



SPERLING
HANSEN
ASSOCIATES

THE CRYSTAL MOOSE NEWS

North Vancouver, B.C.

February 2003



Dr. Tony Sperling, Editor

GREETINGS, and welcome to our semi-annual Newsletter. 2002 was a particularly memorable year at SHA. Foremost, we have added a number of super staff who have really expanded our technical capabilities. They include Tom O'Connell, a senior Civil Engineer formerly from Kerr Wood Leidal Associates and Dennis Trammell, who brings to SHA over 25 years of solid waste management experience as Director of Solid Waste Operations for King County in Seattle. Having the extra depth has allowed us to tackle some really diverse and complex solid waste engineering projects. Many of those projects are described in the Projects Around B.C. section of this newsletter. Our LANDFILLFIRE.com initiative has really taken off as well. I have had an opportunity to travel extensively as a result and to meet some really special people in New York, Nova Scotia, and Calgary, amongst others. A fire project in Malta is looming on the horizon. Everybody at SHA is volunteering to go.

I hope to see you all at the upcoming SWANA Northwest Regional Symposium. SHA will be sponsoring the awards luncheon on Thursday, April 3rd at which time I will have the great pleasure to present three Crystal Moose Awards for Most Improved Landfill in Northern B.C., most improved landfill in Southern B.C. and the Best Landfill in B.C. Hope to see you there.

The Fourth Annual Indian Arm Thigh Burner:

by Sharon Tenenbaum

What do you get when you cross 40 eager bike riders with 30 km of scenic BC mountain trail, a beautiful fall day and a salmon barbeque? Did you say the Tour de France? You're close, it's SHA's annual Indian Arm Thigh



Sharon Tenenbaum

Burner from Squamish to Indian Arm. This year's event took place on Sept. 21, 2002 and participation soared to 40 riders this year, up from 15 in 2001.

We opened up the event this year to less experienced riders by using trucks to transport people to the top of the 3,000' high pass below the Sky Pilot massif. However, most took up the challenge and rode or pushed



Poul Hansen

their steeds to the top. Paul Henderson even towed his son Ben up in a trailer. From there, it was an easy 20 km downhill coast to Wigwam Inn at the head of Indian Arm with numerous scenic viewpoints along the way. Thanks to all riders who helped raise \$1,500 for Linda Carney's memorial fund at the Squamish Rotary. Once again the ride finished with a much welcomed rest and salmon barbeque social at the Sperling waterfront home on Indian Arm.

The fifth annual Thigh Burner will take place on September 20, 2003. If you want the full burn or you just want to tough it out for the barbeque afterwards, please give Tony a call or drop an email to book your spot. The cost of the event is by donation (\$25 to \$50), with all proceeds going directly to charity.



Barge crossing on Indian Arm

Foothills Boulevard Regional Landfill:

By Tom O'Connell



Tom O'Connell

In 2002 SHA, in association with Golder Associates and Emco Engineering, completed the design for the Progressive Closure and Landfill Gas Management System for the Foothills Blvd. Landfill. The project included capping the old landfill, installation of a landfill gas (LFG) collection system, construction of a LFG flare station, and a leachate collection and recirculation system. Construction was completed in the summer of 2002 by Wayne Watson Construction, with SHA's Barry Munro providing on-site inspection services, and Derek Bates and Jim Martin from the Regional District of Fraser-Fort George providing project coordination.

The project included the closure of about 53,400 m² of landfill. A textured linear low density polyethylene (LLDPE) geomembrane, over a 300 mm compacted clay layer, formed the final cover barrier.



Sixteen landfill gas extraction wells were installed and connected to two 20-HP blowers which created the suction on the gas wells. The blowers discharge the LFG to a 12.2 m high flare stack. A slotted HDPE leachate collector pipe was installed as the base of the landfill. Collected leachate along with gas condensate are pumped to the top of the landfill to four infiltration cells. The leachate recirculation provides leachate disposal as well as helps to keep the solid waste in an active state of decomposition in order to maintain methane gas production levels.



The flare has been operating since December 21, 2002, with a flow of about 250 cfm and a methane concentration of around 45%. The flare burns the methane and provides over 98% efficiency in the destruction of non-methane organic compounds (NMOC). Methane is a critical greenhouse gas (GHG). By flaring the LFG, a significant reduction in GHG emissions is achieved. Methane is about 21 times more destructive than carbon dioxide (CO₂) relative to the generation of GHGs. Therefore the LFG collection and flaring project represents a major reduction in GHG emissions. The RDFFG effectively negotiated project funding based on selling the GHG credits to the Federation of Canadian Municipalities.



