Composting Food Discards at the
1999 Special Olympics World Summer Games

After Action Report
Composting Subcommittee
Logistics/Waste Services Committee

INTRODUCTION

The 1999 Special Olympics World Summer Games were held in the Raleigh-Durham-Chapel Hill area of North Carolina from June 26 through July 4. This international event drew 7,000 athletes and 3,000 coaches from 150 countries to compete in 19 different sports. In addition, over 35,000 local area volunteers were recruited to help put the Games together and to provide a comprehensive support program for the athletes, coaches, and families.

Logistical planning for this event began several years ago. In mid-1998, representatives of the Special Olympics Games Organizing Committee (GOC) requested a meeting with local area solid waste and recycling professionals to discuss the logistics of solid waste management at the Games. Over the course of the following year, three separate committees of professionals were assembled, one each for solid waste disposal, for recycling, and for food discards composting. The GOC was particularly interested in recycling and composting, as they wanted to leave a legacy of trying to minimize the adverse environmental impact of this event on local solid waste management systems.

PLANNING PROCESS

The Composting Subcommittee met monthly from January 1999 until June 1999. Committee members included:

Craig Coker, NC DENR/Div.of Poll. Prevention & Env. Assistance (chair)
Cindy Salter, Organics Matter/The Removable Feast
Eric Lopez, Regional Logistics Manager, GOC
Ivan Dickey, former Solid Waste Manager, NC State University
Lee Barber, The Removable Feast
Ron Alexander, R. Alexander Associates
B.J. Tipton, UNC – Chapel Hill Office of Waste Reduction & Recycling
Barry Barker, WebOfferings
Molly Beacham, Town of Chapel Hill
Jean “Chip” Dodd, Browning-Ferris Industries
Norm Wood, Waste Industries
Rhonda Sherman, NCSU Dept. of Bio and Ag Engineering

The subcommittee prepared an operations plan for composting during the Games. The operations plan spelled out the logistical details of food discards collection, transportation, composting, and compost use. Financial support for the program was obtained from the

Division of Pollution Prevention and Environmental Assistance (DPPEA) in the North Carolina Department of Environment and Natural Resources (DENR).

The objectives of this composting project were to:

- Evaluate the technical and economic feasibility of diverting pre-consumer and post-consumer food discards from the landfilled solid waste stream;
- Demonstrate viable recipes for composting food discards with wood wastes, leaf mulch, and/or ground yard waste to produce a high-quality compost;
- Utilize the resulting compost in local plantings for public display and educational activities; and
- Provide a case study in special events composting to supplement a guidance document in preparation by a contractor to DPPEA

Project planning included detailed evaluations of the Special Olympics plans for feeding visiting athletes and coaches, selection of the collection containers to be used for food discards collection, preparation of signage for containers, development of a web page about composting and recycling, and obtaining Solid Waste Composting Demonstration Permits from the Division of Waste Management, NCDENR. This planning process also included developing a "flow plan" for food discards. This plan addressed the questions of what to divert, how to divert it, the roles of volunteers, the placement of the collection containers, the movement of the containers from the kitchens to the composting sites, the unloading and mixing procedures at the composting sites, and other factors. Implementation of the composting operations plan was to be handled by DPPEA, and its subcontractor, The Removable Feast (Durham, NC).

PROJECT IMPLEMENTATION

During the Summer Games, Olympians were housed at three area universities (North Carolina State University (NCSU) and Meredith College (in Raleigh) and University of North Carolina (UNC) at Chapel Hill). The athletes, coaches, staff, and volunteers used the universities' dining halls for their meals. Meals were served from 5 AM to Midnight from June 24 through July 5, 1999. The number of meals served daily was much greater than the normal school-year number of meals served at NCSU
(10,000 meals per day as opposed to 4,500 meals per day during the school year). The number of meals served at Meredith and UNC were similar to normal servings. The Special Olympics established menus in advance, and food service was all-you-could-eat buffet style with disposable paper plates, cups, and cutlery.

