



engineered**COMPOST**systems

Statement of Qualifications

About ECS

ECS is an engineering and science-based company dedicated to the composting industry and founded in 1999. ECS is “compost process focused” and provides technical services, compost systems and equipment, and product support to commercial-scale compost facilities. ECS has provided comprehensive process design and technical consulting services to over 110 operating facilities in North America, Europe, and New Zealand; and has provided compost systems, technology and on-going technical support to over 70 client-owned composting facilities. Together, these operating facilities process over 1.97 million tons of organic waste into compost annually. Our customers are public and private entities; and compost a wide range of feedstocks that include: biosolids, food waste, industrial & agricultural wastes, green waste, and MSW.

ECS Technical Services

ECS provides technical assistance for all aspects of planning, permitting, designing, evaluating and analyzing a compost facility and its processes. ECS technical services include:

- Preliminary facility design for business case analysis and risk assessment
- Facility sizing, layout and process design
- Detailed design of mechanical and electrical control systems
- Facility start-up and operator training
- Process improvement: comprehensive measurement of composting process parameters
- Measurement, analysis and modeling of air emissions
- Modelling compost facility water management and use
- Bench-scale compost process laboratory to optimize feedstock mix and process design
- Pilot systems, test plan development, and data analysis

ECS Systems and Equipment

ECS offers an unparalleled range of proven process technologies engineered to enable client success. Our designs are based on the scientific understanding of the composting process, our rigorous engineering approach, and our nearly 20-year quest for continuous product improvement. Our in-vessel and aerated pile systems (static and turned) are comprised from the following components:

- CompTroller™ automated aeration control and monitoring software/hardware
- Aeration systems: positive, negative, reversing, recirculating
- Below-grade aeration floors: trench and HDPE sparger pipe with risers
- Above-grade aeration floors: pipe-on-grade
- Odor capture and control systems including biofilters and humidifiers
- Temperature probes: wired and wireless

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ECS Facility and Product Support

ECS product support is provided by the same technical engineering staff that develop facility designs and manage installations. Product support is available Monday through Friday, from 7:30 a.m. to 5:00 p.m. PST. There is a dedicated email address and phone number for our client's non-emergency issues; and phone numbers to call in case of emergencies outside of regular business hours. All product support is logged into our client data-base and is used to improve our designs.

Key Personnel

ECS has eleven dedicated staff members, and shares other engineers, technicians and administration staff with its sister-company, Measurement Technologies NW, when required. (ECS and MTNW have the same ownership and address). We invite you to learn more about MTNW, Thermetrics and Rugged Controls, by viewing their websites at:

<http://www.mtnw-usa.com>

Tim O'Neill, President

Education

University of Washington, BS Mechanical Engineering, 1981

University of Washington, MS Mechanical Engineering, 1985

Certifications

The U.S. Compost Council Certified Compost Facility Operator, 1998

Role at ECS and Experience Summary

Mr. O'Neill is president and founder of ECS (1999), president and founder of Measurement Technology Northwest (1986). He has worked in the compost industry since 1993 and has been responsible for the development and manufacture of compost process control systems; and the supervision of in-vessel and ASP design, research development, fabrication, and project management. Mr. O'Neill has provided compost engineering consulting for scores of municipal and commercial clients. He is a recognized expert in compost aeration and control, regulatory compliance, process control & monitoring technology, odor control, feedstock preparation and material handling. He currently serves on the board of trustee for the US Compost Research and Education Foundation. Mr. O'Neill is a frequently invited speaker at professional conferences including: US Composting Council (USCC), BioCycle, Canadian Composting Council, SWANA, Waste Expo, Washington Organic Recycling Council (WORC), Northwest Biosolids Management Association; and teaches compost facility design classes at USCC and WORC compost operators training courses.

Christopher Hibbard, Engineering Manager

Education

Michigan Technological University, BS Mechanical Engineering, 1993

Certifications

Engineer in Training (EIT) Certification, 1993

Role at ECS and Experience Summary

Mr. Hibbard oversees ECS engineering activities in project management, compost process design, vendor supervision, and facility start-up. He joined ECS in 2001 and in that time has been the lead project engineer on over 30 compost facilities in North America, and has provided

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on-site technical support at dozens more. He is instrumental in the development of the ECS Tool Kit of systems and components, directs the ECS Product Support team, and has worked closely with our mixer and conveyor equipment vendors to adapt their products to the difficult requirements of the composting industry. Prior to joining ECS, Mr. Hibbard designed tooling used with ultra-high pressure water jets in a nuclear environment, and developed procedures for cutting decommissioned nuclear reactor parts for disposal.

Chris Anderson, Director of Operations

Education

Seattle University, BS Electrical Engineering

Role at ECS and Experience Summary

Chris oversees engineering, manufacturing, vendor management, quality assurance and project management at ECS. Successful projects begin with listening and finding the right technology to meet our client's needs. Chris ensures that our client's needs drive the design and that the ECS design team integrates seamlessly with our client's team. Prior to joining ECS, Chris held design, project management and leadership positions with firms in the aerospace industry.

Charlie Krauter, Lead Engineer

Education

University of California at Davis, BS Physics, 1995

California State University at Sacramento, BS Mechanical Engineering, 2003

Certifications

Engineer in Training (EIT) Certification, 2003

Role at ECS and Experience Summary

Mr. Krauter brings an extremely broad skillset to ECS. He divides his time among ECS' fundamental research efforts, product development, and client support activities. He has been the lead developer of ECS' latest generations of the CompTroller™, our automated compost process control technology. He has served as the project lead on five of US Government funded compost research projects that ECS has carried out during his tenure, and is part of the ECS Product Support team. Prior to joining ECS in 2006, Mr. Krauter worked as a design engineer for a tunnel boring machinery company, and as a software engineer.

Aimee Manderlink, Engineer

Education

Boston University, BS Mechanical Engineering, 2018

Role at ECS and Experience Summary

We have been happy to welcome Ms. Manderlink to the ECS team as of October of 2018. She contributes to system design and ECS' research and development efforts. Aimee also assists as an engineer to ECS' subsidiary, Toilet Tech Solutions, with research and development of new products. As an undergraduate, Aimee applied her passion for sustainable waste management as a member of Engineers Without Borders. Before joining the ECS team, Aimee was a research assistant in energy engineering at Pennsylvania State University investigating electrochemical systems and biomass conversion.

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Baraka Poulin, Director of Business Development

Education

Georgia College and State University, Master of Business Administration, 2011
Gonzaga University, BS Mechanical Engineering, Minor Business, Concentration
Entrepreneurship, 2008

Certifications

Professional Engineers License, WA, Mechanical 2013
Certified Energy Manager, AEE
2012 Young Energy Professional of the Year Region V, AEE

Role at ECS and Experience Summary

Mr. Poulin works to understand customer goals and help apply appropriate technology solutions. He joined ECS in 2019 and provides sales engineering and early stage technical support. Prior to ECS, Mr. Poulin developed industrial scale biomass renewable energy projects with both pyrolysis and gasification technology. He also brings an extensive background developing energy efficiency projects with public sector clients through energy service performance contracting.