Training News and Upcoming Events

By Dennis Trammell



Dennis Trammell

In 2002 our LANDFILL FIRE.com training team presented full day training sessions for landfill and fire department staff at Brookhaven Landfill in New York, the Calgary Fire Department and most recently in Truro, Nova Scotia for twenty-seven solid waste and fire fighting staff employed by Municipality of Colchester County. Following a full two days of lectures, class projects and case histories, students gained the ability to design and implement their own Fire Risk Management Plan. Individual lessons included all the elements needed to implement a fire plan such as identifying resources, implementing a command structure and a special session on fire prevention and minimizing fire risk at their facility.



Fire at Colchester Balefill in September 2002

SWANA Northwest Regional Symposium to be Held in Richmond This year the Regional Symposium is hosted by the SWANA British Columbia Pacific Chapter and will be held at the Best Western in Richmond, April 3-4, 2003. This eighteenth Symposium, alternately hosted by the Oregon, Washington and British Columbia Chapters is an opportunity for northwest solid waste professionals to gather, share information and participate in training events.

This year, the BC Chapter is offering three different training programs. SWANA's **Manager of Landfill Operations Course** is designed for individuals who manage or inspect landfills. Open to both public and private solid waste management professionals, the primary audience is landfill managers and landfill enforcement officers. The intensive curriculum includes both classroom and field instruction. Qualified participants passing a final exam will receive certifications by SWANA, valid for three years. The Course is offered March 31st through April 3rd at the Richmond Best Western. The course will be instructed by Dr. Tony Sperling, Dennis Trammell and Paul Henderson.

SWANA C&D Waste Management Certification Course [March 31 - April 3, 2003] - This course is designed specifically for individuals who manage local solid waste operations and would like to add C&D waste processing, who want to establish commercial operations in the private sector or who would like to upgrade their existing practices. This

relatively new SWANA offering will be taught by Stuart Sommerville.

Communicating in Crisis [April 2, 2003] - This one-day workshop is designed for individuals that are required to deal with the media on regular basis. The workshop will focus on managing communications in the event of a crisis. It is not specific to solid waste and is applicable to anyone in the public and private sector.

Additional information about the Symposium and the training events can be obtained by contacting SWANA BC or from the website at <http://www.ecowaste.com/swanabc/>

All technical training courses will take place at the Best Western Richmond Hotel and Convention Centre, Richmond, British Columbia.

SHA and the City of Kelowna are offering a FREE Landfill Operations Course on May 8 and 9th in Kelowna.

As part of our ongoing commitment to advance the state of landfill operations in BC, SHA has teamed up with the City of Kelowna to offer a comprehensive, made in BC Landfill Operations Course. To give Gordon Light the opportunity to book adequate teaching facilities, we need to know how many of you are interested in participating in this unique opportunity to bone up on your landfill operating and management skills. The training will involve two full days of lectures, practical exercises, and the latest information you need to improve operations, reduce costs and make your landfill more efficient. If you are interested in attending just give Tony or Dennis a call or e-mail us at Sperling@sperlinghansen.com.

the organic waste fraction in your garbage? Since our office doesn't have any possibilities to have an outdoor composter, we had to find a different solution. The most viable option for a small office like Sperling Hansen was to use an indoor worm composter.

After some research it was agreed that we would try the red wiggler option, even though the line-up of volunteers needed for the care of the worms was rather short.

North Shore Recycling kindly donated a used "Can of Worms" composter which consists of a cylindrical bin made up of three trays.



Red wigglers



David filling a tray in the SHA "Can of Worms" composter

Waste Jokes...

A camping expedition got lost, then spent several weeks hiking over snow-covered peaks, across flower-strewn alpine meadows, and sparkling, trout-filled brooks, until finally an automobile junkyard flanked by a smelly mountain of trash tires appeared around the bend. "At last", gasped the expedition leader, "civilization."

A garbage man was walking along the sidewalk whistling and balancing one bin on his head and two more on his shoulders. A woman asked the man, "How do you manage to do that?". The garbage man replied, "It's easy, you just put your lips together and blow".

Organic waste reduction

By David Kvick

After performing two waste composition studies in the Lower Mainland and one in Victoria in 2001, it became clear to us that the organic waste fraction in our garbage is bigger than ever. The three studies concluded that the organic waste fraction in the region is more than 40% of the overall waste stream. So, what can you do to reduce



David Kvick

The following website has lots of good advice in setting up and running a worm composter.