To accomplish this food discards diversion; a pool of 62 volunteers was assembled. Volunteers were drawn from state government, local recycling associations, and local high school environmental clubs. These volunteers were separate from the main pool of 35,000 Special Olympics volunteers. Volunteers were assigned to one or more of the three dining halls and were organized into 3-hour shifts, a lunch shift from 11:30 – 2:30 and a dinner shift from 5:30 – 8:30. Breakfast and late dinners were not included in the project at NCSU, due to logistical constraints with the dining halls and a lack of adequate numbers of volunteers. These other meals were captured at Meredith and UNC as the kitchen staff helped with the diversion. The food discards collection effort was managed by three Diversion Coordinators (one at each dining hall). Cellular telephones were used by the Diversion Coordinators to communicate with each other and with the Logistics Department.

FOOD DISCARDS COLLECTION

Separation of compostable food discards from non-compostable items was accomplished at diversion stations established in the proximity of tray-return areas and dishwashing rooms. Volunteers and dining hall personnel staffed these stations. The original intent was to encourage athletes to participate in the separation process. Due to space and time constraints, however, this approach was abandoned for a more practical one in which volunteers and dining hall staff received the trays and placed materials in the appropriate containers. Unfortunately, this approach limited the amount of interaction with athletes but allowed rapid sorting of the waste stream. Figure 1 depicts the diversion station at Lenoir Dining Hall at UNC-Chapel Hill.

Figure 1

Food discards were collected in 40-gal. wheeled Zarn containers (lined with 45-gal. 100% recycled black plastic bags). These containers were labeled with the Special Olympics recycling logo and a food waste-to-compost graphic illustration (Figure 2). The disposable products used by the dining halls contained both poly-coated and non-coated plates and bowls; the cutlery was all plastic. Some small paper plates were included in compostables (Chinette brand of non-coated paper plates); but most were not taken due to wax/poly coatings. Larger dinner plates (Chinette 9 ¼" dinner plates) were taken at first, but later not included due to their effect on compost mix C/N ratios, their effect on mix moisture content, and the potential to blow around on site. Compostables also included paper napkins.

Figure 2

Full containers were transported to two compost sites (one at NCSU operated by DPPEA and NCSU staff, and one near UNC-CH operated by The Removable Feast) in 15-

ft. box trucks equipped with hydraulic lift gates rented by Special Olympics and made available for this project. For the NCSU compost site, the truck was weighed after each meal using MD-500 portable truck scales (capacity of 20,000 lbs) borrowed from NC Division of Motor Vehicles. For the UNC compost site, individual containers were weighed using a Pelouze heavy-duty postal scale (400 lb capacity). The total amount of food discards transported to the NCSU site was 13,888 pounds; the amount diverted to the UNC compost site was 7,736 pounds, for a total diversion of 21,624 pounds (10.8 tons). Table 1 lists the weights by day for each site.

Table 1

Date	MEALS SERVED	FOOD DISCARDS (LBS) NCSU/Meredith	COLLECTED UNC - CH	Total
6/24/99	2,340	430	389	819
6/25/99	14,405	1768	488	2256
6/26/99	16,772	815	353	1168
6/27/99	16,614	1630	549	2179
6/28/99	17,885	1768	1271	3039
6/29/99	17,147	1380	950	2330
6/30/99	17,605	1780	865	2645
7/1/99	17,504	1556	917	2473
7/2/99	17,876	1493	914	2407
7/3/99	16,221	1268	1040	2308
Totals		**13888**	**7736**	**21624**

