Plan of Operation

Cowlitz County Headquarters Landfill Project

June 2013

Rev. 2

Energy and Environment, LLC

Thiel Engineering

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Plan of Operation

Rev. 2

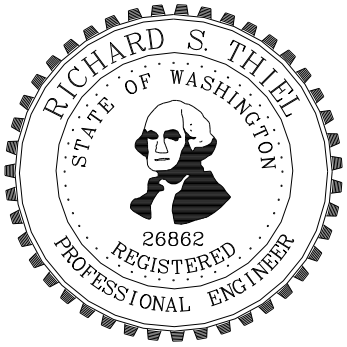
COWLITZ COUNTY
HEADQUARTERS LANDFILL PROJECT

COWLITZ COUNTY, WASHINGTON

Prepared for

COWLITZ COUNTY DEPARTMENT OF PUBLIC WORKS

June 2013



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1.0 INTRODUCTION

This *Plan of Operation* (Plan) concerns the landfill currently known as the Weyerhaeuser Regional Landfill but referred to in this document by its proposed name, the Cowlitz County Headquarters Landfill ("Landfill"), at the Headquarters site in Cowlitz County, Washington. It is intended to be a required part of a complete application for a Municipal Solid Waste Landfill ("MSWLF") permit to the Cowlitz County Environmental Health Unit ("EHU") within Cowlitz County's Building and Planning Department. The applicant, Cowlitz County Public Works ("County"), is applying for this MSWLF permit pursuant to a definitive agreement between Weyerhaeuser NR Company ("Weyerhaeuser") and the County providing for Weyerhaeuser to sell and the County purchase the Landfill and related assets, subject to several additional agreements and closing conditions, including issuance, modification, and/or transfer of several permits. In the agreement between Weyerhaeuser and the County, Weyerhaeuser expressly authorizes the County to apply for such permits necessary to conclude the contemplated transaction.

The County owns and operates a landfill for its municipal solid waste ("MSW") as well as other industrial and commercial solid wastes from customers in the region. This landfill, known as the Tennant Way Landfill, is nearing its capacity and will close in early 2013. The County's purposes in acquiring the Weyerhaeuser Landfill is two-fold:

1. to provide long-term environmentally protective disposal capacity within the County for its MSW, with minimum costs, energy consumption, and carbon footprint; and
2. to provide stable and cost-effective utility infrastructure, including solid waste disposal, for its current and prospective future industrial and commercial businesses, as part of the County's broader economic development and diversification strategy.

This Plan contains all required information specified under the state's Washington Administrative Code ("WAC") Chapter 173-351, as administered by the state Department of Ecology ("Ecology") and Cowlitz County Code 15.30 "Solid Waste Management".

1.1 PURPOSE

Although incorporated into the County's MSWLF permit application, this Plan is a stand-alone document that describes general and specific operational elements of the Landfill. This document conveys the concept of operation intended by the applicant and describes the detailed operations to site operating personnel. These detailed operations include:

- Site and design elements critical to the proper operating procedures
- Solid waste handling, including transportation, routine filling, grading, cover, and housekeeping
- Leachate management including transfer and conveyance to a treatment plant
- Required equipment
- Critical operation and maintenance items
- Frequency and conduct of inspections
- Personnel qualifications and training
- Safety and emergency procedures, including responding to a fire, explosion, or sudden release
- Environmental control and monitoring
- Required documentation
- Closure and post-closure plans and associated financial assurance.

The site will be operated in accordance with this Plan, as may be periodically updated and amended.

The Plan is intended to be a living document, responding in a timely manner to any changes in the regulatory foundation, technological advances, best practices, and the County's solid waste management strategy, plan and policies that may occur over the more than 100 years of the Landfill's life. Any future changes will only take effect after approval by the Cowlitz County Department of Public Works and submittal to the Environmental Health Unit. The plan will be available for inspection at the Landfill.

1.2 SITE HISTORY

The Landfill was originally permitted, constructed, and operated by Weyerhaeuser to serve as an industrial waste landfill for forest-products waste and construction-and-demolition waste. The first landfill cell and ancillary facilities were constructed in the summer of 1993, and the site began receiving waste in the fall of 1993. The Landfill was permitted with a 308-acre footprint plus an additional 50 acres of support facilities (e.g. leachate pond, rail transfer facility, stormwater control, etc.). The site was permitted as a regional facility for the above wastes, and permitted to receive up to one million cubic yards per year of waste volume. Since the opening of the Landfill, the site has received approximately 3.8 million cubic yards of waste fill through September 2010. As Weyerhaeuser's business model has evolved it decided to focus its investments in core assets and operations, and consequently offered the Landfill for sale in 2009.

Cowlitz County has owned and operated its own landfill at the Tennant Way site since it was developed in 1974, which has been in continuous operation since 1975. The Tennant Way Landfill is located in an industrial section of Longview, Washington, with a total size of about 100 acres. The Tennant Way Landfill is projected to reach capacity in the year 2013, and thus the County found itself in need of a new waste disposal option. In light of Weyerhaeuser's offer to sell the Headquarters Landfill, and the protective standards to which Weyerhaeuser had adhered in construction and operation of the Headquarters facility, Cowlitz County entered into a purchase agreement in 2012 for the Headquarters Landfill to serve as its long-term disposal facility. This Plan was submitted in 2012 to the County EHU as part of an MSWLF permit application for the County to own and operate the Headquarters site as its new MSW landfill. It is further updated in this June 2013 edition.

Ecology has recently adopted revisions to its regulation governing MSW landfills, WAC 173-351. We have, therefore, updated our original application filed on March 29, 2012, to be consistent with the revised regulation. Additionally, in response to comments from agencies and through the State Environmental Policy Act ("SEPA") process, various additional technical submittals were provided, which are herein integrated into our application. Updated versions of the *Engineering Report*, the *Hydrogeologic Report*, and this *Plan of Operation* constitute our updated application for the MSWLF permit.

1.3 REFERENCE DOCUMENTS

The following key documents are available at the Landfill office to provide additional information about landfill operation:

- Solid Waste Permit Application, Southwest Washington Solid Waste Facility, Headquarters Site, prepared for Weyerhaeuser, EMCON, December 1992.
- Final Environmental Impact Statement, Headquarters Camp Solid Waste Disposal Facility, Cowlitz-Wahkiakum Health District, December 1992.

- *Engineering Report*, Cowlitz County Headquarters Landfill Project, prepared for Cowlitz County, Thiel Engineering and Energy & Environment, June 2013.
- *Hydrogeologic Report*: Cowlitz County Headquarters Landfill Project, prepared for Cowlitz County, Tuppan Consultants, June, 2013.
- *Cowlitz County Headquarters Landfill, Final Environmental Impact Statement, Cowlitz County Building and Planning Department, 2013.*

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2.0 OVERVIEW OF LANDFILL DESIGN AND OPERATION

2.1 SITE DESIGN AND LAYOUT

A complete set of the permit-application drawings is included in this Plan for easy reference (Appendix A). A regional plan having a scale of 1 inch = 1 mile is presented on the cover sheet of the drawing set in (Drawing G01).

A vicinity plan having a scale of 1 inch = 2,000 feet is presented in Drawing G03. This plan shows the area within one mile of the property boundaries of the facility in terms of the existing and proposed land uses within that area. There are no residences within one mile of the facility, and all of the surrounding land within that radius is either owned by the County as part of this facility, or is owned by Weyerhaeuser, from whom the facility is being purchased. There are four water supply wells near the administrative and maintenance buildings that serve the facility. The closest access road is South Silver Lake Road, which is a County road ending approximately 1.5 miles west of the Landfill. This road becomes the Weyerhaeuser 1600 Road as it enters private property, and provides access to both the Landfill and to the commercial forest lands comprising the bulk of the vicinity land use. The existing Woods railroad, formerly owned by Weyerhaeuser and now by Patriot Rail, runs to the site and is currently used for waste and leachate transport.

A site plan having a scale of one inch = 400 feet is presented in Drawings G04-05. The following items are shown on these plans:

- Five foot contour intervals.
- The Landfill's property boundaries.
- Onsite utilities (electric, water, and storm systems).
- Right-of-way easements.
- 100-year floodplain (there is none)
- Wetlands: the Landfill will not be located in wetlands. There are wetlands within the property limits, as delineated and shown on the drawing, that will not be disturbed except the north isolated wetland which has been fully mitigated[1]
- Holocene faults and unstable areas (none known at this time).
- The names and addresses of contiguous property owners (only Weyerhaeuser).
- The location of soil borings, piezometers, and wells. Note that there are no down-gradient drinking water supply wells within two thousand feet of the property boundary. This map does not include the locations of test pits and geophysical surveys that were conducted, as those studies are described in more detail in the *Hydrogeologic Report* (Tuppan 2013).
- The existing gas flare and condensate management area.
- Benchmarks and permanent survey markers
- Onsite buildings and appurtenances, fences, gates, roads, parking areas, and drainage culverts.
- The delineation of the total landfill area including planned staged development of the landfill's construction and operation, and the lateral and vertical limits of previously filled areas.

[1]Wetlands in existence within the project area before the Landfill was developed were fully mitigated by Weyerhaeuser through its Army Corps of Engineers permit (confirmation from the Corps pending).

- The location and identification of the sources of cover materials are all within the landfill footprint.
- The location and identification of the defined area for transferring solid waste delivered by rail and for loading leachate for transport off-site (the Rail Transfer Facility or "RTF"), which is the only other waste handling area besides the landfill footprint.

The proposed Landfill will be developed incrementally over its expected 100+ years remaining life. The expected lifetime[2][3] is based on an assumed filling rate of 400,000 yd^3/yr through 2017, and a rate of 450,000 yd^3/yr thereafter. It will eventually comprise a 308-acre footprint plus additional areas for ancillary facilities. The planned total site capacity is about 54.8 million cubic yards (mcy) of in-place waste. This is about 4.9 mcy (9.9%) greater than the capacity reported in the original Weyerhaeuser permit application for this site in 1992. This increase in the capacity estimate is primarily a result of refined engineering calculations related to slope stability on the south (uphill) side of the Landfill allowing a 3(H):1(V) final slope as compared to the original 4.5:1 slope. The limits of the landfill footprint have not changed from the original limits proposed by Weyerhaeuser, nor has the elevation. As of December 2012 approximately 4.3 mcy of airspace had been filled in Cells 1-5.

Major landfill design features include:

- A composite liner
- A leachate collection and removal system ("LCRS"), including double-lined sump regions
- A hydraulic gradient control system ("HGCS") where required
- A soil and synthetic final cover system
- A double-lined leachate pond
- A leachate pipeline conveying leachate from the pond to an approved treatment plant
- Stormwater runon and runoff control systems
- Diversion of the Southern Tributary to Sucker Creek
- Landfill gas controls
- A rail transfer facility.

Detailed descriptions of these design features are provided in the *Engineering Report* (2013, Thiel Engineering and Energy & Environment). A plan showing the complete layout of the site when fully developed is shown in Drawing C01. The maximum waste height will be approximately 250 feet above the original topography at its highest point. The final contours are designed to be graded naturally to form smooth swales and ridges to blend into the surrounding topography.

[2]For such a long-lived landfill there is significant uncertainty of total annual waste flow, and sources/types of solid wastes from the region. Inasmuch as southwest Washington is characterized by an industrial base, often involving pulp and paper or other forest products and primary metals facilities, we assume most of the growth in waste flow to the Landfill during its life will be industrial in nature. Industrial wastes tend to be denser than MSW or other solid wastes typical of metropolitan areas; for simplicity we assume average density of the mix of all solid wastes to be one cubic yard equals one ton.

[3] Note also that through the third-party State Environmental Policy Act process, which produced a Draft and then Final Environmental Impact Statement for the project, slight changes were made to the projected waste types and flows, so as to be more conservative in determining probable significant adverse impacts. In that both this application and the DEIS attempt to evaluate the implications of diverse waste flows over a long project life, both of the projections are viewed as consistent with a reasonable expectation of the future.

Landfill construction commenced in 1993 and development is proceeding in phases. This enables the active areas to be easily controlled and operated, and closure to be completed incrementally. It also allows evolutionary improvements in design, construction, and materials technology to assure the latest technologies are employed. Landfill cell and permanent ancillary facilities construction completed to date include:

- Construction of the runon "upper" diversion channel south of 1600 Road (and also south of the future re-directed 1600 Road on the south side of the proposed Landfill). This channel intercepts and re-routes up-gradient runon water around the Landfill.
- Wetland and fishery mitigation features such as a series of constructed wetlands in the diversion channel and on the west side of the Landfill, as well as enhanced in-stream and off-channel ponds habitat for migrating salmon and trout.
- A stormwater sedimentation/detention basin with connecting culverts and piping.
- A biofiltration basin located after the sedimentation basin, which discharges into the southern tributary of Sucker Creek.
- A double-lined leachate holding pond.
- The RTF including gravity flow lines from the leachate holding pond to the RTF, and stormwater collection being pumped up to the sedimentation pond. This system will be modified to feed and operate the leachate pipeline as it is constructed.
- Excavation and regrading to subgrade elevations for Cells 1-5. Excess soils have been stockpiled for future use and hydroseeded within the landfill footprint at a location in the future Cell 12 area where all runoff is directed to the sedimentation basin.
- Liner system for Cells 1-5 including the hydraulic gradient control system and the composite liner, the leachate collection and removal system, and an operations soil layer.
- The force main from the landfill Cell 1 sump to the leachate holding pond, and a gravity-flow leachate conveyance line that collects leachate from Cells 2-5.
- A landfill gas collection, condensate management, and flare infrastructure.
- A system of groundwater wells for monitoring and water level measurements.
- Final cover construction on approximately 9 acres over Cell 1.

The original landfill project included a new support office as well as a maintenance building adapted from existing buildings at the Headquarters Camp, approximately one-half mile west of the landfill footprint.

All aspects of on-going and future landfill cell and cover system construction has and will continue to receive full-time monitoring and inspection by an experienced representative of a registered engineer. The registered engineer will provide quality assurance services and report their observations in regards to the work being completed in general accordance with approved plans and specifications.

The Landfill is being developed incrementally in 22 planned cells that will last two or more years each. Some of the future cells may in fact be developed in sub-cells over several year periods. Cells 1-5 are already built and filling is occurring in these cells, though final closure cap construction for a portion of cell 1 has been completed. The proposed cell sequencing (Drawing C06) was developed to provide the most efficient manner of control for stormwater runon and runoff, constructing the LCRS and HGCS, and optimizing efficiency for landfilling. The rerouting of a portion of the 1600 Road in the summer of 2012 has allowed further optimization of sequencing and timing of a few of the cells, which is reflected in C06.

