Preliminary Closure Plan - Richmond Landfill

January, 1996

Prepared for
ECOWASTE INDUSTRIES Ltd

by
GNH Engineering

Table of Contents

List of Drawings and Tables

Introduction

Ecowaste Industries Ltd. (the "Company") operates a landfill in the City of Richmond (the" City") under the terms of Permits PR-04922 and PE-08036 issued by the Ministry of the Environment, Lands and Parks (MELP). The office of the BC Environment supervises the permits and monitors and inspects the operation to assure compliance with the permits.

From time to time the permits are updated or amended. The most recent amendment to PR-04922 on March 10, 1995, provided for a lateral expansion of the landfill to the north of the existing site. The amendment to the permit also deals with other administrative requirements, more specifically, Subsection 2.29 calls for the preparation and submission of a Preliminary Closure Plan (the" Plan"). This document, together with appended drawings and designs previously approved by the BC Environment, represents the Plan.

The designs in this Plan are a mosaic of the recommendations from engineers, agronomists and development consultants. These recommendations are configured to specifications of The Landfill Criteria (the "Criteria") but they remain sensitive to the mandates of the Agriculture Land Commission ("ALC") as well as to the standards of the City Public Works Department. The resultant drawings are a compilation of approved design concepts from which, specifications and/or contract drawings will be prepared.

The following documents, commissioned by Ecowaste, were previously submitted to MELP or the ALC and were instrumental in preparation of the Plan:

1- Phase I Leachate Collection Facility, June 1988, Golder Associates
2 - Application to the Agricultural Land Commission, Under the Soils Conservation Act, July 16, 1992, Kelvin Development Services.
3 - Site Investigations and Conceptual Designs - August 4, 1994, Golder Associates
4 - Richmond Landfill, Lateral Expansion, Review of Landfill Criteria, December 1, 1995, Ecowaste Industries Ltd.
5 - Addendum to #3 above - December 7, 1994, Golder Associates
6 - Landfill Development and Design of Environmental Controls, Ecowaste Landfill Expansion, June 26, 1995, Golder Associates
7 - Addendum to #6 above - August 24, 1995, Golder Associates

8 - Landfill Rehabilitation, Drainage and Irrigation Design - September 1995, RBF Land Resource Consultants Ltd.

The primary intent of the Plan is to meet the requirements of Subsection 2.29 in the amended permit but it is also a working document which will assist Ecowaste staff who will be operating the landfill. The drawings are in sufficient detail to clearly present the geometry of the landfill and in most circumstances, will not require the staff to refer to the detailed text. Never-the-less, some explanatory text is required to fulfil the permit and for convenience, the narrative which follows, is in the same sequence as the nine drawings appended.

Landfill Location and Future Development

Sheet #1 shows the land use location plan and major access routes in the City surrounding the site and gives a detail of vehicle access. The location of this landfill is pivotal to the closure planning for the site. The site is in the centre of east Richmond which is one of the last tracks of undeveloped lands of the Lower Mainland. The landfill site lies at the intersection of the traditional Richmond agricultural belt and the future industrial harbour area for the Fraser River Port. The site is also near a potential future North-South Fraser River crossing.

Present access to the property is via Steveston Highway and Number 6 Road. As eastern Richmond develops, roads and railway links will undoubtably impact the transportation access to the site. The drawing shows some future potential access routes to the development. These potential connectors (shown as dashed lines) are based on conjecture. The exception is Blundell Road which is to be constructed as a *divided-arterial* corridor. Ecowaste has entered into discussions with the City for preparation of the road base and has offered to transfer land to them to widen the right-of-way to 26 m.

The Company and the City will be working cooperatively to integrate the site according to land usage plans. The City has reviewed the Company plans with respect to access, road elevations and drainage concepts. Adjustments have been made to the Plan to conform with City's standards. The City may extend Blundell Road through the property within 15 years to connect adjacent proposed industrial harbour lands to the east. In preparation for construction of the road, the Company will set out field markers to identify the property lines and subject to agreement with the City, will place only inert mineral fill on the Blundell alignment. Other roads will inevitably be constructed on the registered rights-of-ways. For example, Savage Road, south of Blundell will likely be an arterial road connecting with Blundell.

Other roads within the Agricultural Land Reserve (the "ALR") will be developed on approval of the ALC to appropriate agricultural standards. The ALC has approved the Company plans for the lateral expansion. As required by the ALC, the Company has employed a qualified agrologist for this work. The Company will continue the planning process to assure proper integration of the site with long term development of the region.