COMPOSTING AT THE NCSU SITE

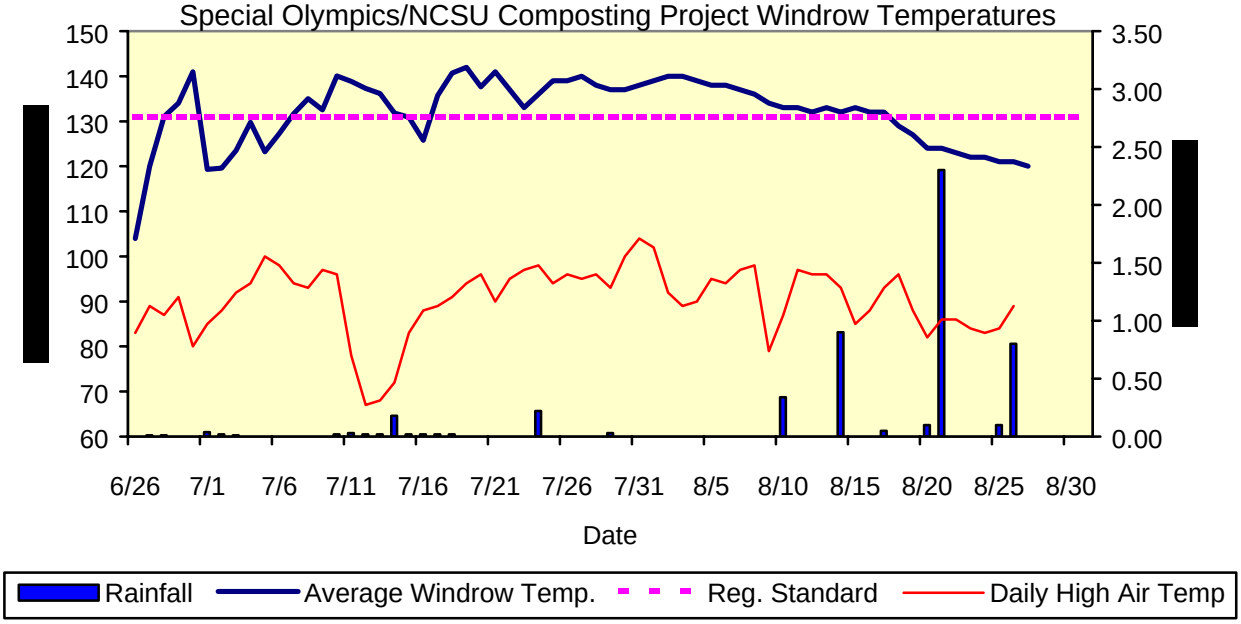
The site is located at Centennial Campus in Raleigh, and is normally used to produce mulches from campus and municipal yard waste. The compost mix at the NCSU site consisted of food discards, partially composted leaf mulch from leaves collected on campus in 1997, and ground, screened wood waste from campus landscaping (screened to a 1” minus mesh size). Figure 3 illustrates the nature of the waste stream.

Figure 3

The bulking agent (leaf mulch and wood waste) was added to the food waste at approximately a 5:1 volumetric ratio. Food wastes from each meal were dropped off on 6" wood mulch base, debagged, spread evenly (contaminants removed), and covered with 6" layer of leaf mulch. Approximately 200 gallons of water were added after each layer (food wastes & leaf mulch). Four meals (four layers) were added to the mixing pad over two days. Materials were mixed with a Wildcat Model FX 700 PTO Turner (pulled by Ford 9030 Tractor). Mixed materials were reformed into a windrow on 6" layer of wood mulch with Ford 755A Backhoe Loader. Windrows were covered with 3-4" layer of wood mulch (1"- ground and screened wood waste).

Composting temperatures at the NCSU site exceeded the regulatory requirement of a minimum temperature of 131^{o} F. for 15 days. Figure 4 shows the average windrow temperatures at the NCSU site as well as daily high air temperatures and rainfall recorded at a nearby weather station.

Figure 4



COMPOSTING AT ORANGE COUNTY SITE

The Orange County composting site is located at the Orange County Regional Landfill in Chapel Hill. The site was approximately 4,000 s.f. (40x100) and fenced to prevent windblown litter from entering or leaving the site.

