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SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

# Phase 3 and Phase 4 - Operations Plan

## On-site Industrial Waste Landfill No. 3

*Domtar Paper Company, LLC (Formerly Weyerhaeuser Company), Plymouth, North Carolina*

**June 2008, Revised August 2009, August 2010**



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# Section 1
# Overview

Landfill No. 3 will be operated as an area fill. An operating area will be established on the waste surface where loads of waste will be dumped from transport and conveyor equipment. Landfill operating equipment will spread and compact waste materials into a working face that will slope downward from the operating area into the open cell bottom. The landfill operations described in the following sections will be conducted to accomplish the following objectives:

- Compact waste materials into a stable fill mass.
- Cover paper wastes that might present a blowing litter problem with soil-like waste materials such as dewatered wastewater treatment solids (fiber sludge), boiler ash, and woodyard waste (bark, grit, and reject wood chips).
- Grade all waste surfaces to promote drainage to the leachate collection drainage layer on the bottom and sides of the landfill.
- Maintain as small an operating area as possible.
- Minimize the area of operation generating leachate by using stormwater diversion berms and redirecting non-contact stormwater directly to surface drainage systems.

In addition, operations will be conducted in compliance with the provisions of NC DENR regulations Section .1626. Asbestos waste will be placed in the asbestos landfill located east of Landfill No. 2 and west of Phase 1 of Landfill No. 3.

# Section 2
# General Operating Requirements

Landfill operations will be conducted by a Domtar employee or a contract operator to Domtar.

Site control will be maintained at all times by a security fence and a manned guard station at the entrance to the Domtar mill. The landfill area will be accessible only to landfill operations personnel, Domtar supervisory personnel, and authorized visitors. The following activities are prohibited:

- Scavenging of waste materials
- Feeding of farm or domestic animals
- Waste fill in standing water
- Open burning

Access to the disposal area of the landfill will be established using temporary culverts and soil, ash waste or gravel as appropriate to construct ramps off the perimeter dike road into the lined fill area. Runon and runoff from waste-filled areas will be controlled at all times by the leachate collection system and the perimeter berm. Stormwater within open areas of the cell will be controlled by means of temporary stormwater diversion berms, which will allow stormwater to be discharged to the perimeter ditching rather than treated as leachate. Waste will be placed from the perimeter inward so that the side slopes may be capped as they reach final grades.

Salvage operations will not occur on a routine basis. Infrequently, the interior of the landfill might be used to store materials for recovery and use at a later date. Such materials include bark and wood waste, waste lime to be used for agricultural purposes, or dewatered fiber wastewater solids to be used as a soil amendment or other application. No hazardous wastes will be stored in the landfill. Recoverable materials will be segregated from the active waste disposal operation to the extent possible.

Daily inspections should also be performed to evaluate leachate levels within the landfill. Impermeable waste streams, such as ash, should be concentrated within the cell as much as possible to allow direct runoff into the leachate collection layer. Care should be taken to place various waste streams in appropriate locations that assist the operation of the leachate system as well as the evolution of the cell. This includes leaving some freeboard along the edge of the perimeter berms. Waste should not be placed in such a manner as to spill on to the tops of these berms. The free board will leave access to the drainage layer against the wall of the berm allowing leachate runoff access to the collection system below.

Working faces should be kept as small as possible, and areas should be capped as they are completed to the designed grades. Placing waste from the edge of the cell inward will afford the opportunity to cap sections sooner. Stormwater that flows off the capped sections will be diverted to the perimeter drainage ditches and will not be collected as leachate. These common landfill operational practices will compliment a stormwater control berm.