Topographic Plan

Sheet #2 shows the road elevations and contours of the cover at the closed site and significant features of the adjacent properties.

Areas South of Francis Road

The lands bounded by Williams Road to Francis Road have been reclaimed using mineral soils. At this time, the Company has no plans to place refuse on this area which is presently used as a storage site. In this Plan, only the areas which are to be filled with refuse are detailed. Therefore, although the permits include areas south of Francis Road, this portion of the site will remain as a separate planned development which is outside of this Plan. Its future development will most likely make use of the commercial and transportation services which parallel the site. No definite plans have been put forward for any changes over its current usage to store aggregates and to provide complimentary services for recycling and recovery of materials. The Company is constructing a truck scale on this land to monitor tonnages of refuse received at the site and weigh products being recycled.

Northern Area

Development of the northern portion of the site will be consistent with agricultural land use. The orientation of the cells, drainage and other features have been selected in consultation with the ALC. The grid-like geometry of production areas is designed to be adaptable to varying agricultural uses including turf farming, nursery planting and cranberry farming.

The placement of refuse, compaction and consolidation program is designed to reclaim unproductive lands and to make the land available for agricultural production. The fill will be placed, compacted and loaded to enhance compaction and stabilize the land surface. Further details of the sequence of filling, compaction and completion of the surface development plan can be seen on Sheet #6.

Because of the agriculture designation, elevation contour planning follows the slope criterion which best suits this purpose. Surface slopes have been reduced to a minimum to enhance its value for growing most valued cash crops, as well as to accommodate irrigation systems and harvesting equipment. The surface slopes have been set to maximum grades of 1%. This allows for some differential settlement while still maintaining drainage to limit water infiltration. Some surface regrading may be required after closure to counter settlement.

Northern roads

Site roads are laid out in a grid to facilitate agricultural activities. The road substructure will be constructed principally of mineral soils to allow for future placement of underground utilities and to act as a fire barrier between blocks of refuse cells. Typical utilities would be perforated agricultural drains and irrigation piping networks.

The road will be 30 m wide at the base and be identified in the field using range poles which can be clearly seen by operators. Settlement gauges will be set at regular intervals to monitor consolidation of insitu soils.

Southern Area

The topographic plan for the southern area is designed to provide minimum surface grades of 4% at vegetated surfaces. Maximum slopes of 33% could be used at some points, however in most perimeter locations our objective is to achieve side slopes of 25% to minimize erosion. The ground slopes comply with the Criteria for surface grades.

Southern Roads

Road surfaces and parallel ditches will be constructed at a minimum slope of 1.5%. Ditch slopes of 1.5% will limit storm water erosion. Where ditch slopes exceed 3%, some form of erosion protection will be employed such as culverts or perforated sub-drains.

The alignment of south and northern roads were designed to serve the following purposes:

1. To support heavy vehicles to the active face with a minimum of traffic congestion during landfill operation. The roads will have durable surfacing to provide access by trucks to distribute cover soils.

2. To direct vehicle traffic to the centre of the property. This will reduce nuisances at boundaries such as noise and minimize airborne dust impacts for neighbouring property owners.

3. To drain surface waters and minimize bury depths for waste or storm water piping. The roads alignment will provide circular routing of water supply piping for future commercial fire protection flows.

4. To integrate with future road development in east Richmond and provide for two

north/south corridors between the south and the northern areas. The principal external connector is expected to be Blundell Road but other improvements at Williams Road or Triangle may occur.

5. To provide future flexibility for commercial industrial development. Over the next 20 years, the commercial economic value of the site will change. At this stage, we have selected road corridors on the basis of balanced access to the entire site by vehicles and utilities. We expect that alignment adjustments and additional service roads may be needed to complete the transportation network.

6. To provide occasional vehicle access to property boundaries for maintenance and landscaping after closure using a perimeter service road. Perimeter roads will be used during construction of environmental controls and for access by trucks during construction of internal roads.

Cell Construction, Timing and Location

Sheet #3 shows cell construction timing and location for refuse placement on the landfill from 1995 to the year 2015. The southern area is expected to be closed and final cover placed over the next 5 years, while the northern area will be filled over the next 20 years.

Southern Area Fill Plan

The allowable fill placement on the southern area will most likely be completed in 1997. The remaining area to be filled is shown as hatched areas on the cell construction drawing.