The Landfill is broadly designed with three separate "leachate drainage basins", which correspond to the three natural surface-water basins of the site. As shown on the bottom-grading plan depicted in Drawing C06, the first leachate drainage basin would comprise Cells 1-13, the second Cells 14-17, and the third Cells 18-22.

2.2 SUMMARY OF SITE OPERATION

2.2.1 Waste Acceptance and Transfer to the Site

Waste will arrive at the site by truck and by train. It will be delivered in transfer truck/trailers designed to maximize payloads from the Waste Control Recycling, Inc.'s ("Waste Control") Transfer Station, and from commercial customers within the region delivering waste directly to the Landfill. It may also arrive from Weyerhaeuser by either truck or rail. In contrast to operation at Tennant Way Landfill, no significant amount of waste will be delivered by small-volume self-haul vehicles[4]. Waste that arrives by truck will be delivered directly to the landfill tipping area and placed into the active area, as described in section 2.2.4 of this document. Waste that arrives by rail is transferred to shuttle trucks at the rail transfer facility, which then deliver the waste to the landfill tipping area. Waste inspection and acceptance procedures vary by the three major sources and locations of waste generation: the County's MSW system; Weyerhaeuser's industrial solid waste; and third-party generators of industrial and C&D waste.

Waste Control collects municipal solid waste and recyclable materials generated within the County by homes and businesses. These loads will be routed to the Transfer Station located at 1150 3rd Avenue, Longview, Washington. The Transfer Station is open for public drop-off of waste and the consolidation of waste from commercial collection vehicles. This municipal waste transfer station consolidates the waste and then delivers it to the Landfill in large transfer trailers. The few drop-boxes and any collection vehicles provided in the rural northeastern portion of the County may be delivered directly to the Landfill so as to not waste fuel and transport costs. Waste is not accepted from the public nor contractors via self-haul at the Landfill; those waste deliveries will be made to the Transfer Station. MSW waste inspection and acceptance is performed both by trained transfer station personnel and by landfill operators at the time of tipping.

All waste generated by Weyerhaeuser at its mill in Longview is and will continue to be properly characterized, designated and inspected by Weyerhaeuser operators to verify conformance with waste acceptance criteria. Weyerhaeuser currently employs rail to deliver solid waste to the Landfill, but they may elect to use trucks at some point in the future, which possibility is accommodated by the agreement with the County. Additionally, rail disruptions may require truck transport of the Longview Mill wastes. Weyerhaeuser personnel are trained in acceptable waste criteria and perform waste inspection and acceptance as provided in its disposal contract with the County. This waste is inspected again when tipped at the Landfill by trained landfill operators.

Third-party trucked waste is currently and will continue to be accepted at the Landfill by the County provided it is pre-approved by the County, is properly designated as required by solid waste regulations, and the customer sets up a contractually binding account ahead of time. As required by regulations, generators are principally responsible for proper waste designation and inspection to assure conformance with acceptance criteria, but the trained landfill operators also inspect this waste

[4] An exception from time to time for difficult-to-handle wastes that are incompatible with the Transfer Station may be approved by the Solid Waste Superintendent. These are infrequent occurrences.

at the time of tipping. The County will also randomly spot-check and inspect waste loads as per its further inspection procedures, described in Section 3.2.4.

2.2.2 Rail Transfer Facility ("RTF")

The RTF is located on the northwest side of the site on a northwest trending lobe parallel to the existing Patriot Railroad line. It serves two functions: off-loading solid waste delivered by rail, and loading of leachate into either rail tank cars or truck/trailers. Leachate is delivered to a permitted treatment system in Longview for treatment and discharge. The RTF is about 1,100 feet long and 180 feet wide, providing for level storage for up to 17 rail flat cars. Railcars with loaded boxes of waste from Weyerhaeuser are set onto a waste-spur siding at the RTF. Rail tank cars to receive leachate from the leachate ponds are set onto a separate leachate-spur siding (510 feet long of level storage with spill containment, which also is employed to fill truck trailers with leachate). The Patriot Railroad crew performs rail car switching and hauling. Transfer of waste boxes from the rail cars to landfill shuttle trucks, and leachate from the pond to the tank cars (should they be utilized), is performed by Weyerhaeuser personnel or Weyerhaeuser contractors.

2.2.3 Leachate Pipeline

The County has completed preliminary engineering for a pipeline that would be used to convey leachate from the leachate pond to a treatment plant, rather than use of either trucks or rail cars. The pipeline is the County's preferred conveyance option. It is proceeding with final design, and plans to construct the pipeline as soon as ownership of the Landfill transfers to the County. Procurement and construction is expected to take up to two years following transfer of Landfill ownership. The pipeline will generally be installed within improved public roadways, and will be a force main from the leachate pond to the ridge west of the Landfill and gravity flow from there to the Three Rivers Regional Wastewater Plant ("TRRWP").

2.2.4 Waste Filling Operation

All-weather rock pads will be maintained on the access roads and tipping pads on the landfill surface.

The shuttle trucks currently used for rail-delivered waste self-unload their waste by dumping their load off a tipping platform. One truck is dumped at a time, and the dumped waste is pushed away by a dozer. There is a spotter on the tip platform to assist with the unloading operation.

Most third-party industrial/commercial trucks as well as MSW transfer trailers from the Transfer Station will be tipped using a portable tipper that is set on a prepared rock pad. The waste will fall out of the trailers as they are tipped in the air one at a time. The dumped waste will be pushed away with a dozer and spread to the working face. The landfill personnel will provide spotters to check for unacceptable waste and to assist with waste tipping as needed.

The dumped or tipped waste will be pushed away to the active disposal area by D-7 or D-8 dozers or a compactor and spread into maximum 3-foot thick lifts. Although a landfill compactor has been used in the past at the Tennant Way Landfill for MSW, a compactor was never suitable for the industrial forest-products and C&D waste at the Headquarters site. Since the majority of the proposed waste stream will be forest-products waste, a compactor will likely not be appropriate for the operation, but it will be further evaluated after startup. Filling and compaction generally will be achieved by the dozers.

To prevent landfilling equipment from damaging the bottom liner, the initial layer of waste will be placed in a five-foot thick lift. The first five-foot lift will be free of construction and demolition debris and will not contain any waste greater than 12" in any dimension.

Daily cover of the exposed working surface at the end of each working day will include use of alternative daily cover ("ADC") such as auto shredder residue, some of the forest-products waste including boiler ash, and/or other approved ADC. Should adequate ADC not be available, at least six inches of soil will be used for daily cover. Interim cover tarps will be placed over areas of waste that are at final grade or which will not receive additional waste for several months, to reduce production of leachate. The interim cover will be sloped to shed stormwater runoff away from the active area and prevent its contact with waste. Experience has shown that an 8' x 8' rope grid, with a sandbag tied at each intersection, is required to maintain the tarps in place.

The general approach for waste filling is to tip from a high deck and push the waste downhill on a 3(H):1(V) or flatter slope. Permanent outer slopes of the facility will be constructed to the grades shown on the master plan.

For the purpose of this Plan, the County envisions cell development via "blocks" of solid waste. A "block" of waste is defined as a 20-foot thick layer that has been placed on the active slope. The reason 20 feet was selected was for purposes of internal drainage of industrial waste (described below). The area of the deck expands as waste blocks are completed, and the tipping platform is moved periodically to reduce the push distance. In general, the average push distance from the ramp is targeted at 100 feet, with a maximum of about 250 feet. Occasionally longer pushes are necessary. The ideal distance between the floor and the deck, or between succeeding decks, is on the order of 40 feet vertically.

The top deck will be maintained with a minimum 2% slope to promote drainage. Berms and ditches can be used to divert clean water from interim soil-covered or tarped areas away from the active area.

There will be exceptions to the ideal model of tipping from a deck 40 feet above a lower deck. There may be times, for example, when the dozer needs to push uphill to create a new deck. There may be pushes and fill patterns needed to create haul roads or improved drainage. It is usually desirable to conduct these unique filling operations in the summer when drainage and waste integrity are not so critical.

Creating a network of drainage fingers internal to the waste has been developed by Weyerhaeuser and is important to promote internal drainage and stability of the Landfill. It originally was used due to the high moisture content of Weyerhaeuser's boiler ash, sludge, and other wastes. The County intends to continue this practice unless the waste mix changes significantly. Shredded tire remnants, a byproduct of tire recycling programs, are used to create the drainage fingers. Tire-shred finger drains are placed in the waste approximately 50- to 100-feet on-center across a 20-foot waste block. The finger drains are constructed approximately 3 feet thick, equipment-width wide (approximately 15 feet), and extend from the top to the bottom of the waste block. At the toe of the waste block, a horizontal finger drain is constructed that is tied into the finger drains on the deck below, or otherwise hydraulically connected to the leachate collection system at the bottom of the Landfill. Every 20-foot thick waste block will receive finger drains.

Ideally, all of the finger drains are interconnected so that the drainage from these fingers has a way to get to the bottom of the Landfill. Usually there is a way to direct tire finger drainage

near the perimeter toe of the Landfill, where it can be connected to the leachate collection system.

2.2.5 Leachate Management Facilities

Leachate collected at the base of the Landfill is delivered to the leachate pond(s) either through a force-main pump system, or a gravity-flow pipeline.

The existing leachate pond is located near the northwest corner of the Landfill at an elevation that allows gravity discharge into the rail tank cars or tank trucks at the leachate unloading area in the rail transfer facility. A second 5-million gallon leachate storage pond between the RTF and the existing (upper) leachate holding pond (see Drawing C10), could be constructed in the future, if deemed necessary by the County. If constructed, the new pond would be called the "Lower Leachate Pond" as shown on the drawing.

Infrastructure that needs to be operated and maintained to manage leachate includes;

- The vertical sump risers and pumps in the Landfill
- Cell 2 gravity feed sump, leachate force mains to the leachate pond
- The leachate pond
- The leachate transfer piping from the pond to the tank cars and/or truck trailers, to be replaced by the pump and piping to operate the pipeline when it is constructed
- The leachate spill containment structure and sump pump for the leachate rail spur.

Maximum daily leachate flows are estimated at approximately 432,000 gallons, and the maximum average monthly flow expressed as a daily average is about 155,000 gallons per day. The total annual amount of leachate between the years 1995 and 2010 has averaged 23.2 million gallons, while the last few years the site has averaged about 30 million gallons. During the winter the leachate pond must be emptied as much as practical every day. During the summer advantage is taken of evaporation by not emptying the pond as often, but making sure to go into the winter starting with the leachate storage inventory as near to zero as practical. Landfill operations emphasize minimizing the size of the active area, as well as assuring that all interim tarps and other leachate minimization features are in order. These steps reduce leachate production during the winter.

Leachate is transferred to the treatment plant by a pipeline, once constructed, and by either rail cars or truck tanks in the interim, as summarized above. In the unlikely event the pipeline is not constructed, leachate transfer would be by a combination of rail, standard tank truck, and/or belly tanks in the waste transfer trailers. The pipeline will have a separate operations and maintenance ("O&M") manual which will be included as an appendix with a future edition of this *Plan of Operation*.

2.2.6 Landfill Gas ("LFG") Collection System and Flare

The existing LFG collection system was installed as an odor mitigation measure due to a historical, aberrant high hydrogen-sulfide ("H2S") level within the LFG. The system includes vertical 2" and 3" diameter wells installed approximately 20' in depth to intercept the tire shred network within the Landfill. The LFG collection system was primarily installed in the upper slopes in Cell 2 and Cell 3 areas. The current LFG collection rate is approximately 100 standard cubic feet per minute ("scfm") measured at the flare.

The H2S treatment system consists of a wet scrubber using an aqueous 10% sodium hydroxide solution. The H2S removal system will remain in operation until H2S levels drop

below 1,000 ppm and the enclosed flare (see below) is installed, at which time the County may be permitted by SWCAA to remove the scrubber.

Since MSW is to be added to the waste mix, the County will construct a future LFG blower and flare station that will include a 30 MMBtu/hr enclosed flare and blower system capable of destructing one hundred (100) to one thousand (1,000) scfm of LFG having a ~50% methane content. Stack height will be at least thirty feet (30') and the LFG system will achieve a minimum 98% destruction and removal efficiency. The location selected for the flare station is across the road to west of and immediately adjacent to the existing Cell 1 as shown on the Site Plan.

2.2.7 Stormwater Management

Major stormwater controls include the runon diversion channel and 36-inch culvert, the perimeter runoff control channel, temporary and permanent stormwater runoff berms on the landfill surface, temporary stormwater runon and runoff perimeter ditches, permanent stormwater inlets from the perimeter runoff control channel near the sump areas, temporary stormwater inlets to culverts from temporary ditches, inlets and outlets to the sedimentation/detention and biofiltration basins, the stormwater collection system and sump pump in the rail transfer area, and the final site stormwater culverts that pass under the rail line. It is important that an inspection and maintenance schedule for these facilities be maintained. The inspection and maintenance schedule, along with other Best Management Practices used at the Landfill to comply with the Industrial Stormwater General Permit, can be found in the Storm Water Pollution Prevention Plan, Appendix I to this Plan.

2.3 MONITORING SYSTEMS

The following systems need to be monitored on a regular basis as described in the Sampling and Analysis Plan presented in the *Hydrogeologic Report* (2013, Tuppan Consultants):

- Leak Detection Pipes ("LDP"). Monitor for leaks in the leak detection layer below landfill sumps and leachate ponds.
- Surface Water Monitoring. Monitor against standards in the Industrial Stormwater General Permit and other environmental monitoring requirements.
- Leachate Monitoring. Sample the leachate to determine indicator parameters for both HGCS and ground water monitoring programs.
- HGCS and Ground Water Monitoring. Monitor HGCS outlets and ground water samples for possible indications of liner leaks. Also monitor HGCS for presence of landfill gas.
- Landfill Gas. In addition to the landfill gas monitoring requirements outlined in the Solid Waste Permit, the landfill gas collection system requires monitoring as outlined in the SWCAA Air Discharge Permit.

3.0 LANDFILL OPERATING PROCEDURES

3.1 GENERAL PROCEDURES

3.1.1 Access and Security

A gate on the main access road leading from 1600 Road controls access to the Landfill site facilities. The gate is posted to indicate that unauthorized people are not allowed on-site and that all visitors must register at the office before entering the site. The gate is open during site operating hours, and locked at all other times. Keys are limited in their distribution.

Direct delivery of waste to the Landfill is limited to times when Operations personnel are present during normal operating hours. Neither public delivery of waste nor collection vehicle deliveries are allowed (except drop-box or any collection vehicles serving the rural northeast-County). Scavenging is strictly prohibited. Site personnel are trained to be alert for any unauthorized personnel and to immediately inform the Lead Person if any are observed. No visitors are allowed onsite unless accompanied by an authorized landfill employee. Access to the leachate pond is controlled with a wildlife fence and gate (see Drawing C13). A suite of additional access management options are available for controlling access by humans and animals so as to avoid safety hazards, avoid disease vectors, and protect engineered features of the Landfill.

