

## **T-9.0 SWANA TECHNICAL POLICY**

### **THE SANITARY LANDFILL COMPONENT OF INTEGRATED SOLID WASTE MANAGEMENT**

#### **I. POLICY**

The need for continued landfilling is expected to remain in effect into the foreseeable future, though at a reduced rate due to success of diversion programs. For example, through recycling and composting the United States achieves an overall national average recycling rate of approximately 35%, with an additional 15% of municipal solid waste (MSW) reduced through waste-to-energy. The remainder, approximately 50%, is disposed of in sanitary landfills. SWANA supports sanitary landfilling as a necessary element of integrated solid waste management where these facilities:

- Operate in conformance with federal, provincial\state and local government integrated solid waste management plans and the established capacity needs;
- Establish the full costs for the siting, design, construction and operation including waste collection and transfer, closure and post-closure in the costs assigned to a sanitary landfill within an integrated solid waste management system;
- Comply with all federal, provincial/state, and local government rules, regulations and permits during siting, design, construction, operation, closure and post closure;
- Work to ensure that landfill owners and operators receive fair and equitable treatment in all regulations and regulatory activity;
- Operate to maximize their roles as a renewable resource through diversion or the on-site salvaging of discarded material for re-use or further processing, capture of landfill gas for use as a renewable fuel and, to the extent possible, serve as a resource to the local community through the development of the site for beneficial post-closure activities; and
- Operate in consideration of new and critical emerging issues, tools and technologies of importance, specifically life cycle analysis, third-party agreements, potential recycling/reuse of mined materials within landfills, use of drone technology for landfill application, bioreactor landfills and greenhouse gas regulations.

Presented below are detailed technical positions and discussions of important specific issues that support SWANA's overall policy statement.

## **II. Position**

SWANA believes that sound and responsible sanitary landfilling includes the following best practices:

### **A. Selection of Sites for Sanitary Landfills**

The selection of sites for sanitary landfills, and the design, construction and operating practices used at these sites, should:

- Be consistent with local land use conditions and zoning codes;
- Assure that landfill activities will not increase bird hazard risk to aircraft;
- Protect flood plains and wetlands;
- Protect against problems caused by unstable geologic settings;
- Provide for best practices in design, construction, operation and closure;
- Minimize impacts on air or water quality to the extent necessary to ensure no adverse impact to public health, safety and welfare;
- Consider impacts to region wide water resources and water supply sources; and
- Management/business criteria, including location relative to waste generators and costs of site development

### **B. Design of Sanitary Landfill**

Sanitary landfills should be designed by, or under the supervision of, registered professional engineers and other licensed professionals with clearly demonstrated knowledge in sanitary landfill design, to meet the following performance criteria:

- Provide for controlled access to the site;
- Provide for use by individuals at convenience areas, public drop-off areas, or public use areas;
- Provide means for the measurement by weight of incoming solid waste;
- Provide means for the screening of incoming solid waste;
- Provide for control of storm water run-on and run-off;
- Provide for prevention of groundwater, surface water and air quality contamination;
- Provide for groundwater, surface water and landfill gas/air quality monitoring systems;
- Provide for the collection, recovery and management of leachate;
- Allow efficient and safe operations;
- Provide for the management and control of landfill gas, in compliance with federal, state and provincial laws;
- Provide for the recovery and flaring of the landfill gas (LFG) where necessary and, when economically feasible, provide for the utilization of LFG as an energy source;
- Provide for post-closure uses of the property to the extent locally practicable; and

- Provide design which are constructible and easy to maintain and operate. With the use of computers in landfill design, it is a good practice to provide design documentation in order to enable others to reproduce similar designs conditions for a comparable site condition.

### **C. Operation of Sanitary Landfills**

Sanitary landfills should be operated according to the following principles:

- Operate under the management of a provincial/state/SWANA certified manager of landfill operations/operator/integrated solid waste manager;
- Provide for training of landfill best management practices for all on-site personnel;
- Provide for controlled access and use by only authorized users;
- Provide for use by individuals at convenience areas, public drop-off areas, or public use areas;
- Measure incoming solid waste by weight;
- Conduct random inspections of incoming loads of solid waste designed to detect and prevent the disposal of hazardous or unauthorized waste;
- Accept only wastes specifically allowed and included in the permit, permit conditions, or permit amendments;
- Prevent inadvertent fires from incoming combustible material, hot loads, or from uncontrolled burning of materials or vegetation in areas adjacent to the landfill;
- Provide for, where possible and permitted, the diversion, segregation and salvaging or further processing for beneficial use or recycling of waste components, such as tires, yard trimmings, electronics, scrap metals, white goods, MSW incinerator ash, concrete, asphalt, untreated wood and other inert materials;
- Provide for means and methods of implementing an emergency plan consistent with applicable laws and regulations and or with regional emergency plans;
- Have a provision to enable 'close as you go' concept for waste disposal areas in which areas which have achieved the desired and permitted final grades can be closed per regulations while other areas can be maintained at their existing status.
- Provide for the use of daily cover [earth or alternate materials];
- Provide for control of vectors and birds, as well as general nuisances such as odor, litter and noise;
- Provide, where applicable and permitted, for the control of invasive species on-site;
- Control storm water run-on and run-off;
- Prevent groundwater contamination;
- Prevent surface water contamination;
- Prevent air quality contamination; and
- Prevent the off-site migration of landfill gas.