The design features and operating procedures described in this application have been developed to minimize the potential for slope failure. However, the slope stability analysis has revealed that the potential for slope failure at this site increases under the following conditions:

- Steeper slopes than planned
- Waste placed much looser or wetter than in the existing landfill or that which was tested.
- Soil or waste not compacted as recommended
- A rise in the groundwater table
- Leachate not able to adequately drain
- Shear strength parameters less than those used in the analysis
- Subgrade soils destabilized due to poor drainage or construction equipment traffic

To minimize the potential occurrence of these conditions, the following operational procedures are recommended:

- Have the subgrade soils observed by a qualified geotechnical engineer immediately prior to construction of the liner to confirm that the subgrades are suitable for construction of the landfill.
- Have qualified geotechnical personnel monitor placement and test compaction of all controlled fill soil used to construct the landfill and sediment basins to verify that the recommended compaction has been attained.
- Control the equipment traffic and drainage throughout construction (especially during rainy weather) to prevent destabilization of the subgrade soils.
- Place soil used in construction of the sediment basins, perimeter dikes, or grading of the site in lifts no more than 8 inches thick (loose). Compact the soil to at least 95 percent of the Standard Proctor (ASTM D 698) maximum dry density at ±3 percent of the optimum moisture content.
- Dewater all dredge wastewater solids by plate and frame press immediately prior to placement in landfill.
- Place and compact the waste material in lifts no more than 3 feet thick. Waste material placed in the facility should be compacted by repeated passes of the bulldozer until firm.

- Keep all waste material well drained by sloping the surface of the waste material to allow for stormwater drainage.
- Conduct additional testing and slope stability analyses if there is a change in the waste material placed or the quality of waste material placed in the landfill.
- Maintain adequate drainage of any leachate generated during waste placement operations. RMT recommends that no more than 1 foot of head be allowed to build up within the solid waste facility.
- Construct side slopes no steeper than 3 horizontal to 1 vertical to a height not greater than 214 feet. Bench exterior side slopes inward 15 feet for every 20 feet rise in height.

In the event dewatered wastewater solids are subjected to precipitation prior to placement, blend it with ash to improve its shear strength and compaction. The shear strength of 60/40 dewatered wastewater solids to ash blend is significantly higher than for dewatered wastewater solids alone.

# Section 3
# Operating Equipment

Landfill No. 3 will be operated with a mid-size bulldozer. Support equipment will consist of over-the-road transport vehicles, including standard dump trucks and rolloff container trucks. A motor-grader will be used for road maintenance, but will not necessarily be dedicated to the landfill operations.

In general, a bulldozer will be used to spread waste and compact the working face. The bulldozer will be used to maintain access from the perimeter road to the operating area, and to spread soil-like waste materials over blowing waste.

Hauling equipment operating outside the landfill area will be washed in a wash down area located at the dewatering press building. Wash water will be collected and treated with the landfill leachate and the dewatering press filtrate.

Operating equipment will be included in Domtar's preventative maintenance program. Routine maintenance, such as oil and filter changes, as well as sampling and analysis of lubricating and hydraulic oils will be conducted on schedules set in the program. Spare parts will be carried in inventory. If extended service should be required on the landfill bulldozer, a substitute bulldozer will be provided by other operations at the Domtar mill or leased from a local contractor to ensure continuous operations.

# Section 4
# Pumps

Redundant submersible pump systems remove leachate from the bottom of the landfill and transfer it by force main to the storage tank/sump of the leachate transfer station, then to the mill wastewater treatment system. Maintenance of the pumps will be conducted in accordance with manufacturer's recommendations.

Maintaining a strict set of operational checks and balances is crucial to the success of all landfill operations. A daily record of flow rates and total volumes will be used in troubleshooting the system. If flow is lower than anticipated, the system should be thoroughly inspected and any problems should be repaired - a pump may be down, the line may be clogged, or the leachate collection layer may be impeded by an impermeable waste stream. The flow meter should be routinely monitored and placed on a preventative maintenance (PM) schedule. The pumps should also be placed on a PM schedule. This will allow water to be removed as designed and the overall storage capacity of the cell for the major storm events to be maintained.

# Section 5
# Dust Control

Due to the frequent use of ash as daily cover and the potential for dusting, dust control equipment will be used at the Landfill. This equipment will consist of a pump and piping system tied to the leachate transfer station storage tank or wet well. Leachate will be pumped from the storage tank or wet well to mobile sprinkler units located within the landfill. The ash will be sprayed as needed to control dust, and as frequently as on a daily basis.