3.1.2 Operation Hours

The Landfill will generally be open for waste disposal by the County's contractor (Waste Control) and its customers from 7:30 a.m. to 4:00 p.m. Monday thru Friday, with reduced hours on major holidays. Its permitted hours are 6:00 a.m. to 7:00 p.m. Monday through Saturday, and customer requirements or other operational considerations may require operation during the entire period. Portable lighting provides added visibility during limited daylight hours in the winter.

3.1.3 Signage

The main entrance sign to the Landfill from 1600 Road will read "***Cowlitz County Headquarters Solid Waste Landfill***" and provide the hours of operation, emergency telephone numbers, and the landfill operator's name.

All other access gates will have signs that read "***Cowlitz County Headquarters Solid Waste Landfill, Unauthorized Personnel Not Allowed, Use Main Entrance***".

Warning signs will be posted at key locations. These include:

- At the site perimeter:
  "**Cowlitz County Headquarters Solid Waste Landfill, No Trespassing**"
- On fencing around the leachate pond:
  "**Danger, Keep Out, Access for Authorized Personnel Only**"
- On structures housing electrical controls:
  "**Danger, High Voltage/Sensitive Switch Gear**"

Finally, site roads will have speed limit signs reading, "***Speed Limit 25 mph***" or lower as necessary.

3.2 THE WASTE STREAM

The Cowlitz County Headquarters Landfill will initially have three main waste streams:

- MSW from the County's contracted collector/hauler (Waste Control) and Wahkiakum County, and potentially from other MSW generators;
- Industrial waste from Weyerhaeuser NR Company, Longview Fibre Paper and Packaging Company, and other county and regional industry (though latter entities have not yet entered into contracts with the County);
- Third-party commercial, C&D, and special waste that is pre-approved.

The total waste stream is initially expected to be about 400,000 tons per year composed of approximately 30% (120,000 tons/yr) municipal solid waste and 70% (280,000 tons/yr) industrial/commercial waste (see footnote 2, above). Anticipated growth is assumed to expand this to a long-term average of about 450-500,000 tons per year by 2017, and depending on the County's and other nearby counties' industrial economic development success, volumes could grow even further. Of course, waste volumes from a given source and in total are expected to vary significantly from year to year and over economic cycles, and in some years a total waste flow of one million tons may be delivered.

Municipal solid waste is from homes, businesses, and industrial or institutional facilities. Over 80% of the municipal waste is expected to originate from within Cowlitz County. The remaining municipal waste is projected to be third-party collections from nearby jurisdictions, which must be pre-approved prior to delivery to the Landfill. Cowlitz County contracts with Waste Control to operate a transfer station to consolidate in-county municipal waste and local, general, public, self-haul waste. Collection vehicles are routed to the Transfer Station, which is open for public drop-off of waste and commercial collection vehicles. This municipal waste transfer station consolidates the waste and will then deliver it by truck it to the Landfill. By contract with the county, the facility operates daily and provides waste collection and recycling service facilities for household, hazardous, and small quantity generators.

Industrial/commercial waste is currently mostly from industrial forest product manufacturing and processing facilities, as representative of the industrial sector in the county. More than 60% (180,000 tons/yr) of the industrial waste originates from Weyerhaeuser managed collections at its own and tenant facilities in Longview. The remainder is from additional forest products and industrial businesses, and from miscellaneous sources in the region. The industrial waste consists primarily of boiler ash, newsprint deinking-rejects waste, corrugated cardboard recycling waste, stabilized clarifier sludge, and other residues from forest product manufacturing and processing. This waste stream may also include contaminated soils, dewatered dredge spoils, construction and demolition wastes, including treated timbers, and petroleum contaminated soils meeting the waste acceptance criteria.

3.2.1 Screening and Acceptance of Municipal Waste

MSW will be first visually screened by equipment operators at the transfer station and then again by operators at while the waste is being spread and compacted at the Landfill. No liquid or hazardous wastes will be accepted for disposal at the Landfill.

Bulky waste, such as discarded furniture and larger demolition debris, will be accepted for disposal at the Landfill and disposed at the working face with other solid wastes. Bulky waste will be placed as low in a lift of waste as possible (but not within 5' of the bottom liner) to ensure that it is well embedded before daily cover is applied.

Regulated Asbestos Containing Materials will not be accepted at the Landfill.

Biomedical wastes generated by the St. John's Medical Center, currently the only general hospital in Cowlitz County, will not be disposed at the Landfill. Instead, the County contracts with Stericycle, Inc. of Morton, Washington to handle these wastes. Properly treated biomedical wastes may be accepted at the Landfill, provided they have been autoclaved or received alternative treatment rendering the waste non-infectious prior to arrival at the Landfill. Clinics in the area participate in a program, administered by the health department, which arranges for biomedical wastes and sharps to be disposed of by the hospital and its disposal systems. The medical facility segregates all sharps from the general medical waste stream. They are kept in sealed, properly labeled (red) containers, and are disposed of through agreements with Stericycle. Sharps waste generated by individuals will be accepted for disposal at the Landfill. The sharps must be confined in a durable container, such as a PET bottle, which is capable of maintaining its structural integrity. Stericycle is the current WUTC permitted medical waste transporter for Cowlitz County.

Construction and demolition wastes will continue to be landfilled along with the municipal and industrial solid wastes that are received as part of the regular operation. Construction and demolition waste is generally limited in size to pieces no greater than 4 feet by 1 foot, although special handling procedures can be arranged for larger debris. Waste screening will include the requirement for removal and/or diverting of wallboard to recyclers from any construction and demolition waste containing more than incidental quantities of gypsum (e.g., 10% based on visual inspection), since gypsum can degrade to produce hydrogen sulfide emission. (Other high-sulfur wastes such as poultry feathers will also be prohibited from disposal at the Landfill.)

Hazardous waste disposal at the Landfill will continue to be strictly prohibited[5]. The Landfill will not accept, dispose, treat, store, or handle any designated hazardous waste. Hazardous waste is defined as any solid waste designated as dangerous waste under chapter WAC 173-303, the dangerous waste regulations. The County contracts for the collection of household generated hazardous waste ("HHW") at the Waste Control Transfer Station. HHW may also be collected through a Mobile Collection Program established by Cowlitz and Wahkiakum Counties and provided by under contract by Waste Control. Material is collected at the mobile collection events within the two-county area and transported to the HHW collection facility at the Waste Control transfer station for bulking, packing and temporary storage.

Municipal sewage sludge, biosolids, or any material containing either of these also will not be allowed for disposal at the Landfill, with the exception of infrequent sanitary solids from Weyerhaeuser's mill or the Toutle Wastewater Treatment Plant, generated from line breaks, spills, or maintenance. The current permit provides specific conditions regarding this special case, and the County intends to continue the practice.

Bulk or noncontainerized liquid waste will not be accepted at the Landfill unless the waste is household waste other than septic waste. In addition, containers holding liquid waste will not be accepted at the Landfill unless the container is a small container similar in size to that normally found in household waste, or the container is designed to hold liquids for use other than storage, or the waste is household waste.

[5] An exception to this prohibition is the Landfill's permit allowance for a specific type of state dangerous waste that is reactive but contains no toxics. This waste is called recausticizing waste and is from pulp mills. It is allowed to be disposed at the Landfill per a regulatory variance procedure granted by the EHU and Ecology. Moreover, all special wastes allowed for disposal at MSWLFs by WAC 173-303 will be allowed.

3.2.2 Acceptance of Industrial Waste

Preventing unacceptable waste from entering the disposal facility is critical to the County's purposes in operating the Landfill. The objective is to prevent the commingling of relatively benign solid wastes with higher-hazard wastes that are properly designated as either dangerous or hazardous wastes under the relevant local, state or federal regulations. To assure this goal is achieved, a stringent waste characterization, designation, inspection and acceptance program is used. This waste inspection program includes a set of waste acceptance criteria and several check-steps including:

- Communication of waste acceptance criteria to the generator
- Generator mandatory characterization and waste designation as required by both the criteria and by state and federal regulations
- Pre-acceptance review by the County
- Waste acceptance determination
- Waste shipment assurance
- Routine sampling and analysis
- Waste auditing
- Records keeping.

All generating sources of solid wastes, whether within County controlled operations, Weyerhaeuser, or third-party operations, are informed of the waste acceptance criteria and required to pre-qualify their waste and management procedures to conform to County operating requirements and permit conditions. Information is supplied to generators describing acceptable and unacceptable wastes and contractual terms require generator conformance.

It is important that any waste shipped to the facilities is appropriately characterized and designated in compliance with regulations. The generator is instructed that only waste previously approved by the County will be shipped to the transfer station or landfill. Physical inspection will occur at both locations as applicable. Operations personnel are provided the training/information to differentiate between conforming and non-conforming waste and to identify typical unacceptable waste. Training includes MOLO, HAZWOPER, and DOT training.

If unacceptable wastes are identified, they are to be handled in accordance with regulatory requirements for that class of waste. The waste should be either returned to the source, or shipped to a proper recycling or disposal facility permitted to accept the waste. Personnel at the generating source will be notified about the unacceptable material and informed again of the waste acceptance criteria. County and other agency investigations may follow.

Industrial waste streams are evaluated and must be designated non-dangerous as per state regulations. These waste streams will continue to be monitored by regular sampling and testing to assure continued conformance to the waste acceptance criteria. All new wastes should be similarly tested and designated. All third-party generators are required to show evidence of proper characterization and designation of their wastes, and no wastes will be accepted without this showing.

Weyerhaeuser's industrial solid wastes are managed per the terms of a long-term contract with the County for continued proper designation and inspection. Weyerhaeuser's environmental and operational departments are advised of the waste acceptance criteria and asked to pre-qualify their waste and management procedures to conform to the landfill operating requirements and permit conditions. The current Weyerhaeuser waste streams have been evaluated and designated non-dangerous as per state regulations. Cowlitz County will request

evidence of Weyerhaeuser's regular sampling and testing to assure continued conformance to the waste acceptance criteria. Any new wastes will be similarly tested and designated.

3.2.3 Random Inspections

The Landfill, in compliance with WAC 173-351-200, will perform random inspections of waste delivered to the landfill site. The waste chosen for such inspection shall be dumped onto a suitable surface away from other current landfilling activities to avoid interference with operations and so that the waste for inspection can be distinguished from other loads of uninspected waste. The inspection surface chosen must also provide collection of any leachate created from the waste. Generally, inspections at the Landfill will take place in a designated area of the active landfill. In addition, the Landfill's largest waste customer, Weyerhaeuser, typically conducts random, periodic inspections of its industrial waste stream at its manufacturing locations.

Records shall be kept for all random inspections conducted (Appendix D). If hazardous waste is found, the Landfill may either return the excluded wastes to the hauler or arrange for proper disposal.

All Transfer Station and landfill personnel will be trained to recognize potential hazardous waste. Landfill operating personnel must be prepared to identify any significant quantity of hazardous waste that might be delivered to the Landfill. Any hazardous waste materials that pass through the prescreening process and reach the landfill face must be properly removed and disposed.

If any hazardous waste that is not household hazardous waste is discovered in the Landfill, the employee who identified the hazardous waste shall notify the Superintendent, who will then notify the Cowlitz County Environmental Health Unit.

3.3 WASTE TRANSFER

Initial waste delivery to the Landfill includes both rail and truck modes. It is anticipated the Weyerhaeuser waste will be delivered by rail, while both the County and other third-party generators will ship by truck. The average total daily truck traffic to the Landfill is estimated at about 30 trucks transporting about 850 tons of municipal and industrial/commercial solid waste. These annual average estimates are assumed to expand to about 37 trucks per day by 2017. Should Weyerhaeuser exercise the option to use trucks for waste delivery, an additional 23 trucks transporting about 750 tons of waste per day will be added. Noting that several commercial and industrial waste sources are episodic and project-based, such projects can generate significantly more truck traffic for project periods than the above annual averages, and at other times significantly less traffic may occur. The County views the above average annual flows to be a reasonable forecast. The project Final Environmental Impact Statement (Cowlitz County, 2013) presents additional information concerning truck traffic.

For so long as rail transport is continued, then on average, ten to twelve rail cars, each carrying three (3) 20-30-ton boxes, will transport about 750 tons of industrial waste per day to the Landfill. Trucks may deliver more, or even all, solid wastes to the Landfill in the future.

3.3.1 Municipal Waste

MSW will be via truck primarily originating from the Waste Control Transfer Station on Third Avenue in Longview, travelling north on Interstate 5, then east on Headquarters Road, south Silver Lake Road, and 1600 Road to the Landfill. The one-way distance is about 14 miles.

Alternative routes to the interstate as well as access to the Landfill are available if necessary (e.g., weather-related issues). Total truck traffic bearing MSW will be about 16 loads per day.

The trucks will be emptied at the fill face of the active cell either by end-dump type trailers, a tipper, or walking-floor type trailers. For end-dump type trailer disposal:

- The refuse hauling truck backs to the edge of the fill face
- The truck driver operates the truck bed lift to empty the trailer
- The truck driver inspects for completeness of disposal and ensures that the trailer is empty
- The trailer is inspected for damage and the tailgate flaps and seals are cleaned
- The truck bed is lowered
- The truck departs.

For tipper disposal:

- The tractor-trailer backs onto a tipper
- The tractor is detached from the trailer and pulls a safe distance away
- As the trailer is tipped to an angle of about 75 degrees, the top-hinged rear door opens, and waste falls to the cell face
- A bulldozer maybe required to clear the waste pile from the rear door and allow the trailer to completely empty
- The trailer is returned to a horizontal position
- The trailer is inspected for damage and the tailgate flaps and seals are cleaned
- The tractor backs up to retrieve the trailer and then departs; if it is a Closed-Loop Truck Transportation System ("CLTTS") vehicle (see Section 3.4.3 for summary description), it proceeds to the leachate load-out station.
- The entire process takes about five minutes.

A walking-floor trailer has a floor that may move either as a whole unit or in three alternating segments along the long-axis. This rapidly carries waste in the trailer bed to the rear opening where it falls to the fill face. For walking-floor disposal:

- The refuse hauling truck backs to the edge of the fill face
- The truck driver operates the walking-floor to empty the trailer
- The truck driver inspects for completeness of disposal and ensures that the trailer is empty
- The trailer is inspected for damage and the end is swept cleaned
- The truck departs.