The southern area fill is nearing completion to the maximum height imposed by the City. In order to comply with the Criteria and execute a timely closure of the site, the Company will request the City to modify the height restriction at selected locations. Sheet #4 shows the fill sections A and B through the northern and southern areas illustrating the relationship between refuse and cover material using the agricultural and Criteria grades. Excessive amounts of soil are needed to meet the Criteria specifications for 4% surface slopes while staying within City height restrictions. Without the use of refuse to achieve grade changes, a cover thickness of 7.5 m will be required at some points. The resulting soil volume is more than 2,000,000 m^3 to complete the fill.

This volume of soil is not readily available. Historically, the site receives sufficient soils to satisfy interim cover for refuse and some additional material which can be diverted to new roads, berms and then approximately 30,000 m^3 which can be set aside for cover. Assuming there is no requirement for mineral

soils at the northern site, it would still take 7 years just to satisfy the slope and capping requirements for the southern area.

In the interests of achieving timely closure and to meet the requirements of the Criteria, the Company will seek approval for a redefined refuse height in the southern area. The refuse fill would be designed and constructed to provide a minimum cover thickness of 2 m. This plan it would reduce the amount of cover soils to approximately 1,200,000 m^3 and allow the Company to construct the cover over the next 4 years. Completion of the fill plan could be done in 2 years (1997) and final cover and top soils could be completed by the year 2001 based on present availability of soils.

Achieving closure by 2001 is contingent on regional availability of soils. The Company's estimated time of closure is subject to soils being available in the next 5 years. These volumes can be easily influenced by the demand for soils by others. For example, if the Fraser River Harbour Commission or if the City of Vancouver landfill at Burns Bog should construct final cover as set out in the criteria, the total regional demand for soil may not be met. Closure at one or all facilities could be unavoidably delayed. Progress would be reviewed and submitted to BC Environment in annual reports.

Northern Area Fill Plan

Sheet #3 shows the cell grid and the proposed fill sequence for the northern lateral expansion. Cells are alphanumerically divided into 1 hectare parcels. Each lettered parcel is isolated by 1 m wide soil barrier as illustrated by the dashed lines. A cross-section of a typical barrier is shown on sheet #6. Numbered cells will be filled in ascending order while maintaining a 1 ha active face. The designed fill sequence and year of filling is illustrated by the table on the same sheet. The year of filling is estimated using the allowable maximum annual tonnage in the permit and the available space within each cell.

Existing Leachate Treatment Marsh

As the fill sequence reaches cell #10, the existing leachate treatment marsh will be filled. As required by the permit the northwest corner of the expansion has been reserved specifically for leachate treatment works. The time for the construction of the new treatment facility is estimated to be between the years 2005 and 2007. The period from 1996 to the year 2005 will be used to monitor leachate from which treatment design criteria will be determined.

The environmental controls will be constructed in advance of placing refuse at any cell. Controls include leachate piping and lateral barriers which will be installed before filling proceeds at any cell adjacent to a property line.

The planned construction sequence for refuse cells is shown on Table 1.

TABLE 1
Estimated schedule of refuse placement and closure

CELLS	ESTIMATED FILL PERIOD	ESTIMATED CLOSURE
SOUTH SITE	1995 - 1997	1999 - 20003
1 TO 4	1996 - 2001	1998 - 2002
5 TO 7	2001 - 2005	2003 - 2006
8 TO 10	2005 - 2009	2007 - 2010
11 TO 15	2009 - 2015	2011 - 2016

Landfill Cover and Drainage

Sheet #5 shows the surface drainage and piping alignments for the surface of the closed landfill. The drainage for the northern expansion area has been designed to conform with the planned agricultural development while maintaining the intent of the Criteria. The southern area cover and drainage design conforms with specific elements in the Criteria.

Northern area

The cover for the agriculture lands will be constructed according to the design specification[1] approved by BC Environment. The refuse surface will be constructed at a drainage slope of 1% and capped using a 1 metre minimum thickness of selected low permeability soils. Typical soils will be composed of sandy-clay-loam or clay-till. The surface will then be covered with a 0.8 m high permeability, sandy top soil with subdrains installed to collect and remove storm water. The system of drains would also remove excess irrigation water after closure.

Sheet #6 shows the sections C and D illustrating the arrangement of cover materials and drainage at the southern perimeter of the landfill. As designed by

[1]*Golder Associates, Landfill Development and Design of Environmental Controls, Ecowaste Landfill expansion, June 26, 199, Approved by BC Environment, September 25, 1995.*

the land resource consultants[2], the combination of cover, top soil and drains would produce an infiltration barrier exceeding the hydraulic conductivity requirements specified for cover soils in the Criteria[3].