# Section 6
# Litter Control

A portion of the waste disposed of in the landfill will be compacted and uncompacted paper from the Domtar Complex paper manufacturing operations. This waste type will be dumped at the edge of the operating area. The waste material will be compacted by repeated passes of the compactor or bulldozer. Each day, or more frequently if required by weather conditions, blowing waste will be covered with soil-like waste materials or soil if suitable wastes are unavailable. Cover material will be available from a stockpile area. If necessary, litter-control fencing will be used to prevent litter from blowing beyond the landfill area.

# Section 7
# Stormwater Controls

Landfill operations will be conducted in a manner to minimize infiltration into the waste fill for two reasons:

- Excess moisture will reduce the stability of the fill by lowering the shear strength of the waste materials.
- Excess moisture will result in the generation of unnecessary quantities of leachate and increase the hydraulic head on the landfill liner.

Surface water runon will be prevented by the perimeter ditch and berm around the landfill, and by the cell delineation berms at the south end of each construction stage. The waste fill will be graded to minimize infiltration of contact rainwater. The operating area must be nearly level to function as a turnaround and dumping area for waste transport vehicles. The working face and operating area will be kept as small as practical, and will be sloped or crowned so that water drains from the surface to the leachate collection sand layer at the toe of the waste fill. Ponding of water will not be allowed. Depressions in the operating area will be filled with waste materials to promote runoff. The working face of the fill will be maintained at a slope of 3 horizontal to 1 vertical up to 5 horizontal to 1 vertical to promote runoff to the leachate collection sand layer at the toe of the slope.

Temporary stormwater control berms will be constructed in unfilled areas of the active cell to divert clean stormwater away from the leachate collection system. The berm will be located to provide adequate storage space for waste as well as temporary storage of runoff from the working face. It will also be sited to maximize segregation of stormwater and leachate.

Leachate will be collected in a series of sumps equipped with both primary and secondary submersible pumps. It is anticipated that during normal landfill operations the pumps will cycle to minimize pump burnout. In the event of an extraordinary rainfall event, primary and secondary pumps will be active thereby minimizing the amount and holding time of leachate within the landfill.

The following stormwater and leachate management practices will be maintained at the landfill:

- Diversion of non-contact stormwater away from the leachate system and removal of surface water discharge outside the landfill boundary. This can be accomplished via temporary internal diversion berms within the landfill and the use of portable pumps, if necessary. Internal berms are most important in the initial time period after the landfill is opened

because extreme leachate generation rates are more likely. Although, the landfill system with internal stormwater diversion berms will allow for temporary storage/handling of the leachate generated from a 25-year, 24-hour storm event, it is crucial to separate and discharge non-contact stormwater before it is considered leachate. The pumps are sized to take up to 6 days to discharge leachate generated from the 25-year, 24-hour storm event.

- Limitation of the active filling area of the landfill to a small area to minimize the volume of leachate generated. This area is typically 5 acres or less depending on specific site conditions.
- Maintenance of a filling sequence that reaches final waste grades as soon as possible so that final cover soils can be placed to further divert surface water.
- Proper maintenance, operation, and monitoring of the leachate pumps, pump controls, discharge piping, leachate collection piping, and clean-outs.

# Section 8
# Site Facilities

Telephone, potable water, and toilets will be available in the dewatering press building. Back-up communication to and from the site will be provided by radio or cellular telephone. Since the dewatering press building is located in the area set aside for asbestos waste disposal, it will ultimately be demolished at closure of the landfill when it is no longer needed.

# Section 9
# Final Cover

Final cover will be progressively placed on areas of the landfill that have been graded to final contours. Cap construction will typically be performed in areas of 5 acres or less. Final grading and cap construction will proceed from north to south and west, as the fill reaches final grades. The cap for the Landfill includes GCL and a VFPE liner. These materials will be protected from the elements and operating equipment by a vegetative soil layer. Maintenance of the vegetative layer is critical to protect the integrity of the landfill cap system.