If the truck driver or tipper operator notices anything unusual in the waste, the Lead Person or Solid Waste Superintendent will be notified, and the load will be inspected before placement.

3.3.2 Industrial/Commercial Waste

Industrial/commercial waste received at the Landfill may initially be in the range of 280,000 tons per year. This will be transported to the Landfill by trucks and by rail. The trucks are estimated to transport 100,000 tons per year (385 tons per day) from industrial and commercial sources requiring an average of 14 daily trips to the Landfill. Off-loading at the active cell would follow procedures outlined in section 5.6.3.1.

About 180,000 tons/year of industrial waste is annually processed at Weyerhaeuser's Materials Recovery Facility ("MRF") and will be shipped either by rail (Patriot Rail) to the Rail Transfer Facility ("RTF"), or by truck to the landfill tipper if Weyerhaeuser so elects. Trucks act as a backup transportation system in the event of a prolonged rail shutdown (e.g., labor strike or

track slides.) On average, Weyerhaeuser's industrial waste requires 10-12 rail flat cars per day. Up to 17 rail cars, containing three waste containers (boxes) each, can occupy the waste rail spur (see Drawing C10). The Patriot Railroad crew will switch the trains every day of operation.

The waste boxes are designed to hold a maximum volume of about 40 cubic yards, or a total weight of up to 30 tons, varying from 20-30 tons each depending upon waste type and moisture content. The outside dimensions of the boxes are about 8' x 8' x 20'. Upper volume and weight limits for the 17 rail cars are about 2,040 cubic yards or 1,500 tons. The boxes are loaded at the mill from the top. The boxes are emptied from shuttle trucks by opening a top-hinge back gate and tipping. There is a maintainable liquid seal between the gate and box frame.

Weyerhaeuser's industrial waste is currently shipped by rail from the MRF to the RTF. The RTF is located on the northwest side of the Landfill on a northwest trending lobe parallel to the existing Woods Railroad. It contains 1,100 feet of level storage for waste rail cars. Once at the RTF, railcars with loaded boxes of waste are set on a siding. Leachate cars to receive leachate from the leachate ponds occupy a separate siding containing about 510 feet of level tank car storage over a spill containment sump. The Patriot Railroad crew will perform switching and hauling of rail cars. Transfer of waste boxes from the rail cars to landfill shuttle trucks, and leachate from the pond to the tank cars, is performed by Weyerhaeuser employees or their contract vendor personnel.

The transfer of waste boxes from the rail cars to landfill shuttle trucks is designed to occur as follows:

- Shuttle trucks coming from the Landfill with empty boxes will drive up next to the rail spur to the location where the intermodal top-pick is working.
- The intermodal top-pick will back up and allow the shuttle truck to stop between it and the rail car.
- The intermodal top-pick will pick the empty box off of the truck, and the truck will pull forward.
- The intermodal top-pick will set the empty box onto an available space on a rail car.
- The intermodal top-pick will maneuver to the next full box on a rail car, pick it up, and back up so the shuttle truck can pull up in front of the top pick.
- The intermodal top-pick sets the full box onto the shuttle truck.
- The truck pulls forward and drives up to the active landfill cell.

This operation is repeated with the next shuttle truck, and continued until all the boxes are emptied. Note that in the future, self-tipping shuttle trucks could be replaced with standard truck/trailer systems, and the boxes would be emptied via placing the trailer on the tipper provided for MSW and other waste tipping.

Some of the boxes may be designated for specific wastes. For example, some boxes may be lined with special coatings for the mill waste while other boxes may be unlined for demolition/construction waste. Consequently, it may be necessary to perform some staging of the boxes on the ground surface. A gravel shoulder along the east side of the transfer area has been set aside for this.

If any of the boxes are observed to have defects or appear to leak, they are recorded on a container damage tag, which is then attached to the container. Some minor repairs may take place at the Landfill but most repairs will be done by Weyerhaeuser at their MRF in Longview.

3.4 LEACHATE TRANSFER

The County has several options for leachate transfer from the landfill leachate pond to the approved wastewater treatment facility. These options are summarized below. The County intends to construct a leachate pipeline as soon as it owns the landfill. During the interim period (e.g., one to two years), the County will backhaul leachate by rail tanker and/or truck tanker. In the very unlikely event that for some reason the pipeline cannot be built, then in addition to truck and rail the County will also implement leachate backhaul via specially-designed trailers with internal "belly tanks" for backhauling leachate, called the" closed-loop truck transportation system" ("CLTTS").

3.4.1 Pipeline Transfer from Leachate Pond

The County has conducted preliminary engineering studies on a pipeline alternative for conveying all leachate to the treatment plant rather than using truck tanks and/or rail cars. This approach is the County's preferred option for leachate transfer. Permitting and final design have been initiated, and pipeline construction will start immediately upon transfer of ownership from Weyerhaeuser to the County. Procurement and construction may take up to two years following transfer of ownership. Operation of the pipeline will replace leachate transfer to the RTF for load-out to rail or truck, and will involve pumping the leachate via the pipeline from the leachate pond to the ridge crest west of the Landfill, then gravity flow to the Three Rivers Regional Wastewater Plant ("TRRWP"). Pipeline alignment will be mostly within public road rights-of-way. During pipeline construction, leachate transfer will continue to be by rail and/or truck. A revised State Waste Discharge Permit will be required to change the treatment plant destination from the Weyerhaeuser mill to the TRRWP.

A complete operations and maintenance (O&M) manual will be required as part of the final engineering design, which will be included in this Plan as an additional appendix. The basic elements of the O&M manual will include:

- Procedures for pump station start-up and the proper operations of valves.
- Pump station maintenance, including flow meter calibration.
- Pump start- and stop-controls, and PLC logic.
- Procedures for leachate pond management to properly feed the pump station, and will include maintenance of a minimum dissolved oxygen level.
- Performance monitoring of flow meter and pressure gauges.
- Pig cleaning procedures, and any considerations for "smart" pigging.
- Sag drain operations.
- Maintenance of combination air valves.
- Regular monitoring of geologic hazard zones (potential landslide and unstable slope areas).
- Operational procedures for any other valves installed in the pipeline as part of final design.

3.4.2 Rail Transfer from Leachate Pond

As provided in the long-term disposal contract between the County and Weyerhaeuser, Weyerhaeuser has the right to both deliver waste to and remove leachate from the Cowlitz County Headquarters Landfill by rail or by truck. If delivering by rail, and if the pipeline is not

yet operational Weyerhaeuser will use 16-20,000-gallon capacity rail tank cars to remove the leachate. On average, about six tank cars per day are required to remove 100-120,000 gallons per day of leachate. These are filled at the RTF and discharged at Weyerhaeuser's mill site.

The leachate pond has been designed to have the ability to load rail tank cars or truck trailers by gravity. The 12-inch underground pipeline from the pond to the leachate rail spur terminates in a header pipe that feeds six distribution pipes. The distribution pipes are 8-inch ductile iron to HDPE pipes with automatic valves that top-load the tank cars. Below the leachate unloading area is a geomembrane-lined concrete spill-containment sump whose collected liquids are automatically pumped back up to the leachate pond. There is a booster pump on the riser to the header pipe to accelerate tanker-loading times.

The following valves exist in the pipelines:

- One manual valve at the end of a stub-out from each of the two outlet pipes from the pond before they merge into a single pipe. These valves are in a valve box and remain locked closed unless one-half of the pond contains clean stormwater to be discharged should pond capacity become necessary for leachate storage.
- One manually operated valve in each of the two outlet pipes from the pond downstream from the stub-outs. (These two pipes merge into a single pipe after these valves.) Normally, one of these valves remains locked open and the other locked closed, depending which half of the pond is being used.
- One manual master valve in the combined outlet line from the pond, located in the rail transfer facility area. This valve is in a closed valve box.
- Electronically operated valves on the distribution pipes. These valves have sensors that will automatically shut off when the tank car becomes nearly full. A button on the control panel starts the filling sequence and is the only way the valves can be opened.

The leachate transfer operation was designed as follows:

- Each day at the end of operation the manual master valve is closed.
- Before beginning leachate transfer operations, verify that the tank cars are correctly positioned beneath the discharges and that the automatic valve sensors are connected.
- Open the manual master valve.
- Zero the flow meter reading on the panel.
- Push the button that opens electronic valves on each distribution pipe and initiates filling.
- If during filling, any of the tank cars are observed to overflow, hit the emergency stop buttons located on the main panel and at two locations along the pipe support I-beams. The top-pick operator also has a remote emergency shut off to cease leachate loading. If some of the tank cars still need filling, reinitiate the filling sequence for the remaining cars. (The overflow liquid will be captured in the spill containment structure and automatically be pumped to the leachate pond.)
- When all the automatic valves have closed, close the master valve and push an emergency stop button.
- If any irregularities are noted, such as a malfunctioning valve, they must be reported immediately to the Solid Waste Superintendent for correction.

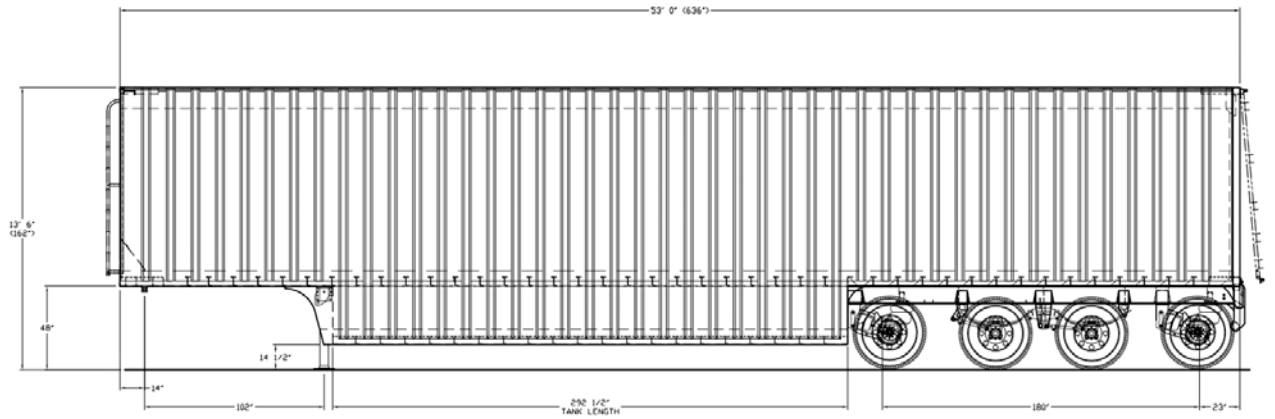
Freeze protection on the main distribution line has been installed. Occasional maintenance of insulation and heat tape may be necessary.

3.4.3 CLTTS Transfer from Leachate Pond

Section 3.4.1 above describes a leachate pipeline as the County's preferred method of conveying collected leachate from the Landfill back to the TRRWP plant for treatment. Rail and possibly truck transport will be used while the pipeline is constructed. If the pipeline were not constructed for some reason, then the County would implement the CLTTS system in addition to the current practice of using rail and/or standard tank truck conveyance of leachate. The CLTTS approach allows the backhaul of leachate from the Landfill in the same trailers that haul the waste from generators to the Landfill, conserving fuel and other costs significantly. CLTTS vehicles contain belly tanks fabricated in the space between the tractor and trailer axles, below the bed of the waste compartment (Figure 3.1). These tanks are designed and certified to backhaul landfill leachate at a rate of about 4,000 gallons/trip. Approximately 38 CLTTS vehicles per day would be expected to haul waste to the site (combination of Weyerhaeuser and County, 280,000 tons/yr). This provides a daily leachate backhaul capacity of about 150,000 gallons and an annual capacity of 35-40 million gallons.

The CLTTS vehicles would be loaded at the leachate rail spur over the spill-containment sump described in the next section. CLTTS vehicles would drive onto the spur and have the belly-tanks filled from the distribution hoses.

Figure 3.1: Diagram of CLTTS Vehicle with Belly Tanks



3.4.4 Future Leachate Pond

In the unlikely event the leachate pipeline is not constructed, the County would evaluate construction of an additional 5-million gallon leachate storage pond between the RTF and the existing (upper) leachate holding pond (see Drawing C10). The new pond would be called the "Lower Leachate Pond". It would be designed as one single containment area rather than in two halves. This pond would be constructed with a double-liner and leakage detection and collection system, similar to the existing pond. Any leachate collected in this pond would be pumped up to the existing pond, from which the existing leachate removal to trucks or rail tank cars would be accomplished. Overall leachate pond operation would be as follows:

- The main leachate storage zone would be the north half of the existing "Upper" leachate pond.

- If additional storage is needed, the north half of the upper pond would overflow into the south half, as it has done periodically during the past 18 years.
- In the event that more leachate storage is needed, leachate would overflow into a new outlet orifice constructed in the south half of the upper pond (see detail on Drawing C18) and flow into the new "Lower" leachate pond.
- Leachate would be transferred from the upper pond to the unloading area in the RTF via the existing pipe and booster pump from the upper pond.
- Leachate from the lower pond would be pumped up to the upper pond as capacity in the upper pond became available.
- Up until the time the lower pond is needed for leachate storage, it would be used to store rainwater that fell into the ponds. After the lower pond had been used to store leachate, it would have to be cleaned before allowing it to store clean rainwater in accordance with the permit conditions.

If the pipeline were not constructed, the County would also consider installation of floating covers over the tops of the two upper ponds to be able to avoid collecting direct rainfall into the ponds as leachate. These covers have the potential to reduce leachate generation by approximately 2 million gallons per year, assuming average rainfall. The floating covers would have a pumped-stormwater-removal system from their surfaces, and would allow the stormwater to be pumped into the lower leachate pond, or into the natural drainage course to the north, as directed by a valve box. The stormwater collected in the lower pond would typically be used for dust control and construction projects in the summer, as has been done with the south half of the upper pond in the past. A standpipe fill station would be constructed on the pond perimeter above the sump to allow the water unloading to occur. In advance of the time that it appears that the lower pond might be needed to store leachate, all stormwater would be evacuated and discharged from the pond.

3.5 WASTE DISPOSAL PROCEDURES

Waste is typically placed in blocks (or lifts) of approximately 20 to 40 feet in thickness, with perimeter slopes of 3:1 (horizontal: vertical) or flatter. Waste is spread and compacted to 2-foot-thick layers on the working face, 50-feet wide and sloped at 3:1 or flatter. Waste is deposited from an all-weather road or platform area onto the working face, spread along the face, and compacted. The compaction equipment traverses the entire length of the working face and makes several passes over each 2-foot-thick layer of waste to ensure that adequate compaction is achieved. Large or bulky wastes and tires are placed in the lower portion of the advancing lift, and thoroughly compacted to prevent bridging of the surrounding waste.

