SME
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MICHAEL S. BOOTH, P.E.

EDUCATION

University of Maine - B.S. in Civil Engineering, 1979
Special Courses:
Carbon Emission Trading – 2008, Financial Research Associates LLC
Landfill Gas Systems Engineering Design – 2006, CES Landtec Course
Geotechnical Aspects of Waste Disposal – 1987, University of Maine
Sanitary Landfill Gas and Leachate Management – 1985, University of Wisconsin
Geotechnical Aspects of Landfill Design – 1984, University of Wisconsin
Groundwater Pollution and Hydrology – 1984, Princeton University
Advanced Wastewater Treatment Systems – 1981, University of Maine

PROFESSIONAL REGISTRATION

Professional Engineer – Maine

AFFILIATIONS

American Society of Civil Engineers, Member
Solid Waste Association of North America, Member
U.S.EPA Landfill Methane Outreach Program, member

EMPLOYMENT HISTORY

1989 to currently - Sevee & Maher Engineers, Inc, Senior Project Manager/Project Engineer
1986 to 1989 - E.C. Jordan Co., Portland, Maine, Project Manager/Project Engineer
1980 to 1986 - Maine Department of Environmental Protection, Augusta, Maine, Engineer

PROFESSIONAL EXPERIENCE

Mr. Booth has over 35 years of experience with the design, permitting, and operation of environmental projects. As a Project Manager/Project Engineer with Sevee & Maher Engineers, Mr. Booth is responsible for both the technical and managerial aspects of multi-task projects including client relations, regulatory agency relations, detailed design, permitting, construction, and operation assistance principally focused on solid waste management issues.

Assignments in his various areas of expertise have included:

- Preparing Design and Permits for Commercial, Private and State Owned Landfills and Overseeing Landfill Construction - Mr. Booth has managed and acted as lead technical engineer on five major landfill permit projects in the State of Maine. To date, these projects have included a total of 35 construction projects encompassing 200 acres of landfill cell and cover construction. As the lead technical engineer Mr. Booth has been responsible for directing the detailed hydrogeologic investigations, evaluating siting issues such as odor, noise, visual, and wetland impacts, completing detail liner and leachate collection system designs, and preparing cell development and operational plans. Mr. Booth has also been responsible for preparing supporting permits for the projects and providing permit support during the permitting process. These landfills were designed to accept a number of different materials, including municipal solid waste, construction and demolition debris,

and special wastes such as bottom and fly ash, and sludges. For these projects, Mr. Booth has been involved in the oversight of construction and provided operational assistance to the facilities;