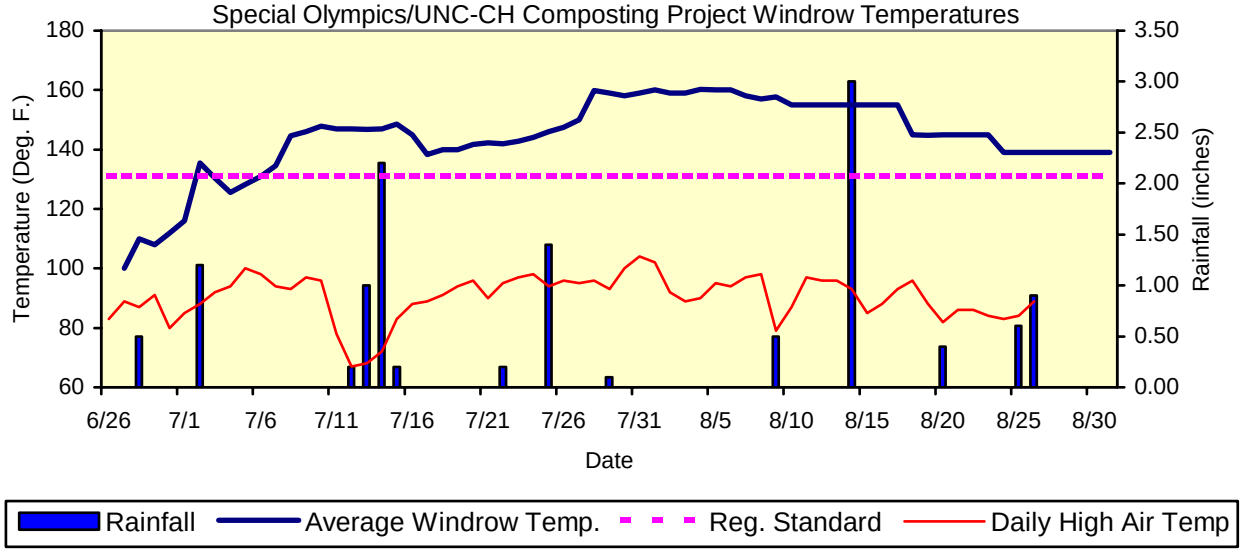
Food wastes were removed from bags, spread out on a 6" base of ground yard waste supplied by the Town of Chapel Hill, and inspected for contaminants. Because paper plates and cups used at Lenoir Dining Hall were plastic coated (hence not fully biodegradable), they were not included in the diversion program. Another significant difference in the composition of food discards from Lenoir Dining Hall is attributed to the inclusion of unserved food from the serving lines and food preparation areas.

After contaminant removal (mostly plastic cutlery), the food discards were mixed with the ground yard waste base using a Bobcat 863 bucket loader and formed into a pile. The yard waste bulking agent was added to the food discards at a volumetric ratio of approximately 2.5 to 1. A total of 3 piles were built over the course of the Summer Games. Each pile was approximately 8-9' wide, 14' long, and 3-3.5' high. Following the attainment of the regulatory requirement for minimum temperatures, the piles were combined. Figure 5 depicts the nature of the food discards collected at Lenoir.

Figure 5

Composting temperatures at the Chapel Hill site also exceeded the regulatory requirement of a minimum temperature of 131^{o} F. for 15 days. Figure 6 shows the average windrow temperatures at the Chapel Hill site as well as daily high air temperatures and rainfall recorded at a nearby weather station.

Figure 6
Special Olympics/UNC-CH Composting Project Windrow Temperatures



COMPOST UTILIZATION

Planned uses for the finished food compost are focused on commemorative landscape plantings to honor the 1999 Special Olympics World Summer Games at NCSU's J.C. Raulston Arboretum and around the Bell Tower on central campus, and tentatively at UNC-CH's Botanical Gardens.

PROJECT ANALYSIS

Implementation of this food discards diversion and composting project required coordination with a large number of people, organizations, and governments. As with any waste management project, there were several areas where implementation was successful and several areas where improvements could be made.

Overall, the project was very successful, diverting nearly 11 tons of food discards from Special Olympics athletes, coaches and volunteers to composting. The project would not have been successful without the cooperation of the Logistics Department of the Games Organizing Committee, NC State University (both Grounds and Food Service), UNC, Orange Regional Landfill, and the Town of Chapel Hill.

The Logistics Department of the GOC was instrumental in many areas of project planning: actively encouraging support of the project, providing storage space in the Warehouse, providing trucks for food discards transport, and providing AmeriCorps volunteers to help. The staff of NC State University's Grounds Department provided the composting site; use of their composting equipment, and labor to help with the food discards mixing and composting activities. The staff of Meredith College's Belk Dining Hall and UNC's Lenoir Dining Hall helped with the food discards collection. The Town of Chapel Hill provided a temporary site at the Orange Regional Landfill for composting food discards from Lenoir Dining Hall.