The active area during wet weather operation (nominally October 1 through April 30) will be limited to approximately five (5) acres or less. During the summer months the open active area can be up to 10 acres to accommodate seasonal waste volume and to prepare for wet weather operation. Continuous operational efforts are made to reduce open area even further through efficient operation and the use of interim plastic or soil cover to shed rainfall to stormwater.

Daily cover soil or approved ADC is spread to a minimum depth of 6 inches over all MSW waste disposed each day. Intermediate cover in the form of ballasted tarps is placed over all areas where the waste has been brought to grade and elevation for the current fill phase. The intermediate cover is maintained until either further filling takes place or adjacent areas to be closed reach final grade and the final cover system can be placed over the entire area.

Petroleum contaminated soils, except for soils contaminated with diesel range hydrocarbons or less volatile petroleum products such as lube oil, must not be stored for more than 48 hours prior to disposal in the Landfill or use as daily cover (if approved by the EHU).

Temporary access roads to the landfill cells will be constructed out of demolition debris and gravel and maintained by the landfill crew. Haul roads and dumping pads within the landfill cell will be constructed from select waste materials (e.g. boiler slag, log deck cleanup, dirty hog fuel, demolition debris), onsite soils, and pit-run gravel.

3.6 FILL DOZER OPERATION

At the fill face it is the responsibility of the fill dozer operator to place the waste in the desired dumping area, in accordance with the current fill plan. The dozer operator will try to coordinate with the waste trucks regarding the order of box dumping and tipping. Generally maximizing mixing of the various waste types to achieve a uniform fill will be the primary objective.

The active face will be limited to as small an area as possible. The waste will be spread in layers. (Note that much of the waste, which is predominantly industrial forest-products waste, is not amenable to significant compaction using traditional MSW compactors. The primary mechanism for densification is through overburden weight and dewatering causing consolidation.)

Grading operations will be conducted such that they are effective in containing stormwater that has come into contact with the waste. Grading within the active area will be effected to contain stormwater and force it to percolate into the waste, where it will eventually be collected in the LCRS layer at the bottom of the Landfill.

If the dozer operator notices anything unusual in the waste, the Lead Person or Solid Waste Superintendent will be notified, and the load will be inspected before placement.

3.7 INITIAL LIFT PLACEMENT

To protect the landfill liner from damage, a one-foot thick operations layer is placed during construction before operation begins. To further reduce the chances for liner damage, the initial 5-foot layer of waste will not contain any waste material that may pose a risk to the integrity of the liner by maintaining the maximum dimension of waste components to be less than 12 inches in this layer.

Landfill activities will be arranged to permit gravity drainage of the surface water runoff. Shredded tires or other drainage materials may be placed to aid with drainage in selected locations.

3.8 SIDE SLOPE GRADES

Landfill operations will be conducted to correctly fill the Landfill with proper side slope grades. The maximum intermediate slopes will not exceed 3:1. The maximum final grades will not exceed the slopes shown on the final grading plan (Drawing C01).

Through experience it may be determined that some amount of overfilling on the permanent side slopes will compensate for future waste consolidation. This is acceptable as long as the operator is prepared to cut back any over-steepened slope before installation of a final cover. The amount of overbuild will be determined through experience by long-term monitoring of

interim fill slopes, and not be performed without the concurrence of the Solid Waste Superintendent.

3.9 INTERNAL WASTE DRAINAGE FINGERS

Creating a network of drainage fingers internal to the waste is important to promote internal drainage and stability of the Landfill because of many components of the industrial waste is of low-permeability and saturated. Shredded tires are used to create these fingers.

Tire-shred finger drains are placed in the waste approximately 50- to 100-feet on-center across a 20-foot waste block. The finger drains are constructed approximately 3 feet thick, equipment-width wide (approximately 15 feet), and extend from the top to the bottom of the waste block. At the toe of the waste block, a horizontal finger drain is constructed that is tied into the finger drains on the deck below, or otherwise hydraulically connected to the leachate collection system at the bottom of the Landfill. Generally, every 20-foot thick waste block receives a finger drain.

Ideally, all of the finger drains would be interconnected so that the drainage from these fingers has a way to get to the bottom of the Landfill. Usually, there is a way to direct tire finger drainage to near the perimeter toe of the Landfill, where it can be connected to the leachate collection system.

3.10 ACTIVE AREA LEACHATE CONTAINMENT

Landfill operations will be conducted in a manner to assure that stormwater in the active area is contained as leachate. This will be accomplished by managing the fill sequencing within a cell, regulating the size of the active area that captures rainfall as leachate, and managing interim plastic and soil cover (discussed in the next section) to control and segregate stormwater.

As a lift is advanced, the top of the lift will form a deck that will serve as an unloading pad for the hauling trucks and as the foundation for the next lift. The top of the deck will be filled to create a 2.5 - 3.0 % slope away from the active area. If this deck top is not to be immediately used as an unloading pad, it can then be covered with either interim plastic or soil cover to shed stormwater. Effective use will be made of heavy-duty, temporary plastic tarps.

3.11 TEMPORARY COVER PLACEMENT

Temporary cover will be placed over inactive portions of the Landfill to reduce the infiltration of stormwater into the waste. Temporary cover will consist of interim plastic or twelve to eighteen inches of hydroseeded soil.

3.11.1 Temporary Plastic Cover

Temporary plastic cover will consist of a nylon scrim reinforced polyethylene sheet available in panels up to 200' x 200'. The average thickness is about 10 mils. The plastic panels can be sewn, overlapped, or taped at the seams, and roped and weighted down with sandbags. The seams or overlaps shall be shingled similar to a roof, with a two-foot minimum overlap.

Smaller, more manageable panels can be custom ordered or cut as desired. The scrim reinforcement makes this material very durable and it can be moved and reused several times.

3.11.2 Intermediate Soil Cover

Inactive landfill areas not covered with temporary plastic will be covered with intermediate soil and hydroseeded. The soil will be obtained from on-site borrow areas or stockpiles as directed by the Solid Waste Superintendent.

Equipment operators will use the loader and excavator to load the soils into a truck. The truck will deposit the soil at or near the area to receive intermediate soil at the direction of a dozer operator. The dozer operator will spread the soil in at least a one-foot thick layer.

The intermediate soil will be hydroseeded under appropriate conditions and using an approved seed mix. Additionally, best management practices for reducing erosion shall be implemented by the Solid Waste Superintendent. These include providing plastic cover, additional temporary stormwater berms to reduce the amount of overland flow, surface roughening and contour-grading the soil before it is hydroseeded, mulching and matting, using silt fences along the toes of newly seeded slopes, and providing outlet protection such as riprap where flows are concentrated. Problem areas will be given special consideration and may require the use of geosynthetic erosion control mats.

3.12 CELL DEVELOPMENT AND WASTE PLACEMENT PLAN

The Landfill is being developed incrementally in 22 planned cells that will last two or more years each. Cells 1-5 are built and filling is occurring in Cell 5. There is currently some filling over the top of portions of Cells 1 through 4 as well, as slopes permit to raise those areas further toward final grade.

The current and proposed future cell sequencing was developed to provide the most efficient manner of control for stormwater runon and runoff, constructing the LCRS and HGCS, and optimizing efficiency for landfilling. Drawing G05 shows the completed cell development as of Sept 2010. Drawing C08 illustrates the near-term fill plan through Cell 6 and the bottom grades for Cell 7. Drawing C09 illustrates the completion of fill in Basin No. 1 with the bottom grade for the first cell (Cell 14) in Basin No. 2.

A service life projection for each cell, when each cell was or will be constructed, and when each cell will be closed is on Table 3.1. The life of entire Landfill is projected to be approximately 114 years. This assumes a waste stream of about 400,000 cubic yards per year until the year 2017, and 450,000 cubic yards per year thereafter.

Since the actual daily and annual waste volume may vary and the life of a cell may change, the timing of cell additions as well as the cell sizes may change from the conceptual plan. To help make these decisions, waste flows and capacities will be tracked on a regular basis, and new-construction decisions need to be made at least one-year or more in advance to allow for design, regulatory review, contract bidding, construction, and construction certification.

Each new cell will be designed in a final manner, and construction plans and specifications will be submitted to the lead regulatory agency (EHU) concurrent with the bid process. Since most of the design concepts have been approved through the initial solid waste permitting process the agency review should not be complicated. The phased design and construction of the Landfill will allow, however, for the introduction of new technology in landfill design and construction with regulatory approval.

The Solid Waste Superintendent will keep the EHU informed of major landfill planning decisions well in advance of their implementation.

Table 3.1: Cell Sizes and Durations

Cell	Cell Area (acre)	Excavation Volume (yd^3)	Fill (yd^3)	Cell Airspace (yd^3)	Final Cover Area (acre)	Final Cover Volume (yd^3)	Net Waste Volume (yd^3)	Cell Lifetime (yrs)	Month & Year Cell Filled	Year Cell Built
1-4	45.96				9.12					1993-2007
5	3.27			420,599			397,466		06/30/12	07/01/05
5 Completion	7.57			819,648			774,567	2.22	09/17/14	06/30/11
6	2.39	0	0	658,876	4.50	32,670	591,765	1.48	03/11/16	09/17/13
7	16.37	60,843	86,247	2,273,236	10.99	79,787	2,072,809	5.18	05/17/21	03/12/15
8	15.11	5,997	185,837	4,071,007	13.17	95,614	3,756,746	8.44	10/25/29	05/16/20
9	15.28	84,551	66,667	3,422,577	6.20	45,012	3,191,799	7.09	11/27/36	10/24/28
10	16.55	167,848	26,201	5,984,588	23.21	168,505	5,496,199	12.21	02/13/49	11/28/35
11	9.86	143,964	13,043	3,531,617	10.76	78,118	3,263,557	7.25	05/16/56	02/14/48
12	7.45	163,276	7,961	3,534,454	18.13	131,624	3,215,675	7.15	07/09/63	05/17/55
13	40.07	551,281	58,626	6,108,226	33.91	246,187	5,539,627	12.31	10/30/75	07/09/62
14	16.51	125,753	81,949	2,599,826	21.84	158,558	2,306,998	5.13	12/15/80	10/30/74
15	10.68	252,785	28,717	2,912,324	9.42	68,389	2,687,518	5.97	12/05/86	12/15/79
16	11.12	231,677	18,464	2,885,561	19.19	139,319	2,595,198	5.77	09/10/92	12/05/85
17	9.40	196,260	10,446	2,248,439	21.82	158,413	1,975,074	4.39	01/30/97	09/11/91
18	19.54	158,586	54,270	1,379,867	15.65	113,619	1,196,604	2.66	09/29/99	01/31/96
19	17.80	336,393	16,758	3,860,474	17.62	127,921	3,527,262	7.84	08/02/07	09/28/98
20	13.54	248,062	2,653	3,892,943	25.13	182,444	3,506,422	7.79	05/18/15	08/01/06
21	13.27	133,470	25,844	2,511,184	8.67	62,944	2,313,587	5.14	07/07/20	05/17/14
22	16.01	165,192	21,621	3,259,134	38.40	278,784	2,816,431	6.26	10/10/26	07/08/19
Totals	**307.75**	**3,025,938**	**705,304**	**56,374,580**	**307.73**	**2,167,909**	**51,225,304**	**114**		

Notes (Table updated April 2013)

1. "Cell 5 Completion" is so named to maintain internal Weyerhaeuser accounting consistency
2. Cell Airspace: Volumes are as of September 2010
3. Final Cover Area: The timing of the closure events would occur some time after the month and year the cell is closed
4. Not included in the table is 3,863,389 yd^3 of airspace that has been filled between November 1993 and September 2010. Thus the total airspace of the entire facility would be approximately 60.238 million cubic yards; and the Net Waste Volume (as defined in this table) would be approximately 54.8 million cubic yards.

Assumptions

Cell 5 will be completely filled as of 30 June 2012

Filling of Cell 5 Completion starts 1 July 2012 at a rate of 250,000 yd^3/yr

The start of the Cowlitz County Headquarters Landfill Project is 1 April 2013, when the filling rate of Cell 5 Completion increases to 400,000 yd^3/yr

Annual fill rates (yd^3/yr): Opening - March 2013 = 250,000; April 2013 - June 2017 = 400,000; after June 2017 = 450,000

Table Calculation Methods

Final Cover Volume = (Final Cover Area) * (final cover thickness)

yd^2/acre 4,840 Final cover thickness (ft) = 4.5 = 1.5 yd

Net Waste Volume = [(Airspace) - (Final Cover Volume)] * [1 - (fraction of final cover consumed by operations)]

Fraction of airspace consumed by roads, truck pads, and soil cover = 0.055

Landfill development and sequencing within the limits of the constructed cells will be primarily the responsibility of the Solid Waste Superintendent. Each new cell will require a unique approach to provide the most efficient landfilling process, minimize leachate production, and control stormwater.

3.13 TRUCK AND EQUIPMENT WASHING FACILITIES

Trucks and equipment will be steamed cleaned on a covered steam cleaner pad, designed to capture sediments, oils, and grease. The captured water will be added to the leachate pond. Other landfill equipment will be washed intermittently at the landfill site with the water truck or a pressure washer. This washing will be performed in the fill area with the wash water being collected and handled as leachate.

3.14 ENVIRONMENTAL CONTROLS

An Adaptive Management Plan for Animal and Nuisance Control will be prepared to describe the menu of interventions and preventive means available to the County to assure animals to not become a nuisance, a disease vector, or harm the engineered features of the

landfill. The management plan will emphasize learning by experience to implement the most effective tool(s) from the menu of options. This plan will apply to traditional vectors such as rodents and birds, as well as to other possible intruders such as elk, bear, and feral horses

3.14.1 Vector Control

The conversion of the Headquarters Landfill from an industrial to municipal landfill introduces the possibility of some vectors (nuisance organisms such as rodents, birds, flies, mosquitoes and other scavengers), due to the putrescible nature of MSW. These vectors must be minimized or controlled at the Landfill for the protection of human health and the environment. Good compaction of the refuse, collection of scattered litter, and diligent daily application of cover material are the best controls of disease vectors. Additional control methods may be employed as necessary to control problem scavengers, subject to applicable regulatory requirements and authorization.

3.14.2 Bird Control

Most of the waste deposited to date at the Headquarters facility has not attracted birds because of its composition. However, it can be expected that birds will be attracted with the municipal waste as the Landfill is converted. At most sanitary landfills, birds attempt to feed on the refuse and roost in nearby trees and on freshly covered refuse.

A variety of bird control measures, such as population reduction, population dispersion, behavior disruption, and pyrotechnics may be employed to minimize the bird population in the vicinity of the Landfill. Keys to operation of a successful bird harassment program are the use of trained personnel, unpredictability, and persistence. These will be employed as necessary.