<http://www.cityfarmer.org/wormcomp61.html#wormcompost>
Starting up a worm composting "facility" is rather simple; all you need is a suitable location for your composter such as a storage room, food waste (no meat or dairy products) and the right amount of worms. Your local recycling organization should be able to direct you to a local supplier. The following link has an extensive list of worm suppliers in case you have trouble finding one locally.

<http://www.cityfarmer.org/wormsupl79.html#wormsupplies>

Once the composter is set up, you only have to feed your works once a week, or even once every second week, depending on how much food waste you have, so the maintenance is very low.

We have operated our office worm composter for 25 weeks, with a bare minimum of maintenance. Once one tray is full with food waste, you just add another tray. After the three trays have been filled (8-10 weeks) you should be able to remove the bottom tray that should contain dark compost material that you can use in your garden. By introducing the worm composter to our office, we have managed to reduce the amount of waste we normally would have thrown in the dumpster by more than **40%**. By recycling newspapers, office papers, glass and plastic and finally most of the organic waste,

we manage to “recycle” more than 85 % of the waste in the office.

Go for it! You too can reduce the amount of waste going to the landfills, all it takes is a few minutes per week. Please feel free to contact David if you have any questions about worm composting.

Staff Changes at SHA:



Tom O'Connell

Tom O'Connell joined Sperling Hansen Associates in June 2002 as a senior environmental & civil engineer, and vice president. Tom has worked on a full range of civil engineering projects including transfer

stations, landfill expansions and closure projects, landfill leachate control systems, wastewater treatment plants, wastewater conveyance systems, septage disposal facilities, outfalls, pump stations, and odour control systems. His experience includes conceptual planning through to detailed design and construction management.



Anne Pataky

If you call SHA in the morning you will likely be greeted by Anne Pataky's English accent. She joined the Sperling Hansen team in November 2002, as an office assistant. Anne comes with many years experience in the computer operations area including a sound background of office procedures.

Anne returned to the working world after taking two of years off. She is enjoying working in a smaller office with the diversity that it brings. Most weekends you can find Anne either out on the water or at a soccer match as she has two sons 13 and 18 who both sail and play soccer at a highly competitive level. During her time off she traveled to China with her 13-year-old son Mark who sailed for the Canadian National Team in Qingdao. Her family have spent many summer holidays cruising and exploring the Gulf Islands and Desolation Sound in a 27' sailboat.

Landfill Closure Planning and Costs.

by Tareq Islam



Sperling Hansen Associates has been involved in landfill closure planning, design and cost estimating for many landfills in British Columbia. In this article, actual landfill closure costs in several BC landfills are elucidated. There are several key factors that influence the overall cost of the construction. The significant

parameters include the type of barrier layer and whether the landfill closure requires a toe berm or a gas collection layer. Three basic types of closure systems have been designed by Sperling Hansen Associates on past projects. These include clay covers, membrane covers and composite covers (combination of both clay and membrane). Sand has been used on one occasion.

The per-unit cost of the clay cover system is generally more cost effective than the membrane cover system although it is not as effective as a geomembrane in reducing leachate generation. The cost of the clay cover also depends on the availability of the clay source. If clay has to be imported from a distant source, then a membrane solution may become attractive. Recently, SHA has started using double textured LLDPE (Linear Low Density Polyethylene) membrane instead of a PVC (Polyvinyl Chloride) membrane in our membrane and composite designs. The key advantage of LLDPE is that the texturing is much more aggressive than PVC, allowing for steeper side slopes to be used. Also LLDPE membrane costs less than PVC membrane. The cost of the closure also depends on the size of the area to be capped. The bigger the size of the landfill cover, the lower the unit price of the closure system due to the economy of scale.

Table 1 shows actual and unit closure costs for several landfills for which SHA has completed design work. The table does not include the cost of landfill gas collection systems.

Table 1

Landfill	Year	Area (ha)	Cap Type	Gas Layer	Toe Berm	Cost	Unit Cost (Per m ²)
Hartland South Face	1995	2.5	PVC / Clay	Yes	Yes	\$1,044,909	\$41.80
Hartland North Face	1996	5.2	PVC / Clay	Yes	Yes	\$1,845,071	\$35.48
Savona	1996	0.6	Sand	No	No	\$46,317	\$7.72
Knockholt	1997	0.2	Clay	No	Yes	\$196,874	\$82.03
Campbell Mountain	1998	0.6	Clay	No	Yes	\$172,831	\$27.88
Hope	1998	0.5	Clay	No	Yes	\$234,877	\$51.06
Nanaimo	1999	0.7	PVC / Clay	Yes	Yes	\$304,072	\$46.42
Nanaimo	2000	0.5	PVC / Clay	Yes	Yes	\$360,463	\$80.10
Iona	2000	0.9	LLDPE / Clay	No	No	\$180,108	\$19.37
Logan Lake	2000	2.5	Clay	No	No	\$238,750	\$9.55
Nanaimo	2001	0.8	PVC	No	Yes	\$286,878	\$35.86
Prince George	2002	5.3	LLDPE / Clay	Yes	Yes	1,643,971	\$30.81

Our consulting team is rounded out by...