- Providing Technical Design Services for a 68-acre Commercial Landfill - In this role, Mr. Booth has been responsible for managing and preparing a number of State and Local applications for both an expansion and closure of this facility since 1992. The facility handles a variety of waste streams, including MSW incinerator ash, other boiler ash, construction and demolition debris, municipal solid waste, and assorted special wastes. He has directed the design and construction of eight phases of landfill cell construction and three phases of final cover construction at the facility including the development of detailed design drawings, administrative contract documents, and operations manuals. For this site, he has also directed studies and designs relating to landfill liner and cover stability; landfill leachate collection and treatment; groundwater remediation; landfill gas collection and fugitive migration control. Recently he has been responsible for designing and permitting the leachate recirculation system for the site. This system is unique because it recirculates leachate in a waste mass with a large percentage of construction and demolition debris;
- Evaluating the performance of an Alternate Landfill Final Cover System in South Africa - Mr. Booth worked with a South African Paper Company to evaluate the performance of an alternate final cover system at a pulp and paper mill landfill in Springs, South Africa. The landfill received a number of process mill wastes, including pulping wastes, bottom and fly ash, and wastewater sludge. Prior to Mr. Booth's involvement, the company had performed initial laboratory and field tests to evaluate if its primary sludge could be used as a final landfill cover material. A test cell was constructed using the primary sludge and its performance was monitored over a several year period. The monitoring results indicated that the properties of the sludge cover were changing over time and the original assumptions on cover performance were no longer valid. Mr. Booth developed a program to characterize the current in-situ characteristics of the sludge cover and its hydraulic performance in the South African climate. Samples of the in situ sludge cover were collected and laboratory tests performed. From the tests results, Mr. Booth was able to characterize the cover degradation mechanisms and use this information to demonstrate the effectiveness of the cover in the South African climate. Recommendations were also provided on future cover designs using the sludge material;
- Assist client in obtaining a program approval for a Solid Waste Beneficial Use Permit - Mr. Booth prepared and permitted a program approval under the State of Maine Beneficial Use of Solid Waste Regulations to allow for the general distribution of patented biomass energy pellets to industrial, commercial and institutional biomass boilers for use as a fuel substitute. The pellets are manufactured using biomass and recycled plastics to produce a fuel that is high in BTU content and moisture resistant. Because the pellets contain recycled plastics, and are used as a boiler fuel an individual permit would be required for each boiler using the pellets. Mr. Booth designed a program approval program that allowed use of the pellets in solid fuel boilers without first receiving individual permits;
- Evaluate State Solid Waste Capacity Needs as it Relates to an Expansion of State of Maine Landfill - Mr. Booth prepared an application for the Public Benefit Determination for the Expansion of the State Owned Landfill in Old Town, Maine. The application needed to demonstrate consistency with the State of Maine's Waste Management and Recycling Plan prepared for the State Planning Office. Through this effort Mr. Booth developed an in-depth working knowledge of the current waste management practices with the State and the implementation of the waste management hierarchy establishing priorities of waste handling of waste reduction, reuse, recycling, compositing, volume reduction by incineration, for energy recovery, and landfilling;
- Designing and Permitting of an Odor Control and Landfill Gas Treatment System for Commercial Landfill - Mr. Booth participated in the design and permitting of an active landfill gas collection and treatment system at a 57-acre commercial landfill. The main components of the system include gas collection and conveyance piping; a condensate handling system; a stationary flare with a rated

capacity of 1,200 standard cubic feet per minute (SCFM) and 34 MMBTUs per hour and a gas conditioning system to remove sulfur compounds. Mr. Booth was responsible for providing technical oversight to the project, preparing the Title V air permit application, and the facility's Operations Manual. As part of the Operations Manual, Mr. Booth was involved in designing a data operation collections system to allow timely collection of operational data for the facility;

- Preparing and Evaluating the Feasibility of Renewable Energy Projects at a Municipal Landfill - Mr. Booth evaluated the feasibility of developing a renewable energy project for a small municipal landfill with an active gas collection system. The evaluation consisted of quantifying and projecting future landfill gas projections; identifying seven potential utilization projects and their components and performing an economic evaluation that defined project costs and revenues and a project life cycle analysis. The project evaluated included using the gas for power generation, on and off-site heating, and off-site cogeneration; and
- Evaluating and Preparing Documentation of Carbon Credits Associated with an Active Landfill Gas Flaring Project - Mr. Booth assisted a municipal client with the monetization of emission reductions associated with a landfill gas flaring project. The emission reductions, associated with destroying methane gas, are eligible to be sold as monetized "carbon credits" under several different protocols established to provide a means to quantify and qualify projects that result in the reduction of greenhouse gas emissions. The first phase of the project was to evaluate the eligibility of the project under protocols set forth by the Voluntary Carbon Standard (VCS), the Chicago Climate Exchange (CCX), the Regional Greenhouse Gas Initiative (RGGI), and the Climate Action Reserve (CAR). Based on this evaluation the client elected to pursue carbon credits using the CAR protocol. Mr. Booth prepared the required project documentation to have this project listed and verified under the CAR Protocol. Another component of this project was to assist the client with compiling and managing the data required to verify this project.

PRESENTATIONS and PUBLICATIONS

- March 2009 Is it low tide? The saga of an odor control challenge at a small municipal landfill. Presented at SWANA Landfill Gas Symposium in Atlanta, Georgia. Coauthor.
- December 2008 A Small Landfill's Preliminary Evaluation of Carbon Credits and Renewable Energy Projects. Presented at U.S.EPA LMOP Landfill Gas Energy: A Sustainable Energy Source from Small Landfills in New England conference in Portland Maine.
- June 22, 1989, Closing Landfills, presented at one-day conference entitled "How to Deal With Your Solid Waste," sponsored by SMVTI.
- February 1987, Permitting a Landfill in the State of New York, presented at the New York North Western Region monthly TAPPI meeting.