The drainage network consists of main surface drains and branching laterals. The main drains will be buried within mineral fill roadways or cell barriers. Branch drains will extend perpendicular from the main drains using pipe sizes and interval spacing determined by established design criteria. The design objective will be to meet or exceed the hydraulic exclusion of infiltrating water as predicted by the cover and slope specifications of the Criteria.

As the landfill proceeds northward, the completed cells will be closed and reclaimed for agricultural use. Possible agricultural uses would be sod production, nursery planting or cranberries.

Southern Area

Lands south of Blundell will be closed as shown on Sheet #5. Sheet #7 shows the cross-sections A and B illustrating the arrangement of cover materials, side slopes and piping at the southern perimeter. The elevation of refuse fill has been restricted by the City to a final settled maximum elevation of 25 feet (7.62 m) geodetic. The operation of the landfill from 1986 to 1993 was designed to construct flat surface grades with a 0.8 m soil cover. The Criteria adopted by MELP on June, 1993 set out new surface grade requirements which are now being applied to the southern area. The application of these new grades results in cover soil depths exceeding 2 m and central areas could receive in excess of 7 m of soils. The effect of this depth of soil is to create a deeper infiltration barrier for storm water than called for in the Criteria and to provide for greater root penetration for deep rooted grasses and trees. This will support vigorous growth to enhance evapotranspiration of water and reduce infiltration. The deep soils will also restrain cracking of soils during dry weather which can result in production of leachate during summer storms.

Materials for cover will be selected fine grained soils such as silty-clayey tills and or inorganic fines from screening plants. The Company presently recovers some organic based and fine grained material for production of top soils. The majority of the incoming soils are used for road construction or intermediate

---

[2]*Appendix II, Golder Associates Addendum #1, RBF Land Resource Consultants Ltd., Ecowaste Industries Ltd. Landfill Closure Surface Capping, August 21, 1995.*

[3] Conductivity = 1.0×10^{-5} cm/sec

cover at the active landfill face. During closure, incoming soils will be utilized according to classifications:

Organic soils	Top soil and compost blending to be used for top soils and vegetation above the cover.
Fine grained soils	Surface cover above refuse
Coarse grained soils	Screened fines retained for cover and coarse aggregate retained for road surfaces.

Leachate Control, Monitoring and Treatment

Sheet # 8 shows leachate control, flow direction and discharge location at the time of closure. The key elements of leachate control include a natural clay liner beneath the landfill and a perimeter network of berms and engineered piping systems. After closure, leachates will be directed northward, through treatment works and be discharged into a ditch at Granville Avenue. Ultimately, the combined flows of the Granville Avenue ditch will discharge into the Number Seven Road Canal and the Fraser River. Over a period of 20 years the existing leachate management system will evolve in stages to the final arrangement. The construction sequence has been designed to permit this evolution without disrupting the filling or the leachate management process.

The Existing Leachate Management System

Until the year 2005, the flow of leachate will be directed through the existing arrangement of weirs, treatment marsh and an aeration lagoon before being discharged. Changes and additions to the existing system will be done as the northern expansion proceeds, but the direction of flow and the footprint of major components would be retained until the year 2005. All leachate generated in the south and northern area will continue to be directed to the existing marsh treatment system. During this 10 year period the Company will be closing out the entire southern area and portions of the northern area.

Additions to the Existing Leachate System

As required by the permit, the Company undertakes testing of the leachate at points in the landfill and at the point of discharge. The Company employs independent laboratories to extract and test samples. The results of these tests are compiled and submitted quarterly for review by BC Environment. Findings to date were reviewed by Golder Associates Ltd. The results of their analyses have been submitted to BC Environment. They have identified other facilities for installation as follows:

1. A pre-aeration lagoon for leachate at the entrance to the treatment marsh to address levels of dissolved manganese in the leachate.
2. Two deep well monitoring points into the lower aquifer and two shallow monitoring wells in the same location. Proposed positions for these wells are shown on sheet #9.

The pre-aeration lagoon has been installed and plans are to install the deep wells in 1996.

The Final Leachate Management System

Leachate control membranes and piping
Sheet #9 shows the leachate flow control membrane and piping as designed for closure of the site. Berms have virtually been constructed around the entire site and membranes will be added to enhance leachate containment. Portions of this system have already been installed and the remainder will be progressively constructed. The system of berms and method of placing refuse is designed to channel leachate to an area reserved in the northwest corner of the property. Ultimately, the system will connect the existing and future piping networks to a facility in the northwest corner.