Dr. Tony Sperling,	Sr. Geotechnical Engineer
Poul Hansen,	General Manager
Tareq Islam	Engineer (Civil / Environmental)
David Kvick,	Engineering Assistant
Todd Baker	Engineer (Civil / Environmental)
Sharon Tenenbaum	Engineer in Training (Civil)
Barry Munro	Chief Draftsman & Surveyor
Dennis Trammell	Sr. Solid Waste Specialist
Aljeh Sperling	Administrator

Projects Around B.C.

2002 has been busier than ever with interesting projects all around B.C. Some highlights include:

Resort Municipality of Whistler: This fall SHA completed the design on the fourth lateral expansion of the Whistler Landfill. The expanded facility will extend the landfill lifespan to 2008. The fully lined expansion design incorporates a number of innovative features including a large stream diversion that passes directly beneath the liner system. With Whistler's 2010 Olympic Bid gaining momentum, Brian Barnett, Marvin Fisher and James Hallisey from RMOW are exploring end use options for the facility that include a large parking area, a golf course, even green space buffers for a proposed Olympic Village.

District of Squamish: The Squamish Landfill is undergoing some major changes. The operating strategy is being switched from a trench type operation to an area fill. By utilizing available air space on top of the existing landfill, the facility lifespan is being increased by another 15 years.

The final trench was excavated this summer by Carney's Waste Systems. Clay excavated from the trench was used to implement final closure on all completed side slopes. A leachate recirculation system was constructed at the base of the trench to facilitate disposal of treated leachate from the planned expansion area.

Carney's is moving forward to implement an in-vessel composting facility at Squamish that will be able to compost food waste, yard-garden waste and ground up wood products into a quality compost. The facility will increase the recycling rate in the Squamish Whistler corridor well above 50%.

R.D. of Bulkley Nechako: Glenn Herold, Janine Foisy and Kyla Pratt are working hard to implement an integrated solid waste management system in the RDBN. This summer, a large clay lined expansion area was prepared at the Knockholt Landfill. As well, a new transfer station was constructed in Fort St. James. Work is proceeding on development of the eastern regional landfill facility near Vanderhoof and a transfer station in Burns Lake.

R.D. of Nanaimo: The Nanaimo Landfill continues to be upgraded. Carey McIver and David Leitch are leading an enthusiastic team that is turning the landfill into a model facility for medium size operations in B.C. An excellent training program has been implemented for all staff. Extensive landscaping work has been completed to make the facility attractive for all customers. Progressive closure has been implemented on all completed side slopes. An innovative expansion is being contemplated for 2004. Look for more details in our next newsletter.

Capital Regional District: The Hartland Landfill continues to set an example as B.C.'s most innovative facility under the direction of Chris Riddell and Nigel Lomas. New this year is a vacuum truck for picking up litter from catch fences. As well, Jerry McIntosh and Larisa Searle of the engineering group are working on ways to improve methane recovery at the facility. They are also working towards B.C.'s first

Bioreactor test cell. Research is being focused on the development of a leachate mound within the refuse, something that was not expected with Hartland's gravel intermediate cover.

Cariboo Regional District: The landfill search at Cariboo Regional District has identified Gibraltar Mines as the next regional landfill site. Landfill development will commence on top of an existing waste dump at the mine site. The project is being spearheaded by Mitch Minchau, CRD's Solid Waste Coordinator and Bob Patterson from Gibraltar Mines Ltd. SHA is currently working with CRD and Gibraltar Mines in designing a fully lined engineered landfill site that will exceed U.S. EPA Subtitle D regulations. It is expected to be a flagship facility. Construction is scheduled to commence this summer, with the facility commencing operations by October of this year.

R.D. of Fraser Fort George: Derek Bates and Jim Martin have been very busy upgrading the Foothills Boulevard Landfill into the most advanced landfill facility in Northern B.C. Tom O'Connell has described this project earlier in this newsletter.