From a technical perspective, the use of the 40-gal. Zarn carts with recycled-content plastic bag liners were an effective means of moving food discards through crowded dining halls during the Games. Using volunteers and training dining hall staff to control separation of food discards at diversion stations greatly reduced the potential for contamination with non-compostables. The use of 15-foot box trucks with lift gates (provided by Logistics) were an efficient means of transportation for filled food discard containers, but smaller trucks could have served the purpose as well. No incidents of spillage or leakage were reported.

At both composting sites, the composting process worked extremely well, with no problems reported with vectors or vermin, nor with odors. The composting mix recipes used, while different at the two sites, were successful in raising composting temperatures to the thermophilic range quickly, and both sites met the regulatory requirements for pathogen destruction.

If the decision is made to implement food discards composting at future Special Olympics, there are several areas where planning and attention could improve the success of the project. These include:

- Adopt a policy of “zero waste” generated during the Games;
- Evaluate the suitability of host facilities for food discards composting in the initial planning activities for future Games;
- Establish working relationships with appropriate State and local government staff (and host University staff as applicable) very early in the planning process. Determine permitting requirements as soon as possible;
- Integrate food discards composting into the overall Food Service Committee planning for the Games;
- Integrate composting volunteer needs with the overall Games volunteer program to ensure coverage during all times when meals are served;
- Inform attending Olympians about composting and recycling several months before the Games begin;
- Ensure all chains of command at host universities and host communities are informed about the composting project through multi-level dialog between GOC (Food Service & Logistics) and hosting organizations;
- Devote time during Games planning to train dining hall staff on food discards source separation;
- If possible, ensure that Olympics dining halls have sufficient space to store filled containers in refrigerated or climate-controlled areas (to reduce the frequency of discards pick-up) and that loading docks are large enough to handle both incoming food supplies and outgoing food waste trucks, alternatively, use refrigerated trucks or temporary refrigerated trailers;
- If possible, use washable tableware during meals in dining halls. Otherwise, the Food Service Committee should attempt to procure biodegradable disposable plates, cups, and cutlery (i.e. non-plastic, non-wax coated, and non-poly coated); and
- Make sure food discard collection containers and diversion stations have clear, multi-lingual signage to educate, inform, and ultimately to reduce contamination of the food discards with non-compostable items.

PROJECT COSTS/BENEFITS

Project costs for food discards composting include costs incurred by the GOC and costs incurred by outside sponsoring and cooperating organizations. Data is only available for those costs incurred by the North Carolina Division of Pollution Prevention and Environmental Assistance:

Subcontractor services	$ 16,140.00	
Food discard collection carts	2,263.73	
Labels for containers, signage	4,189.12	(includes recycling bins)
Container liners	396.71	
Brochure color copies	742.00	
Volunteer buttons	121.90	
Compost testing (estimate)	500.00	
Total composting project costs	$ 24,353.46	

These costs also do not include the “labor costs” of the volunteer pool working on the composting project. The 62 volunteers working on the project invested about 900 person-hours of time. Several of these cost elements can be avoided in future Special Olympics. If

volunteers are assigned from the large pool of Games volunteers, some of the subcontractor services costs can be reduced. With sufficient lead time and planning, the costs for labeling and signage can be greatly reduced (the costs shown above reflect rush charges to meet rigid deadlines). The brochures to educate athletes, coaches, and delegation assistants could be done without incurring color photocopying charges.

The above costs also do not reflect the actual cost of composting equipment, except what is included in subcontractor services for the UNC-CH site. The cost of composting equipment at the NCSU site was absorbed by the existing operation. If an existing operation and/or equipment is not readily available at future Special Olympics, the operational costs will be greater than reflected above.

The costs for composting food discards at the Special Olympics were extremely high relative to normal costs for food discards composting. The major reason for this was due to the lack of a food discards composting infrastructure in North Carolina. Had there been an existing facility that could have taken these special event wastes in addition to normally-diverted food discards, the operational and capital costs would have been much lower.

In North Carolina and beyond, this project set an important environmental management precedent. Benefits of the project go beyond the successful diversion of nearly 11 tons of food discards from North Carolina landfills. Perhaps the most important benefit is the institutional knowledge of food discards composting gained by the Games Organizing Committee and the hosting universities. This acquired knowledge, including identification of barriers to composting at major international athletic events, enables Special Olympics and other organizers to pursue composting at future events with a higher level of confidence and efficiency.