The system of berms and collection piping was designed on the basis of two criteria:

1. Lateral migration of leachates are intercepted at the perimeter of the site using combinations of soil berms, PVC membranes and perforated collection piping.

2. Downward seepage of leachate through the natural clay-silt barrier is controlled by limiting the depth of leachate retention. Where the thickness of the natural barrier has been determined to be less than 2.0 m, the hydrostatic head of leachate will be maintained at neutral levels with respect to the deep aquifer. At points where the clay-silt barrier depth exceeds 2.0 m, the hydrostatic head will be allowed to rise. Leachate elevation within each sector is controlled using a series of overflow manholes with inlet and outlet inverts which retain or reduce hydrostatic levels.

The concept for the piping layout was selected to discharge flows into the existing treatment system and later to be utilized when a new system is commissioned. The diversion of leachate flow to the northwest corner will be done in stages as refuse fill advances. In the interim, a combination of open ditching and pipes will be employed. At closure, the leachate conveyance system will be entirely underground.

Leachate Treatment
The timing sequence for construction of berms and PVC membranes has been considered in the design for leachate treatment options. We estimate that by the year 2007, the existing marsh treatment area will be filled and a new system will have been commissioned in the northwest area. The new system will be designed, constructed and monitored in advance of filling at the existing marsh. The Company will request approval for this change from the regulatory agency.

The existing leachate management system is sized to handle virtually all rain water but after the year 2000, as the southern area is covered and graded, a significant reduction in the volume of leachate is expected. As closure progresses, the leachate volume changes will be recorded by the Company. The review of flow trends and test results for leachate components over the next 10 years will be used to predict the impact on the quality and volume of leachate. By the year 2005 the Company would establish options for a new leachate management and discharge system.

Post closure monitoring and treatment

The duration of monitoring and continuance of treatment after closure will be based on test results and analysis of leachate and impacts from year 2005 to 2015.

As part of this Plan, the Company will be budgeting annually for leachate sampling and testing until closure. Testing will continue thereafter for a period which is consistent with good practice and in keeping with the plan for any treatment facilities operating at the time.

The Company will maintain reserve lands for managing leachate in the north west corner of the permitted lands and it will undertake budgeting for construction of appropriate systems as determined by analysis of test results. Trends for characteristic leachate constituents from the year 2000 to 2010 will be landmark indicators for post closure leachate treatment operation.

In the period between the years 1995 and 2000, the nature of demolition refuse is expected to change. This refuse stream is targeted as a principal source of recyclable material to meet the national protocol to remove 50% of waste by the year 2000. In keeping with this protocol, there is now a movement to include all fibres within the mandatory recyclables group. Additional pressures may be placed on recycling as a result of recent legislation which empowers the GVRD to compel operators to recover materials. After the year 2000, the new waste reduction protocols that may be undertaken by the GVRD are unknown but directions to date suggest that there will be a continued pressure to remove certain materials. This trend may have significant impacts on the type of refuse buried at the landfill and consequently the leachate that may be generated.

To summarize, the effect of future recycling measures which may be taken by authorities are not known to the Company and the resultant impact on leachate at this landfill past the year 2015, are not predictable with any degree of certainty at this time. The Company will, however as part of this Plan, continue to monitor, test and treat leachate while the operating permit requires it to do so and to take actions commensurate with results of these tests.

Fire Prevention and Control

Fire protection

The Company is involved in recovery of materials, special waste storage and the burial of residual wastes. All of this material can present a fire hazard and as a result there are special needs for combustion control equipment as well as worker training. Vehicles are equipped with fire extinguishers and each worker is instructed in control methods and to use fire control equipment. It is a condition of the landfill permit that fire control water pumps be available and working on site.

Fire is a major concern for the Company because it represents major financial risk. Wherever combustible waste accumulates there is a risk for fires to erupt and cause property damage or to endanger human health and the environment. It is difficult to eliminate fires but the Company reduces the risk of fire and minimizes the damage if fire breaks out.

Fire protection and maintenance of fire fighting equipment is the responsibility of the site supervisor.

Fire Prevention

The Company prevents fires using 4 methods:

- Prevention Planning
- Segregation of Combustible Materials
- Allocation of Fire Extinguishing Materials
- Emergency Response and Damage Control

Prevention Planning is the first and most important stage and involves all staff, insurers, customers, the BC Environment and fire departments. The steps taken by the Company in this process are:

1. Determine potential fire sources and means of removal. This could involve inspections and recommendations by BC Environment, agents of insurers and the fire department.