3.14.3 Bear Control

While a significant bear problem is not to be expected, the location of Headquarters Landfill and its conversion to acceptance of MSW could attract black bears. Landfills elsewhere in the Northwest and in southeast Alaska were contacted to determine what deterrents are found effective. From those consultations, we plan a hierarchy of tools, much like those employed to discourage birds. Some of the methods require permits and may require execution by trained wildlife biologists. USDA has field personnel that will provide contract control efforts. Control techniques include:

- Noise-making devices (whistlers, bangers, other devices)
- Aggressive chase via ATV, with noise-making
- Portable high-voltage electric fencing (solar/battery)
- Trapping and relocation of persistent individuals
- Taking of persistent problem individuals.

3.15 HOUSEKEEPING AND ENVIRONMENTAL NUISANCE

3.15.1 Litter

Several methods of litter control, including portable litter fences, drift fences, or a permanent litter perimeter fence may be used. A 6-inch soil or alternative daily cover is also deposited daily as soon as possible after the refuse is compacted.

Some paper and plastic inevitably escapes from the working face and is distributed down-wind. This paper and other light debris must be picked up from the perimeter, stormwater ditches, and environs of the Landfill on a continuing basis. Policing and control of litter will be

implemented as necessary to control litter migration from the active face. The Cowlitz County Work Release program also supplies labor as needed to assist with litter control.

The following areas are patrolled daily and, if necessary, cleaned up by the litter control person:

- The landfill perimeter
- The portable litter control fences that are placed around the active face
- Storm drainage channels on-site
- The surface slope of the Landfill.

Litter is bagged and taken to the working face for disposal. Litter is also collected at least daily around the office and entrance by landfill staff.

3.15.2 Dust, Noise, and Odor Control

On-site watering of the roads during dry conditions controls dust, and a water truck is available as needed for dust control. Water for dust control purposes will be available from the on-site water system. Environmentally acceptable dust suppressants may also be used, subject to prior approval by EHU as required under state regulations.

No adverse noise impacts from site operation or construction have occurred at the Landfill to date. Onsite equipment mufflers shall be maintained, and will be required on contractor equipment as well.

Application of a daily cover material and effective operation and maintenance of an active gas control system in closed and recently filled areas provide the best controls of landfill odors. The active gas control system will be designed and constructed to meet the LFG requirements under the SWCAA air discharge permit and WAC 173-351, and will provide enhanced odor control.

3.15.3 Other Housekeeping Activities

The rail transfer facility and other paved roads onsite will be swept quarterly or more frequently if needed.

Operators assigned to each piece of equipment will inspect them daily before initial start-up. Operators visually inspect the maintenance area, petroleum storage, loading/unloading areas, and fueling station for spills when utilized and provide a written report at minimum on a monthly basis.

Housekeeping inspection and control of outside areas is completed on a monthly basis.

Inspections for spills are conducted monthly. Spills are cleaned up with absorbent materials or rags as necessary.

3.16 RECYCLING

Recyclable materials will not be collected at the Landfill since no access is available to the general public at the facility. Waste Control collects recyclable materials within the city limits of Longview and Woodland through a curbside residential recycling program. Cowlitz County, Castle Rock, Kalama and Kelso residents can deposit recyclables at drop-off recycling sites located throughout the service area or deliver recyclables directly to the Drop-Off Recycling Center and the Buy-Back Recycling Center at the transfer station. The public may also drop off recyclable materials at the Toutle drop-box facility and at several rural drop-off sites. Waste Control also offers recycling containers to businesses.

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4.0 LANDFILL EQUIPMENT

This chapter describes the equipment that will be used to support landfilling operation at the Cowlitz County Headquarters Landfill. The functions, maintenance programs, and replacement procedures of the equipment are described. The following Cowlitz County equipment will be operated at the Landfill by Cowlitz County personnel or their contractor:

- Columbia tipper (1)
- D-7 Dozer (1)
- D-6 Dozer (1)
- D-8 Dozer (1)
- 980F Cat Front Loader (1)
- 436B Cat Backhoe (1)
- Champion Road Grader 780A (1)
- Fork Truck V180B (1)
- International Water Truck (1)
- John Deere Gator (1)
- Shop Truck (1)
- Site Transport Vehicles (3)
- Al-Jon 500C landfill compactor (1) (standby)
- Bobcat 835 skidsteer (1)
- 10-yd^3 capacity dump truck (1).

Weyerhaeuser personnel or their contractor will operate the following Weyerhaeuser equipment at the Landfill for the purpose of accommodating rail-delivered solid waste:

- Intermodal top-pick at the RTF (1)
- Landfill Shuttle Trucks (4)
- Rail Tank Cars (12)
- Flat Cars (32)
- Containers (150).

The equipment listed above has been found to be useful for the current waste mix and transport systems delivering waste. As the mix and/or transport system evolves in the future, the set of operating equipment will also evolve to accommodate those changes.

This equipment is versatile and adaptable for performing a variety of functions at the Landfill. It falls into three general functional categories, which will be discussed below:

- Waste handling equipment
- Cover material handling equipment
- Support function equipment.

4.1 WASTE HANDLING

The tipper will be used to tip and empty waste trailers that cannot be self-unloaded.

The intermodal top-pick will transfer waste boxes between the rail cars and shuttle trucks and is owned and operated by Weyerhaeuser or their contractor. The compactor was the primary vehicle used for waste compaction at the Tennant Way Landfill. Compactors have been found ineffective, however, on industrial forest-products waste. Given the proposed waste mix, it is likely that waste compaction will be provided best by the dozers, with the overburden mass and waste dewatering accomplishing most of the long-term waste densification. The tracked dozers are used for compaction, waste distribution, and waste grading. The loader can also be used to distribute waste.

4.2 COVER MATERIAL HANDLING

The tracked dozers are effective at excavating and transporting cover material for distances up to 300 feet. They can also be used for grading and compacting the cover material. The loader is also effective at transporting, placing, and grading cover material. The dump truck, loader and box hauling trucks can be used to transport cover material for longer hauls.

4.3 SUPPORT FUNCTIONS

The dump truck can be used for support by hauling equipment, towing trailers, and hauling a variety of materials. The loader can be used for small excavations, lifting equipment, and loading the dump truck. The dump truck is primarily used to transport cover material and rock material for road building and gas lateral construction.

The water truck and grader will be used for road maintenance and dust suppression.

4.4 MAINTENANCE

The Landfill will have a preventive maintenance program to minimize "down time" or costly repairs. This program will also contribute to more fuel-efficient operation, safer equipment operation, and improved operator performance.

Operators will perform a daily walk around inspection before operating equipment. A driver's maintenance report will also submitted as soon as a problem is noticed.

The site equipment receives periodic maintenance and any necessary repairs from Cowlitz County personnel and representatives.

4.5 REPLACEMENT

The Landfill will replace equipment at regular intervals as needed and consistent with prudent equipment life cycle considerations, and to avoid costly repairs and breakdowns.

5.0 FACILITY OPERATION AND MAINTENANCE PROCEDURES

5.1 SURFACE WATER DRAINAGE SYSTEM

All surface water structures are designed to handle runoff from the 25-year, 24-hour storm. The design criteria used for this project was that all conveyance storm drainage structures (ditches, channels, down drains, inlets, culverts, etc.) shall be adequate to handle the peak flow from a 100-year, 24-hour storm.

Soil debris and silt removed from stormwater controls will be placed in stockpiles or used for landfill interim cover.

The water quality control facilities include the stormwater sedimentation/detention basins and the biofiltration basins (see Drawings C10-C12.). These basins provide for stormwater detention, settlement of particulates, and trapping soil particles in the water by the vegetation. The wet pond area of the basin will be cleaned of sediments when required.

Should any of the stormwater control facilities fail (e.g., culverts become plugged and stormwater overflows ditch), equipment operators can provide temporary controls (e.g., ditches and berms) simultaneous with effecting emergency repairs. A design review of each failed system will be performed to avoid repeated failures.

5.2 LINER SYSTEM

The purpose of the landfill bottom liner system is to prevent leachate from infiltrating into the groundwater. The bottom liner system must comply with the applicable regulatory requirements in effect at the time of liner construction. There are no specific operation and maintenance issues related to the liner system. Any suspected damage to the liner system, for any reason whatsoever will be reported and corrected.

5.3 COVER SYSTEM

The cover system is comprised of daily cover, an intermediate cover, and a final cover. These systems are described below.

5.3.1 Daily Cover

Daily cover material is used to control litter, odor generation, and disease vectors; provide fire prevention; and reduce animal scavenging. Daily cover at a minimum depth of 6” will be provided by application of soil or ADC. The regulations governing MSWLFs allow for an ADC material to be used, if approved by the jurisdictional health department. Use of ADC results in a significant landfill operating benefit, in addition to the surface control benefits mentioned above. ADC reduces the need to import or use valuable soil and rock resources within the disposal units, which otherwise consume the costly protective airspace with inert materials.

The Cowlitz County Environmental Health Unit with concurrence of the Washington Department of Ecology has previously approved boiler ash for use at the Tennant Way Landfill as ADC. Boiler ash and certain other forest-products wastes are commonly used as ADC materials at many landfills in the region. Separately, Weyerhaeuser has been approved for and uses Auto Shredder Residue (“ASR”) for ADC at Headquarters Landfill, which also is used by many other landfills. These alternative cover materials have been demonstrated by the County, Weyerhaeuser, and/or by numerous other landfill owners in the region to meet the criteria of WAC 173-351-200(2). That is, they:

- are protective of and will not threaten human health
- will not adversely affect collection and control of landfill gas nor of leachate
- will control disease vectors, fires, odors , blowing litter, and scavenging
- provide adequate access for heavy equipment.

The County proposes to continue the practice of using these ADC materials at the Headquarters Landfill, and provides the supporting demonstration documentation previously prepared by the County (Appendix J) and by Weyerhaeuser (Appendix K). A condition of the EHU approval of Weyerhaeuser's application for ASR includes semi-annual sampling and analysis by the generators of the ASR. The County will continue to require this analysis of ASR. We do not propose any additional materials for use as ADC at this time. Should the County determine to request approval of additional beneficial cover materials, it will submit a proposal with associated demonstration as required by WAC 173-351-200(2).

5.3.2 Intermediate Cover

Intermediate cover at the Headquarters Landfill has historically consistent of reinforced plastic tarps that are sewn or taped together, and ballasted with roped sandbags on a regular grid. This intermediate cover system has worked very well for the past 18 years. The County plans to continue this practice, although interim soil cover works very well as one of the available alternatives.

5.3.2 Final Cover

Final cover construction is described in the *Engineering Report* (2013, Thiel Engineering and Energy & Environment) and summarized in Section 11 of this Plan. Final cover maintenance will be performed as described in the post-closure maintenance section of the *Engineering Report* and is summarized in Section 12 below.

5.4 LEACHATE CONTROL SYSTEM

As mentioned above, the landfill liner system prevents leachate from penetrating through the bottom of the Landfill and contaminating the groundwater. Liquid collected on the liner system, and precipitation that comes in contact with the waste, is directed to the leachate pond via the force-main or gravity-flow pipes from the Landfill. This section describes operation and maintenance procedures for the landfill leachate control system.

The leachate is pumped from the landfill Cell 1 sump by means of submersible, single-stage pumps that are located within the riser. The dual pumps have been sized by bracketing with the low and high flow criteria. The sump riser contains two pumps of the same capacity. This allows one pump to serve as a backup in case of pump failure, allows for system maintenance, and also allows the pumping rate to keep up with peaks in the flow rates. The pumps are controlled automatically with two high water sensors (to turn the pumps on) and a low water sensor (to turn the pumps off). The first high water level sensor is 3.5 feet above sump bottom. The second high water sensor is 4.5 feet above the sump bottom. An alarm sensor is 6 feet above the bottom. The leachate is discharged from the pump through a polyethylene (SDR 15.5) pipe to the top of the vertical riser. From there, the pipe is in a trench to a location that ties into the gravity flow line from Cell 2, which flows into the north half of the leachate pond. The 20-inch discharge pipe enters the pond over the top of the liner and discharges on the interior side slope. The Cell 1 sump pumps are operated by electrical power. In the event of a general power outage, which is

not uncommon in this area, an onsite backup electrical generating system automatically comes on to keep the pumps powered.

Other than Cell 1 in the first "leachate drainage basin", leachate can be intercepted in a 20-inch HDPE pipeline and drained to the leachate pond by gravity flow in Cells 2 through 12. The Cell 1 force main is discharged into this gravity line, so that only one discharge into the leachate pond currently exists. A detail of the Cell 2 sump and gravity-flow pipeline is shown in Drawing C27.

The mechanical equipment and electrical control equipment of the pump station require periodic inspection, lubrication, and adjustment. Routine maintenance is described in Table 5-1. This schedule and information will be updated to include the leachate pipeline once its O&M manual is finalized and included with a future edition of this *Plan of Operation.*

5.5 EMERGENCY PROCEDURES FOR THE LEACHATE CONTROL SYSTEM

In the event of a wastewater spill, failure, or upset, landfill personnel shall act quickly to minimize any adverse effects.

5.5.1 Spills

In case of a spill, landfill personnel shall notify the Lead Person and the Solid Waste Superintendent. If the spill is increasing due to a rupture in a leachate force main, determine the upstream leachate pump station and manually turn it off.

Leachate spill occurrences would primarily be associated with the rail operations either at the rail transfer facility or because of a derailment along the rail line. A secondary concern would be involvement of a truck trailer conveying leachate. Spill containment has been designed into the leachate rail spur. If a leachate spill occurs off-site, then the protocol established in the Emergency Response Plan would be followed (see Appendix B). In general once leachate has been spilled it would be very difficult to collect and recover. For example, leachate is primarily derived from rain-water, so standard petroleum booms will be ineffective in a stream. If spilled leachate is pooled on the ground, then every attempt would be made to collect the free liquid. Once the situation is under control (i.e., the leak has been stopped) the impacted areas will be identified and soil sampling will be performed to see if there is any residual contamination. Impacted soils will be removed and restoration implemented.

5.5.2 Failures or Upsets

Failures or upsets in the leachate control system includes but is not limited to piping, fittings, pump stations, and manholes. The most likely source of a failure is at a pump station. Pump stations are outfitted with alarms to notify landfill staff. If a pump failure occurs, determine the cause of the failure and take steps to rectify the problem.