District of Hope: Phase 1 of a large lateral expansion was completed at Hope Landfill in the Summer of 2002 under the direction of Scott Misumi and James Storey. Phase 2 of the expansion is scheduled to be completed this summer. As well, Hope has secured additional buffer property on the south side of the landfill that will permit the scale facility to be relocated and a new permanent haul road to be developed into the landfill site.

City of Vancouver: SHA has recently been awarded a contract by the City of Vancouver to prepare a comprehensive closure plan for the western 100 acres of the landfill crest. The objective of the project is to develop a versatile end use plan for the area that will sculpt flat landfill crest into a landscaped landform that can be converted into a championship golf course, a nature park, or a tournament facility. SHA will be working on this project with Golder Associates, Sharp and Diamond Landscape Architects, Golf Design Services and Sylvis Environmental.

District of West Vancouver: To protect salmon resources in the Capilano River The District of West Vancouver retained SHA to design a leachate interceptor system for the former 3rd Street Landfill, now known as Hugo Ray Park. Leachate is intercepted in a PVC flume and then diverted to the GVRD sewer. Because sewer capacity is limited, an upstream clean water diversion pipe was installed. Also, because run-off during intense storm events is highly diluted, an engineered overflow has been designed and permitted to allow for continued discharge of a portion of the peak run-off into the Capilano River.

Norampac Paper Mill: Norbert Lacis has been spearheading a major upgrade at the Norampac Landfill next to the GVRD Incinerator in Burnaby. A blacktop lined leachate interceptor ditch is being constructed to convey leachate into a large LLPDE lined settling lagoon. From there, leachate is pumped into the mill's effluent treatment system.

Tareq Islam receives P.Eng. Designation

Tareq Islam recently became a registered professional engineer. Tareq completed the five year Engineer in Training Program and exams with flying colours. SHA staff helped Tareq celebrate this accomplishment on Tuesday, February 11th. Congratulations Tareq!!!



Life at SHA is Nothing But Work.

Not true!!! SHA staff dispersed around the world in 2002. David Kwick and his wife Annie completed an epic trip to New Zealand, with a brief visit to Fiji en route. Sharon Tenenbaum returned to Israel to visit family and to network on possible projects there. Todd Baker completed a whirlwind tour of Europe, with stops in France, Germany and Switzerland. Tareq Islam and his family travelled to Bangladesh to show of their young son to family and friends. After months of being separated while Barry Munro inspected at the Foothills Boulevard Landfill, Barry and his wife Susan went on well earned month long trip to Thailand.

After getting hooked on CAT skiing during a trip to Powder Springs with Paul Henderson, Chris Underwood, John Evans and Brian Davies from the City of Vancouver in 2002 Tony couldn't pass up the opportunity to go again. This year, Tony tried to keep up with Owen Carney, his son Mike (formerly a member of the Canadian National Ski Team) and Paul Kindree (formerly a professional Back Country Ski Guide) and a pack of Weasel Workers (volunteers who prepare the Olympic Downhill race course) on a four day ski adventure at Chatter Creek Lodge, near Rodger's Pass. Despite a high avalanche risk that forced the guides to ski a conservative program, the skiing was still out of this world.



DON'T MISS:

- SHA's FREE BC Landfill Operations Course, May 8th and 9th, Kelowna, B.C.
- SWANA MOLO Course, March 31st–April 3rd, 2003.
- SWANA C&D Course, March 31st–April 3rd, 2003.
- Communicating in a Crisis – April 2nd, 2003
- SWANA N.W. Regional Symposium, April 3rd and 4th, 2003.
- 5th Annual Indian River Thigh Burner, Sept. 20th, 2003.

Contact us:

SPERLING HANSEN ASSOCIATES

1401 Crown Street, North Vancouver, B.C. V7J 1G4

Phone (604) 986-7723, Fax (604) 986-7734

Email: sperling@sperlinghansen.com

Staff E-mail addresses are:

- Dr. Tony Sperling sperling@sperlinghansen.com
- Poul Hansen phansen@sperlinghansen.com
- Tom O'Connell toconnell@sperlinghansen.com
- Dennis Trammell dtrammell@sperlinghansen.com
- Todd Baker tbaker@sperlinghansen.com
- Tareq Islam tislam@sperlinghansen.com
- David Kwick dkwick@sperlinghansen.com
- Barry Munro bmunrow@sperlinghansen.com
- Sharon Tenenbaum stenenenbaum@sperlinghansen.com
- Aljeh Sperling asperling@sperlinghansen.com
- Anne Pataky apataky@sperlinghansen.com

www.LANDFILLFIRE.com

www.SPERLINGHANSEN.com