2. Evaluate operating methods which enhance safety and make changes to use workable alternatives.

3. Train and authorize all staff to take action when risk situations or violations of safe procedures are discovered. When fire alerts are issued, all staff

must respond immediately and continue assigned tasks until directed to cease. Specific procedures for after hours emergency alerts and a management contact list are posted at the gate house and office.

4. Review past fire events for cause and means of prevention in the future. Ensure that senior operators know procedures as outlined for preventing fires and methods of control. All fires are considered to be emergencies.

Segregation of Combustible Materials requires that the Company maintain manageable pile sizes and that combustible materials are isolated to prevent cross ignition. Piles of combustible materials should be located or sites with inert soil bases and smaller piles should be built in preference to one large pile. The clean green piles, for example, should be segregated into 3 areas providing fire breaks between piles - fines including chipped materials, grass-earth-sod, pruned wood and mixed materials. Segregation ensures that we can readily process piled materials and place it into windrows in a timely fashion. This will help keep pile sizes small and limit fire losses. Should ignition occur in a smaller pile, we can extinguish it more easily or at least prevent its spread. The site supervisor should encourage clients to cooperate in materials segregation through the use of signage.

Allocation of Fire Control Materials for fire fighting and regular inspection for depleted supplies is done. This includes:

1. placement of dirt for smothering
2. readiness of water tanker, filled and ready to roll
3. supply and inspection of dry-chem extinguishers for vehicles
4. steel drums filled with water located at critical points.

The site supervisor maintains lists of amounts and locations of all materials. Management is made aware of any changes to the status of fire fighting equipment particularly of critical items such as the water or sand transport vehicle.

Emergency Response and Damage Control involves taking immediate actions in response to emergencies. The first order of action is to advise the most senior staff member as soon as possible even when there is a minor incident. Senior site staff should evaluate the severity of the fire, make a judgement and follow with specific action. In most circumstances no employee should undertake a task which could risk his safety or the safety of others in the prevention of fires or fire damage. The following actions outlined in Table 1 are guidelines based on previous experience.

TABLE 2
Fire Signals and Control Method

FIRE ALERT		RESPONSE AND CONTROL METHOD
A	Smoke/fire seen at vehicle or Ecowaste equipment - little or no risk of explosion or injury to personnel and is not near fill.	Alert all staff and request assistance from drivers with extinguishers and the water truck. Use extinguishers and follow up with water. Douse until temperature allows hand touch. Open bins or vehicle and ensure cause and all embers extinguished. Report to management and photograph site. Determine vehicle owner
B	Similar to above but there is a risk of explosion or expansion to landfill due to gas or combustible liquid leak.	Alert all staff and gate keeper to stop all traffic into site, keep access clear for fire fighting. Contact fire department, management and assemble fire extinguishers, excavator and water truck with hoses. Load dump truck with sand or soil. Water down container near flammable liquid and ground surrounding vehicle to inhibit flame spread. Maintain safe distance (30m). If danger of explosion is eliminated, approach with extinguishers and water. If uncertain, maintain water dousing and await fire department.
C	Smoke or flames seen at fill area. Source is identified and can be isolated. For example a burning tire or container and fire has definitely not entered into buried fill materials.	Alert all staff and gate keeper to stop all traffic into site, keep access clear for fire fighting. Clear the area of all traffic, divert off-loading to alternative locations. Gate keeper should restrict entrance until a safe advisory is given by site supervisor or senior attendant. Advise the fire department and management. Assemble extinguishers and bring water tanker to douse base of fire at safe distance. Load truck with sand and dispatch to nearest point upwind of fire. When is out dig out nearest ground area dousing as required but excavate to be certain no fire has entered the fill.

D	Smoke or flame seen at current dumping area. Source not certain but possibly buried. Smoke or flames seen at old fill areas, source is deep and time of ignition unknown.	Alert all staff and isolate traffic as above; contact management, BC Environment and fire department. Deep fires are extinguished by smothering the source of combustion. Loader fills dump truck with sand and continues delivery to nearest upwind point. Sand is placed on or as close as possible to source of fire to smother flames using the excavator. Continue to places and water. If possible agitate with excavator to force sand into base of fire. Observe for smoke and repeat until fire is extinguished. The fire could continue below ground and continuous observation must be done with periodic placements of sand and water as required. No excavations into should be done until control by smothering and dousing is attained. Restrict air access to the area using all available means. Cooperate with fire department.