#### **D. Closure and Post-Closure of Sanitary Landfills**

Closure and post-closure of sanitary landfills should subscribe to the following principles:

- Provide financial assurance for each individual facility for closure and post-closure care, and for identified corrective action;
- Meet closure performance standards or permit requirements;
- Minimize long-term impact after landfill closure;
- Continue maintenance and monitoring to meet permit requirements or post-closure performance standards;
- Evaluate the end use of the site in consideration of the potential damage to the final cover system and the proper removal and management of leachate and landfill gas;
- Where possible, integrate on-site beneficial use opportunities into the post-closure plan;
- Restrict access to monitoring and control systems of the closed facility to authorized personnel only; and
- Document former landfill use in property records.

#### **III. SPECIFIC ISSUES**

Landfills face increasing regulatory, operational and environmental pressures. In addition to the general position statements used to support the overall policy statement, it is also necessary to introduce and discuss several important emerging issues with which landfill owners/operators should be familiar.

In recent years the concept of life cycle analysis has become an important tool in analyzing the complex role landfills play in an integrated waste and resource management system. Also, modern landfill operations are increasingly complex. In order to maximize flexibility and operational efficiency, landfill operators often enter into complex third-party agreements for the operation of energy facilities, gas collection systems and often even the landfill itself. In addition, landfilling technology itself has advanced with the industry's experience with bioreactor landfills and or landfills with controlled liquid additions conducted to promote and accelerate biological decomposition of wastes; which has added to operational responsibilities and regulatory challenges. Finally, the new regulatory focus on controlling greenhouse gases (GHG) has added new challenges and opportunities for sanitary landfills. The following provides SWANA's perspective on each of these important issues in support of its overall policy.

##### **A. Life Cycle Analysis**

Life cycle analysis (LCA) is a means of evaluating the energy use, environmental emissions and cost of alternative MSW management practices. As communities make choices about implementing integrated solid waste management systems, planners need to understand the relative impacts of landfilling as compared to alternative practices. A landfill's environmental impact should be evaluated based upon life cycle analysis when comparing landfill performance to alternative practices.

##### **B. Third-Party Agreements**

Multiple owners and/or operators may be responsible for sanitary landfill operations. For example, the landfill could be owned by a municipality, the landfill gas collection system operated under a separate services contract, and the energy facility owned and operated by a completely separate private party. At a minimum, third-party agreements should be used to establish the basic responsibilities of environmental compliance by the multiple parties involved.

**C. Bioreactor Landfills or Landfills with Accelerated Biodegradation**

Bioreactor landfills and landfills with liquid addition conducted to promote and enhance biological decomposition can offer significant benefits with respect to environmental performance despite numerous technical and regulatory challenges. These benefits include accelerated stabilization of waste, recapture of airspace gained due to degradation and settlement of waste, reduction in magnitude of settlement following closure and lessening impact on the performance of the final cover system, reduction in leachate treatment and disposal costs during operation of the bioreactor, and potential to shorten the post-closure period. Several projects implementing these practices have been operated with varying degree of success. In general, the practical gains of gaining landfill gas reuse from the early years from landfills employing such practices needs to be evaluated against increased capital and operating efforts and costs to construct and operate these systems (leachate and or landfill gas systems) to make a site-specific determination of cost-benefits as well as environmental risks and operational efforts.

**D. Greenhouse Gas Regulations**

Over the last decade, focus on climate change has resulted in numerous regulatory programs throughout the U.S. and Canada that are in various stages of development. Although heavily regulated, landfills remain the third largest source of methane in the U.S. even though as an industry, landfills have reduced methane emissions by more than 30% since 1990. Landfills can be designed and operated to provide significant GHG benefits through capture and management of methane, and production of renewable energy. Federal and state programs have assisted landfill owners and or operators to implement beneficial landfill gas reuse programs.

CERTIFIED to be correct and complete statement of the approved policy.

UPDATED and APPROVED by the International Board  
on the 4<sup>th</sup> day of May 2018



Brenda A. Haney, P.E.  
International Secretary

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