Table 5-1: Maintenance Schedule for Leachate Systems

Item	Function to be Checked Or Serviced	Frequency
Pump Electrical Panel	Proper operation of switches and indicator lights.	Monthly
Emergency Generator	Operation if power goes out.	Monthly automated test run Quarterly testing of the Automatic Transfer Switch Service according to mfg. recommendations.
Landfill Sump Pumps	Condition of pumps.	According to mfg. recommendations
Leachate Force Main	Check for leaks.	Annually Verify pump output at discharge point.
Valves (manual and electrical)	Proper functioning	Observe functioning at every use Check according to mfg. recommendations.
Leachate Pond	Inspect primary liner for damage.	Annually
Secondary and Leak Detection Systems in Landfill Cell 1 Sump and Leachate Pond	Check for liquids.	As required in Sampling and Analysis Plan
Leachate Rail Spur Spill Containment Sump	Check pump for proper operation.	According to mfg. recommendations.

5.5.3 Upper Leachate Pond Overflow

The following emergency procedures for any leachate pond overflow will be used.

- Notify Solid Waste Superintendent
- Notify Department of Ecology and the Cowlitz County Environmental Health Unit
- Prepare to discharge from the weakest side of the pond. This will generally be the South Pond.
  - Pump out collected water from the pond valve vault.
  - Follow confined space entry procedures prior to entry.
  - Use a pump intake hose to attach to the camlock fitting. The intake hose will reduce flow loss associated with discharge flex line.
- Collect an in-stream sample prior to discharge at a point approximately 1,000 feet downstream from the discharge point as shown Drawing C10.
- After discharge begins, collect a sample of leachate from the discharge line and at the same point, 1,000 feet downstream from discharge point.
- Use a 1,000 ml poly, white label, unpreserved, and a 1,000 ml, yellow label H_2SO_4 preserved sample bottle for collection.
- Collect field samples for: Temperature, pH, Conductivity, and Dissolved Oxygen.
- Sample bottles will be used to analyze required parameters.
- Record all Field Sample results and sample bottle identifications in a field logbook.
- Refrigerate the samples until they can be delivered to the lab.
- Release leachate at a rate that protects the integrity of the ponds; so it won't overflow.

The existing leachate pond has served the site well for nearly 20 years. It will serve the County's purpose as well for supplying and operating the leachate pipeline. Should the pipeline not be constructed for some reason, the County would consider expanding onsite leachate storage. The County may construct a second 5-million gallon leachate storage pond between the RTF and the existing (upper) leachate holding pond (see Drawing C10). The new pond will be called the "Lower Leachate Pond", as described in Section 3.4.3. Should the existing Upper Leachate Pond ever reach capacity and overflow, the overflow would occur from the south half of the existing pond into a new overflow pipe that would discharge into the new Lower Leachate Pond. The Lower Leachate Pond would be operated as described in Section 3.4.3. Of course this pond would not be built if the leachate pipeline is constructed.

5.6 LANDFILL GAS CONTROL SYSTEM

This section summarizes operation and maintenance of the control system designed to manage landfill gas. It summarizes some of the conditions of the expected air discharge permit which will be issued by SWCAA. However, it does not present all conditions of the permit, and that permit must be consulted for detailed permit conditions. This permit will be incorporated by reference when the permit is finalized.

Landfill gas is an odorous, combustible gas produced in solid waste landfills, as a by-product of the anaerobic decomposition of organic material in the fill. LFG is typically a mixture of approximately one-half methane and one-half carbon dioxide by volume, with trace quantities of other compounds, including potentially hazardous hydrocarbons. A landfill will usually continue to generate LFG for a few to several decades after final deposition of waste. The proper management of methane gas from a landfill is important because:

- In confined spaces, methane gas is explosive in concentrations from 5 to 15 percent. When concentrations are over 15 percent, insufficient oxygen is available for explosion, but the flammable nature of methane still presents an extreme danger.
- Methane gas can cause asphyxiation in a confined space.
- Methane will kill vegetation by asphyxiating the root system.

When methane is produced below grade in buried refuse, the gas can migrate through the porous media (e.g., refuse or soil) under the influence of pressure gradients and concentration gradients which are produced by the buildup of gas within the refuse fill. Therefore, the accumulation of LFG in enclosed structures on and off-site is a potential hazard. To prevent this hazard, regulations have been adopted by the Environmental Protection Agency ("EPA") and the Washington Department of Ecology ("Ecology") that require landfill owners to take measures to control offsite migration of LFG and prevent accumulation of gas in onsite structures.

To support the County's design and evaluation efforts for the LFG control system, the County contracted for testing of waste gas-generation-potential for the largest gas generators, and modeled the reductions in gas flow following closure using EPA's methodology (40 CFR Part 60 – Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills). The revised gas projections based on the waste testing, other conservative assumptions, and the EPA methodology is included with this Plan as Appendix L .

5.6.1 Regulations

LFG performance standards to be met are specified in the air discharge permit issued by Southwest Clean Air Agency ("SWCAA") and in the WAC 173-351-200(4)(a) and -200(5). Owners or operators of all MSW units must ensure that:

- The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas control or recovery system components);
- The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary or beyond; and
- The concentration of methane gasses does not exceed one hundred parts per million by volume of methane in offsite structures.
- Owners or operators of all MSWLF units must ensure that the units not violate any applicable requirements developed under the Washington state implementation plan approved or promulgated by the Federal Environmental Protection Agency pursuant to Section 110 of the Federal Clean Air Act, as amended (40 CFR § 258.24(a) and WAC 173-351-200(5)(a)).

The following pollutants are typically emitted from landfills and landfill flares:

- Fugitive dust
- Odors
- Toxic air compounds from LFG and poor flare combustion
- Carbon monoxide, nitrogen oxides, sulfur oxides, and particulates from flare combustion

None of the substances considered as "criteria" air pollutants for which ambient standards have been set are likely to be emitted in significant quantities from landfills. With regard to ambient air quality, emission standards are specific to each source.

Cowlitz County is under the jurisdiction of SWCAA. The County is in compliance with all criteria pollutants. The Landfill will be under the definition of an "emission unit," as defined in SWCAA 400-030(38), and is therefore a regulated air contaminant source. Because SWCAA considers landfills as air contaminant sources, the following state and local requirements must be met:

- The source must not violate any ambient air quality standard or any applicable requirements developed under the Washington state implementation plan approved or promulgated by the Federal Environmental Agency pursuant to Section 110 of the Federal Clean Air act, as amended.
- The source must undergo New Source Review as outlined in SWCAA 400-110.
- The source must comply with odor and fugitive dust emission regulations as outlined in SWCAA 400-040.
- The source must demonstrate compliance with the state's air toxics policy.

SWCAA odor regulations state that a source must use recognized good practice and procedures to reduce odors to a reasonable minimum if odor emissions from the source unreasonably interfere with any other property owner's use and enjoyment of his property. [SWCAA 400-040(4)(a)]. SWCAA fugitive dust regulations require the owner to take reasonable precautions to prevent and reduce fugitive dust emissions.

SWCAA also requires a monitoring program for final cover integrity verification on a monthly basis, and quarterly surface emissions monitoring must be conducted on both the landfill perimeter and on a 30-m grid within the landfill footprint.

Ecology's statewide rule "Controls for New Sources of Toxic Air Pollutants" (WAC 173-400) requires that potential toxic emissions be identified, toxic emissions be controlled with best available control technology ("BACT"), and acceptable ambient levels of toxic air pollutants be met. The rule indicates that existing landfills will be subject to new source review when there is a physical or operational change that results in an increase in the emission rate to the atmosphere of any pollutants. Closure may qualify as an operational change. The County will coordinate with SWCAA well in advance of each phased closure, to ensure that the County has a clear and timely understanding of SWCAA's current requirements.

5.6.2 Existing Active LFG Control System

An active LFG control system will be utilized for the Landfill because of its greater flexibility and positive control of LFG, compared to a passive control system. In addition, an active system can better meet MSWLF regulations and SWCAA requirements to control odors at the Landfill and reduce the potential for offsite migration of LFG. The new active LFG control system must be installed and operated beginning the later of: (a) when the total amount of collected LFG exceeds 100 scfm (monthly average); or (b) 365 days after MSW is first placed in the Landfill.

An active control system allows better control of excessive internal gas pressures that could build up under the cover, causing separation of the cover layers. Flow rates at individual collection laterals can be easily adjusted by means of control valves. Greater flexibility is inherent in the active system because of its ability to increase the blower capacity to handle future landfill expansion or adjust to changing conditions within the existing LFG systems at the Cowlitz County Headquarters Landfill.

Because the Landfill is located in a forested area, gas recovery and utilization is considered only as a future option, depending both on gas quantity/quality and on energy market

characteristics. Provisions must be made for coordinating the control and recovery system to ensure that the goals of the system are not jeopardized should this avenue be explored in the future.

A typical active LFG management system for municipal wastes generally consists of the following components:

- Horizontal and/or vertical gas collection wells
- LFG header system
- LFG condensate collection
- LFG extraction blower(s)
- LFG destruction (flare or recovery) system

Gas monitoring probes (gas sampling wells), are provided to monitor compliance with the regulations, limiting offsite migration of LFG.

The active LFG system to be installed at the Landfill is a significant change from plans when the Landfill was originally permitted by Weyerhaeuser in 1993. At that time minimal gas generation was anticipated due to the nature of the waste, and a system of passive horizontal, perforated gas collectors beneath the final cover was planned. These were to be connected to HDPE headers via a valve assembly. A flare station with blowers was planned only if necessary.

However, Weyerhaeuser installed a limited, active system to manage a discrete area of the Landfill where problematic emissions occurred. The existing active LFG collection system installed at the site by Weyerhaeuser was installed in 2007 as an odor mitigation measure due to anomalous H_2S levels within the LFG. The LFG system includes vertical 2" and 3" diameter wells installed approximately 20' in depth to intercept the tire shred network within the Landfill. The LFG collection system was primarily installed in the upper slopes in Cell 2 and Cell 3 areas. Vertical wells are connected near the surface to lateral piping to deliver the LFG to monitoring well clusters. Three clusters of monitoring wells consist of eight (8) to ten (10) well-monitoring points. The clustered wells are connected to HDPE header piping to deliver the LFG to an H_2S treatment system and associated blower/flare. The treatment system and flare station are located on the northern perimeter of the existing Landfill located between Cells 2 and 3. The current LFG collection rate is approximately 100 standard cubic feet per minute (scfm) measured at the flare.

The H_2S treatment system consists of a wet scrubber using a caustic (10% sodium hydroxide) solution. This system removes 90% percent of H_2S in the LFG before combustion in the flare. The level of H_2S in the collected LFG, prior to treatment, has decreased from more than twenty thousand parts per million at its peak, down to two thousand parts per million over previous five years, and continues to decline. When it is installed, the new enclosed flare will destruct remaining H_2S, if present. The County has applied to SWCAA to eliminate the H_2S treatment system when the new enclosed flare is installed, depending upon H_2S levels and relative effectiveness and costs of treatment alternatives. Operation of the gas collection and treatment system is presented in Appendix E.

5.6.3 Wellfield Configuration

The gas collection system is designed to reasonably maximize collection efficiency considering the waste composition (of which MSW is a minority fraction), and the low-permeability of the industrial waste stream.

The primary LFG collection system consists of horizontal bottom-liner collectors, horizontal interim collectors, and horizontal surface collectors. Horizontal bottom-liner collectors are to be

installed on top of the operations layer of each cell, utilizing the designed slope of the operations layer for drainage (Refer to drawing G1.04 detail #4). These collectors will be connected to LFG lateral piping at the perimeter of each cell (Refer to drawings G1.01 and G1.02). Interim horizontal collectors are to be spaced vertically during filling operations and incorporated with proposed tire shred channels. When final grades are reached, near-surface horizontal collectors will be installed below cover material and use the landfill slope for drainage. Surface collectors are intended to collect residual LFG that migrates upwards and is contained by the cover material (refer to drawings G1.02, G1.03, and G1.04).

Typically for MSW landfills, a system of vertical collection wells would be implemented. However, vertical wells are considered a secondary option for this Landfill, given consideration of waste mixture, low permeability of the industrial wastes, and the proposed tire shred channels. Bottom-liner horizontal collectors and interim horizontal collectors would be installed until waste depth is suitable for sixty-foot (60') deep vertical LFG collection wells. Vertical wells would initially be installed on a trial basis to see how they performed. A one hundred foot (100') radius of influence is assumed for vertical wells with consideration of low waste permeability. Vertical wells intended to interact with tire shred channels to increase radius of influence (refer to drawing G1.05).

Site-specific evaluations based on well collection yields and surface emission monitoring will continue to address the effectiveness of the previously discussed gas collection system as the Landfill develops. In addition to bottom-liner and surface collectors, the appropriate mix of horizontal interim collectors and vertical wells will be determined with experience.

The air discharge permit requires each well to be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of (a) 5 years or more if active; or (b) 2 years or more if closed or at final grade.

5.6.4 Collection Piping Configuration

LFG surface collection piping will consist of HDPE header and lateral pipes installed on-grade using the landfill slope for condensate management. A single header pipe will cross the adjacent road and extend uphill from the flare station; first to the interim high point, then to the permanent high point of the Landfill. From this high point, additional header and lateral piping will extend down the landfill slope to provide vacuum to monitoring points as required.

5.6.5 Condensate Management

Condensate generated in header and lateral piping between monitoring points and the Landfill's high point will drain into the lowermost wellhead on any lateral run. Wherever possible, the lowermost wellhead will be the horizontal base-liner collector for direct drain into the LCRS system. Condensate generated between the Landfill's high point and the flare station will drain downhill to the flare station. A condensate sump, installed at the low point prior to the LFG blower skid, will collect condensate coming down this slope. Condensate generated on the blower skid will drain by gravity into this sump. Condensate in this sump will be pumped to the adjacent leachate sump of Cell 1.

The flow rate of condensate generated between the monitoring points and the Landfill's high point is estimated at 20.6 gallons per day for every 100 scfm of LFG collected. The flow rate of condensate generated between the Landfill's high point and the flare station is estimated at 16.5 gallons per day for every 100 scfm of LFG collected.

5.6.6 Compliance & Flare Monitoring

The proposed flare and blower system to be installed will have a fuel flow-metering device and thermocouple temperature transmitters. The system will monitor intervals of fuel flow to comply with air permit requirements and NSPS 40 CFR 60.752. The fuel flow rate will be recorded every minute. Gas composition (CH4, O2) at the flare will be measured manually and recorded weekly. Internal temperature of enclosed flare will be continuously monitored and recorded to ensure the minimum acceptable internal temperature is maintained, i.e., 1400°F (1-hour average).

LFG extraction wells will be installed with monitoring wellheads and associated vacuum control valves. The wellheads are to be fitted with a differential flow metering device and sample ports. The vacuum control valve will be used to manage the amount of applied vacuum to the extraction well. All extraction wells will be monitored monthly with documentation recording temperature, applied vacuum, gas composition, and flow rate. Monthly monitoring will comply with NSPS (40 CFR 60.753).