The cap will be sown according to approved seeding specifications for perennial vegetation. Vegetated cap areas will be mowed at least annually using equipment that will not damage the integrity of the soil cover layer. Vegetated areas will be inspected during the course of landfill operations. Conditions that may require repair include the following:

- Sparse or unhealthy vegetation
- Improper vegetation, such as trees or woody shrubs
- Erosion of the soil cover layer
- Slope failures, such as soil creep and sloughing
- Rutting from vehicular traffic or equipment operation

Damaged areas will be repaired as weather permits.

# Section 10
# Inspections

The landfill operator or designated inspector will conduct inspections of all landfill operating systems on a routine basis. Inspections will be conducted and documented using an inspection log. A typical example is included as Table 10-1.

**Table 10-1**
**Sample Landfill Inspection Checklist**

| INSPECTION CHECKLIST | INSPECTION | INITIAL AND DATE THE APPROPRIATE BOX | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S | M | T | W | T | F | S | STORMS | MONTHLY | QUARTERLY |
| Pumps | | | | | | | | | | | |
| 1 | Daily - check flashing light and standing water.<br>Weekly - switch on and check current. | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| Ditches | Inspect monthly and after storms. | | | | | | | | | | |
| Sediment Basin | Inspect monthly and after storms. | | | | | | | | | | |
| Dikes and Berms | Inspect monthly and after storms. | | | | | | | | | | |
| Fence and Gates | | | | | | | | | | | |

**Comments:**

**Work Orders Placed:**

| DATE | ORDER NUMBER | DESCRIPTION OF REQUEST |
|---|---|---|
| | | |
| | | |
| | | |

# Section 11
# Leachate Collection System Management Plan

The leachate collection and removal system (LCRS) will be comprised of the following components:

- A granular drainage layer
- Perforated leachate collection lines
- Dual submersible pumps in each leachate collection sump
- Leachate pump station manhole at each sump location
- A force main header pipe
- Wastewater solids dewatering facility

The lined area inside the landfill will be covered with an 18-inch thick drainage layer. The drainage layer will consist of a graded filter composed of a 6-inch thick layer of select clean sand above a 12-inch thick layer of select gravel. The select sand layer will contain less than 5 percent passing No. 200 sieve and will serve to filter out fines within the waste minimizing clogging of the select gravel layer. The select gravel layer will be sized to provide a lateral hydraulic conductivity of at least 0.3 cm/sec. The select gravel will also serve to provide bedding for the leachate collection piping and protection of the liner. The composite liner system below the drainage layer will be protected from the gravel layer, construction activities, and from operation activities with a 32-ounce geocushion.

The leachate collection lines within the landfill will consist of 6-inch diameter HDPE perforated pipes that provide chemical resistance and flexibility, and will be placed in v-notched trenches at a minimum slope of 0.5 percent. The base of the landfill will have a herringbone design consisting of a series of ridges and valleys with the maximum distance from a ridge to a valley of 100-feet. This design will direct the flow of leachate collected in the drainage layer towards collection pipes that will be located in each valley. The collection pipes will have a maximum spacing of 200 feet. The base of the landfill will slope from one side to the opposite side so leachate collected in the pipes will flow to sumps located in each phase at the low side of the landfill. This design is capable of maintaining leachate heads of less than 12-inches above the liner system. The leachate line hydraulic calculations for determining leachate head on the liner are provided in Appendix H of the *Construction Plan Application for On-Site Industrial Waste, Landfill No. 3* ( RMT, 1999). To provide protection of pipes from being crushed during construction activities, operation activities, and under the anticipated waste loads in the landfill,

collection piping with a maximum Standard Dimension Ratio (SDR) of 17 will be used. Pipe strength calculations are presented in Appendix I in the *Construction Plan Application for On-Site Industrial Waste, Landfill No. 3* (RMT, 1999). The ends of the leachate collection lines will be fitted with 6-inch diameter SDR 17 solid wall cleanout pipe that will provide access for inspections and periodic cleaning. Remote camera inspections of the leachate collection lines will be performed after construction, after the removal of any blockage from a pipe, and at a minimum frequency of once every five years. Cleaning of the leachate collection lines will be performed if a blockage is discovered and at a minimum of once every year.

