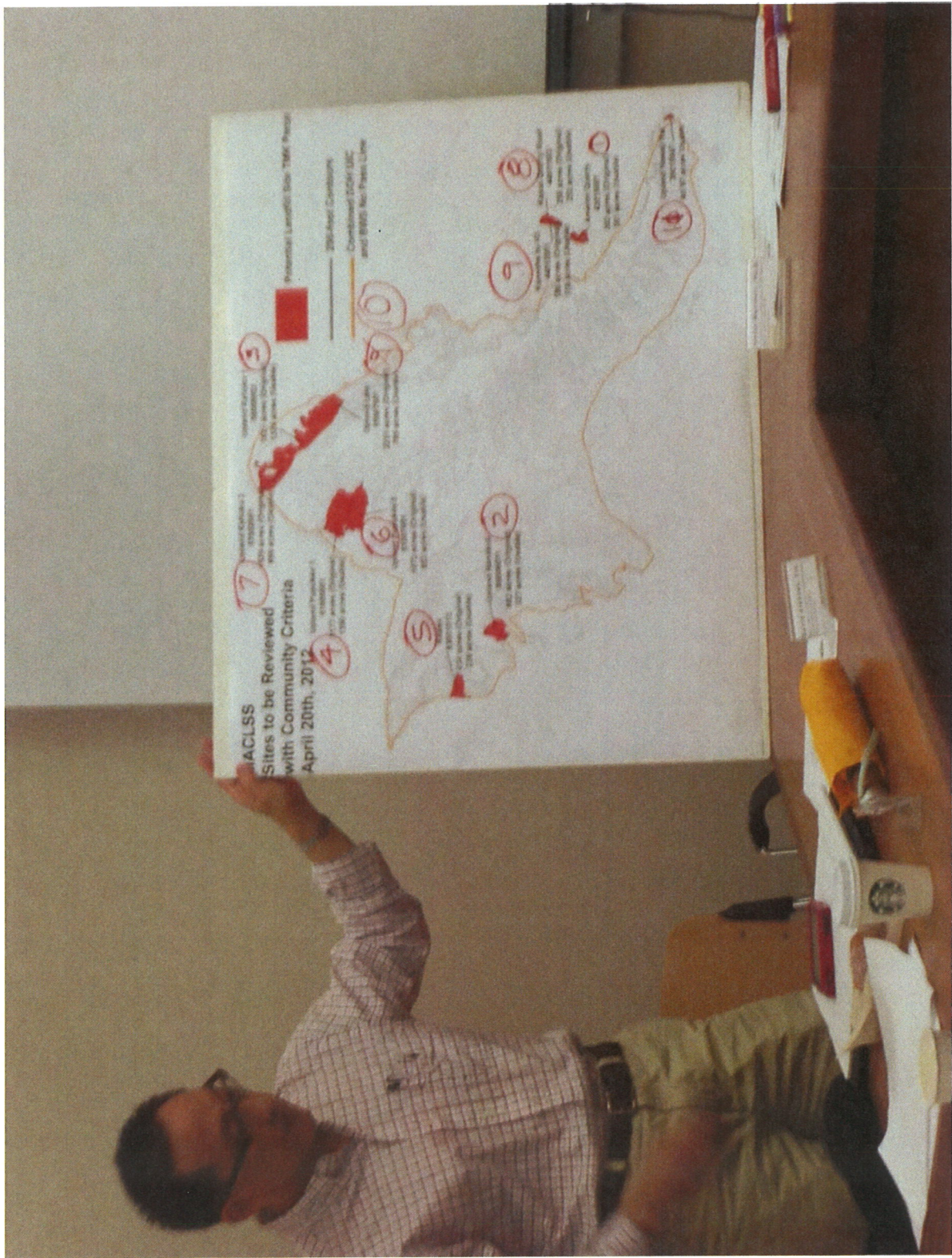
"Composite Liner and Floating Cover for Nuclear Reactor Emergency Effluent Basins" (Sentelle, R.H. and Richardson, G.N.), Third International Symposium on Sanitary Landfills, CISA, Sardinia, Italy, 1992.

EPA/600/R-95/051, RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities, 1995.

"Lessons Learned From Failure: Landfill Covers," Gregory N. Richardson, Kevin Pavlik, Geotechnical Fabrics Report, IFAI, St. Paul, MN, September, 2004.

Oahu Landfill CCE Site Score Sheet									
Preliminary Weighted Site Scores									
Site	Site CCE Score				Rank				
Ameron Quarry	675								
Upland Lare	498								
Upland Pupukea 1	543								
Upland Pupukea 2	521								
Keaau	543								
Upland Nanakuli 1	583								
Upland Hawaii Kai	451								
Kapaa Quarry Road	507								
Kāne'ohe by H3	498								
Upland Kahuku 1	572								
Upland Kahuku 2	514								

Photograph Taken 4/20/12 - EXHIBIT K258



Photograph Taken 4/20/12 - Exhibit K258

BEFORE THE PLANNING COMMISSION
OF THE CITY AND COUNTY OF HONOLULU
STATE OF HAWAII

In the Matter of the Application of

DEPARTMENT OF ENVIRONMENTAL
SERVICES, CITY AND COUNTY OF
HONOLULU

To delete Condition No. 14 of Special
Use Permit No. 2008/SUP-2 (also
referred to as Land Use Commission
Docket No. SP09-403) which states as
follows:

“14. Municipal solid waste shall be
allowed at the WGSL up to July 31,
2012, provided that only ash and residue
from H-POWER shall be allowed at the
WGSL after July 31, 2012.”

FILE NO. 2008/SUP-2

CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

The undersigned certifies that on this day a copy of the foregoing document was
duly served on the following persons:

ROBERT CARSON GODBEY, ESQ.

(Hand Delivery)

Corporation Counsel

DANA VIOLA, ESQ.

ROBERT BRIAN BLACK, ESQ.

Deputies Corporation Counsel

City and County of Honolulu

530 South King Street, Room 110

Honolulu, Hawai'i 96813

Attorneys for DEPARTMENT OF ENVIRONMENTAL SERVICES,
CITY AND COUNTY OF HONOLULU

DEPARTMENT OF ENVIRONMENTAL SERVICES (Certified Mail)
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawai'i 96707

DEPARTMENT OF PLANNING AND PERMITTING (Hand Delivery)
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

IAN L. SANDISON, ESQ. (Hand Delivery)
DEAN H. ROBB, ESQ.
TIM LUI-KWAN, ESQ.
Carlsmith Ball LLP
American Savings Bank Tower
1001 Bishop Street, Suite 2200
Honolulu, Hawai'i 96813

Attorneys for Intervenor
SCHNITZER STELL HAWAII CORP.

DATED: Honolulu, Hawai'i, April 24, 2012.

CADES SCHUTTE
A Limited Liability Law Partnership



CALVERT G. CHIPCHASE
CHRISTOPHER T. GOODIN

Attorneys for Intervenor
KO OLINA COMMUNITY ASSOCIATION
and MAILE SHIMABUKURO