5.6.7 Areas of Uncertainty, Contingency, Adaptive Management Plan to Improve

Capture efficiency is an area of uncertainty based on the expected low waste permeability and waste composition. An adaptive plan based on measured performance of the LFG collection system will be implemented to improve capture efficiency based on actual experience gained.

5.6.8 Startup, Shutdown and Malfunction ("SSM") Plan

As required by the air discharge permit, prior to placement of MSW in the landfill, the County will develop and submit a plan to guide operations and control of the LFG management system during startup, shutdown and any malfunctions that may be encountered. When developed, the SSM Plan will be summarized in the Plan of Operation here, and will be attached in its entirety as an additional appendix to this Plan

5.6.9 LFG Utilization Potential

When the projected LFG flow rate approaches 500 SCFM with estimated 50% methane content, a feasibility study will be performed to investigate potential utilization avenues. Multiple technologies are available now, and others may evolve that may be selected based on gas flow rate, gas composition, equipment efficiency, and other considerations. Energy market economic characteristics at the time will be a large determinant of whether LFG utilization is feasible.

5.6.10 Procedures If LFG Limits Are Exceeded

If the monitoring program detects gas concentrations in excess of the regulatory limits (see Section 5.6.1) either within on-site structures or at the facility property boundaries, then an aggressive response program will be initiated that includes:

- Immediately notify the Solid Waste Superintendent and the fire department
- Immediately monitor gas concentrations at off-site structures if the lower explosive limit is exceeded at the facility property boundary
- Request the fire department to determine if building evacuation is necessary; conduct evacuation if so advised
- Notify the CC EHU once conditions are known and stabilized
- Daily monitor gas concentrations at all detection points
- Within seven (7) days of detection, place in the operating record:

- the methane gas levels detected
- a description of the steps taken to protect human health

- Within sixty days of detection:
  - implement a remediation plan for the methane gas releases
  - place a copy of the plan (including the nature of the problem, its extent, and the remedy) in the operating record
  - notify the CC EHU that the plan has been implemented.

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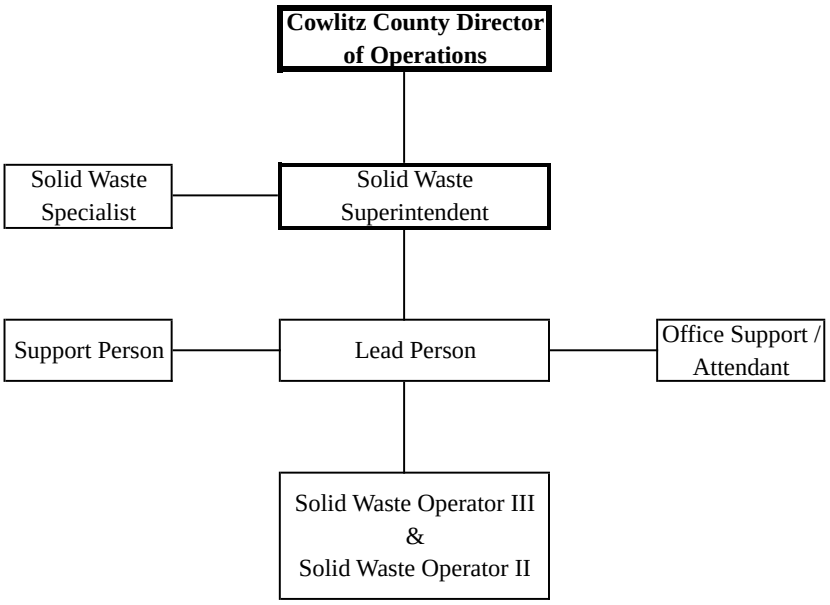
6.0 PERSONNEL

A combination of County employees, customer representatives, and contractor personnel may be on-site at any given time performing operations. Contractors will perform some operational functions, such as trailer tipping and unloading/loading of waste trains, while County employees will perform day-to-day disposal operations. Final County decisions on exact organizational configurations (direct County versus contractor functions) have not yet been made.

6.1 ORGANIZATION

Table 6.1: Cowlitz County Organizational Chart



6.2 ROLES AND RESPONSIBILITIES

6.2.1 Solid Waste Superintendent

The Solid Waste Superintendent reports to the Cowlitz County Director of Public Works.

This position is responsible for the overall operation of the Landfill. Duties include the daily oversight, direction, and work scheduling of all exempt and non-exempt staff. The role is responsible for insuring that the site is operated in a manner that is consistent with the Landfill permit conditions, the operation and safety plans, and all relevant regulations. The position is also responsible for:

- Developing budgets and controlling expenditures of the authorized annual budget
- Administering the waste disposal contractual agreements with Weyerhaeuser and other customers
- Administering the contract with Waste Control for the operation of the Public Transfer Station, Toutle Drop Box Facility, and Moderate Risk Waste Facility, as well as waste transportation services
- Developing customer base for the waste disposal facility
- Conducting planning and implementation of the County Solid Waste Management Plan and maintaining post-closure care of closed County landfills.

6.2.2 Solid Waste Specialist

The Solid Waste Specialist is a technical expert who supports the Solid Waste Superintendent. The primary role is to advise the Superintendent on all site aspects of waste that requires more focused attention to manage it. In addition, the role is responsible for any recycling activities, moderate risk waste program, waste screening program, site gas/air and groundwater and stormwater monitoring and public education aspects recommended by the County Solid Waste Management Plan. Duties will include monitoring, reviewing, and ensuring that all permit requirements are adhered to, and that the Landfill and associated facilities operate in an environmentally responsible manner. This includes but is not restricted to personnel training, agency interaction, environmental and safety record keeping, and the management of the facility's environmental testing and monitoring programs.

This position will also be responsible for coordination of all training, compliance and monitoring of the safety characteristics of associated facilities and landfill operation. Should this position not be filled then the duties will be allocated between the Solid Waste Superintendent, Office Support/Attendant and the Lead Person and professional service vendors.

6.2.3 Lead Person

The Lead Person reports to the Solid Waste Superintendent. This is a non-exempt working operator position whose responsibilities include the coordination of transportation activities associated with waste and leachate, coordination with Waste Control regarding queuing and tipping waste trailers, optimizing the placement of waste, managing the procurement, use and maintenance of mobile equipment, overseeing the operation of leachate collection and load-out systems and the maintenance and monitoring of the Landfill's engineered systems. This would include the day-to-day oversight of the landfill gas collection, scrubbing, and flare systems and leachate collection systems at both the Headquarters and (closed) Tennant Way Landfill. Also, this person would be responsible for oversight of the County Street Sweeping Facility and Compost Facility located at the Tennant Way Landfill.

Administrative responsibilities include ensuring that the facility's working agreement is followed and that landfill operation is in compliance with County policies on safety, environmental performance, personnel, procurement and financial record keeping.

This position is also responsible for ensuring the environmental compliance of facility operation and the safety attributes of the Landfill and associated facilities, such as the vendor operated RTF.

6.2.4 Solid Waste Operators III & II

The Solid Waste Operators will report to the Lead Person and be trained and experienced in solid waste landfill operation. These non-exempt positions are responsible for waste acceptance,

waste loading/unloading, leachate loading/unloading, daily cover, equipment operation, road building and maintenance, gas system management, and other activities as directed by the Lead Person. Each employee shall be individually responsible for performing work tasks in a safe and environmentally responsible manner. At least one (1) Solid Waste Operator, and often two (2), will be on-site at the active portion when the site is open for waste acceptance Operators will be responsible for implementing the random waste screening program and determines the most appropriated and efficient method of handling and moving loads, visualizing the end result while considering grades, weather and other conditions.

6.2.5 Support Person

This role supports and reports to the Lead Person. With the direction and oversight of the Lead Person, this role is responsible for performing manual labor at the facilities such as cleaning refuse stuck in or around the machinery, light maintenance of equipment, securing miscellaneous supplies, fueling, landscaping and implementing site vegetative and litter control and filling in for office or operator support as needed.

6.2.6 Office Support/Attendant

The Office Support/Attendant reports to the Lead Person and is primarily responsible for recording and tracking of the incoming waste loads. Position will process receipts, direct users to the appropriate dumping areas, identify special or problem wastes and communicate it to the lead person. Position will be responsible for maintaining department operating records and assisting in the billing of customers, answering phones and provide accurate information on all county waste disposal programs.

6.3 PERSONNEL REQUIREMENTS

Table 6.2: Cowlitz County Headquarters Landfill Staff Positions

Position Title	FTE*
Solid Waste Superintendent	1
Solid Waste Specialist	1
Lead Person	1
Solid Waste Operator III	2
Solid Waste Operator II	1
Support Person	1
Office Support / Attendant	1
Total	**8**

The County expects 8 full-time equivalent (FTE) positions to operate the Cowlitz County Headquarters Landfill, closed Tennant Way Landfill, Street Sweeping and Compost Facility. This number is sufficient to perform all functions under the current operating plan.

6.4 TRAINING PROGRAM

The Solid Waste Superintendent, Solid Waste Specialist and Lead Person will be certified under a landfill operations training program approved by Ecology. The certification process requires that operators attend all required training sessions and successfully complete required examinations. One certified operator will be on the site at all times. However, a certified operator may be away from the facility on official business or personal emergencies for periods of one day or less if they are on-call and available to respond in case of an emergency at the facility.

The Superintendent or the Superintendent's designee will conduct training for the other positions. This training ensures that employees have a full understanding of job requirements and procedures.

6.5 CONTRACT OPERATORS

Contract operators at the site may include Weyerhaeuser, Waste Control, and third-party truckers who deliver waste to the facility.

As provided for in its contract with the County, Weyerhaeuser will retain the RTF operations including rail transport of its waste and leachate, and shuttle-truck delivery of waste from the RTF to the landfill active area as directed by the County.

Waste Control will transfer waste from its transfer station in Longview to the Landfill, and backhaul leachate in the CLTTS vehicles if necessary. Waste Control will also own and operate the tipper at the site.

Third-party truckers need to be pre-approved and set up an account with the County ahead of time to be permitted to dump waste at the tipping face.

7.0 SAFETY

The following safety procedures and site safety program to be implemented at the Landfill incorporate requirements of regulations promulgated under the Washington Industrial Safety and Health Act, WAC 296-24, 296-62, 296-155("WISHA"), which is consulted for reference. The procedures also incorporate Washington's hazard communication regulation (the "right-to-know" regulation).

7.1 GENERAL SAFETY PROCEDURES

The following general safety procedures are used at the Landfill:

- A walk-around safety inspection is performed monthly. The safety checklist prepared by the National Solid Waste Management Association is used for these inspections. Inspections help to provide safe working conditions for employees and functional safety equipment that is ready when needed
- One safety meeting is held each month to provide the results of the walk-around inspection, review hazards identified, and answer safety-related questions from employees
- The minutes of safety meetings are posted
- A safety bulletin board is in place in the lunchroom. The board displays safety meeting minutes, emergency information, and educational safety materials. All employees are informed of its location
- Personal protective gear is provided for the safe handling of solid waste
- Enclosed work areas are properly ventilated, including trenches deeper than 3 feet, manholes, or any confined spaces
- Eating, drinking, and smoking are prohibited while working on the Landfill. Washing of the hands and face are recommended before work breaks
- Smoking is prohibited within 50 feet of any trenching or piping
- Periodic reviews of the safety procedures are conducted to assess their effectiveness. Appropriate amendments are made to remedy any unsafe practices.

7.2 TRAINING

The development of workplace safety procedures is a positive investment, from the standpoint of both loss prevention and employee morale and productivity. A safety program that includes proper employee training is an important component for developing a safety culture and accident-free operation of the Landfill. Many accidents are preventable because they result from making errors in judgment, working without the proper protection in hazardous areas, or practicing unsafe operating procedures.

The landfill superintendent and lead operators have been trained and certified as landfill operators by the State of Washington. Having properly trained supervisory personnel is an essential part of the overall site safety program.

The in-house employee-training program is designed to educate employees about the hazards associated with landfill operation and the methods of decreasing or eliminating these hazards. It provides detailed safety procedures for construction-related activities such as excavation, trenching, and shoring. This program also educates employees about the existence and location of safety equipment, personal protective gear, emergency directories, and the response procedures to follow in the event of an emergency.

The in-house training plan incorporates specific requirements that may exist under WISHA. For example, the development of an accident prevention program, as required by WAC 296-24-040, is included in the training program. The accident prevention program provides further training opportunities oriented around specific site experiences, and includes monthly site staff safety meetings to discuss safety issues, review any hazards identified during site inspections, and evaluate corrective measures for any unsafe conditions. The meetings are tailored to the particular operation and attendance is mandatory. Meeting minutes and attendance are documented and made available for review by the Department of Labor and Industries, Industrial Safety and Health Division.

The in-house training program contains the following:

- Training for employees in the safety procedures applicable to their activities
- Training for employees in the use and location of safety equipment at the site
- Training for employees in emergency response and contingency plan procedures
- Training for all employees in first aid and cardiopulmonary resuscitation from an approved source. This provides employees with skills to allow them to effectively respond to an injury
- Training for and certification of appropriate employees in the operation of all landfill equipment, allowing only qualified employees to operate equipment
- Training for employees in the proper use and care of respiratory equipment. Employees are examined by a qualified person and tested for proper fit (29 CFR 1910.134) before wearing a respirator
- Instructions in the safe handling and use of poisons, caustics, and other harmful substances. This includes potential hazards, personal hygiene, and personal protective measures. Protective equipment is provided
- Instructions regarding the potential hazards, handling, and first-aid procedures where harmful plants or animals are present
- Instructions in the handling of solid waste and the procedures to be followed in case of accidental contact with waste, leachate, or condensate
- Training for employees in personal hygiene to avoid intake of potentially harmful substances that may be present at the Landfill
- Instruction in the route of entry to the body and toxicology of substances that are potentially present at the Landfill
- Annual refresher training courses to introduce new equipment and reacquaint employees with standard safety procedures

Another step related to employee training is providing employees with information on local safety workshops. These workshops give training in general first aid and permit open discussion of concerns and conflicts. The dates and times of these workshops are posted on the safety bulletin board.

7.3 SAFETY EQUIPMENT

Solid waste personnel work in all types of weather, with many different types of heavy equipment and with a variety of materials that present diverse hazards. For this reason, safety equipment must be used and maintained in a sanitary and reliable condition. Personal protective equipment (for eyes, face, head, ears, and extremities), protective clothing, respiratory devices, and all other appropriate protective equipment must be worn whenever hazards of processes or environment are capable of causing injury. Employees whose duties are performed in high-