In each phase of the landfill, leachate will be collected through perforations in the collection pipes and will flow by gravity from the high end of the liner to the low end where it discharges into one or more collection sumps. Each sump will have 18-inch diameter perforated HDPE inclined riser pipes that will lay across the sump and perpendicular to the landfill perimeter berm. The pipes will run from the bottom of the sump and up the inside slope of the landfill perimeter berm where it will connect to a 6-foot diameter pumping station manhole located at the top of the perimeter berm. Leachate collected in the sump will be removed by using submersible pumps placed inside the 18-inch diameter pipes at the bottom of the sump. A level switch in the sump will automatically activate the dual submersible pump system that will pump the collected leachate up to the pumping station manhole through a 3-inch flexible hose. Inside the manhole the hose will connect to a 3-inch diameter solid wall HDPE force main pipe. Each wheeled submersible leachate collection pump will have a cable attached to allow for retrieval and maintenance of the pumps. See Drawing No. 510101-C17 of the *Construction Plan Application for On-Site Industrial Waste, Landfill No. 3* (RMT, 1999) for leachate collection system details. Maintenance of the submersible pumps will be conducted in accordance with the manufacturer's recommendations. Pump maintenance is also described in Section 4 of this document (Operations Plan).

Leachate in the 3-inch diameter HDPE force main pipe inside the pumping station manhole will exit the manhole through 3-inch diameter double wall pipe. The 3-inch diameter double -wall pipe runs for a short distance where it will connect to a 6-inch diameter double-wall force main header pipe. Leachate pipes located outside the manholes will consist of double-wall pipes and will be buried a minimum of 3-feet below the ground surface. The header pipe is buried inside the landfill perimeter berm and transports collected leachate around the outside perimeter of the landfill where it will discharge the leachate into a wet well located at the wastewater solids dewatering building located on the western side of the landfill. At this building the leachate will be mixed with filtrate from the wastewater solids press building The mixed leachate will either be taken to the landfill and used for dust control as needed or will be to transferred through another force main pipe to the mill's permitted wastewater treatment system located on Domtar's property.

Calculations for the design of the pumps and force main pipes are included in Appendix H of the *Construction Plan Application for On-Site Industrial Waste, Landfill No. 3* (RMT, 1999). Water balance modeling, including the Hydrologic Evaluation of Landfill Performance (HELP) model, was used for various landfill operational scenarios to determine leachate flow into the collection layers. The flow rate used for sizing the pumps and force main pipes includes the peak daily flow collected in the leachate collection layer.

Stormwater run-on and runoff will be controlled by means of the landfill's exterior perimeter berms and temporary interior stormwater control berms. The exterior berms are designed to contain, if necessary, precipitation falling within the landfill during a 24-hour, 25-year storm. The interior berms (shown on Drawing No. 510101-C19 of the *Construction Plan Application for On-Site Industrial Waste, Landfill No. 3* (RMT, 1999)) will allow segregation of stormwater and leachate within the landfill so that precipitation that has not come in contact with the waste will not require treatment as leachate. The temporary berms will be placed to allow for an adequate area for disposal of waste, while maximizing the area where noncontact precipitation can be diverted as stormwater. For Landfill No. 3, if temporary interior berms are not used, the leachate pumps have been sized to effectively pump collected precipitation as leachate within a period of 6 days.

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# Letter of Transmittal

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| **To:** | **Mr. Larry Frost**<br>**Environmental Engineer**<br>**North Carolina Department of Environment and Natural Resources**<br>**2090 US Highway 70**<br>**Swannanoa, NC 28778** | **Date:**<br>**Project No.:**<br>**Subject:** | **September 8, 2010**<br>**71717.10**<br>**Phase 3 and Phase 4 Operations Plan** |
| **Prepared By:** | **Travis Tarbet** | **Title** | **Project Engineer** |

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