CLOVER FLAT RESOURCE RECOVERY PARK
REQUEST FOR MINOR MODIFICATION OF USE PERMIT
NOVEMBER 24, 2009

Clover Flat Landfill, Inc. is the current operator of the Clover Flat Landfill, and the Vista Corporation is the land owner. The Clover Flat Landfill is a Class III municipal solid waste disposal site located in northern Napa County at 4380 Silverado Trail near Calistoga. The General Manager is Bob Pestoni, and he can be contacted at 707-942-4473.

The landfill receives waste from Yountville, St. Helena, Calistoga, the unincorporated areas of northern Napa County, and the surrounding region. The landfill is currently operated under Napa County Conditional Use Permit No. U-438889. Solid Waste Facility Permit (SWFP) No. 28-AA-0002, and Waste Discharge Requirements Order Nos. 91-160 and 93-113.

The Clover Flat Landfill operates according to the Joint Technical Document (JTD) dated December 2005, which was the basis to issue the 5-Year Permit Renewal on April 3, 2006 for SWFP No. 28-AA-0002, and subsequent amendments. The landfill has an estimated closure date of 2021. The next 5-Year Permit Review due date is May 24, 2011. Significant physical changes to the Clover Flat Landfill are not proposed as part of the upcoming Permit Review, as there will be no changes to the following operations:

- No changes in the tonnage amount or waste types.
- No changes in traffic counts.
- No changes in operating hours.
- No changes in permitted boundary or shape of the landfill.

The Clover Flat Landfill has a new management team and a new vision of how the landfill facility can serve the community for years to come, having reached the state-mandated recycling goals. Working with Upper Valley Disposal Service (UVDS), a mixed construction and demolition processing facility was installed in 2008. Looking forward beyond the AB 939 recycling mandates and into greenhouse gas reduction strategies, there are legislative discussions taking place that suggest that the recycling goals will increase beyond the mandated 50% rate towards 60% by 2012, and 75% by 2020, as state government and many jurisdictions are adopting polices to make "zero waste" happen.

The AB 32 Scoping Plan adopted by the California Air Resources Board to reduce greenhouse gas emissions will be mandating commercial recycling in 2011, which would include restaurants and multi-family residences. The AB 32 Scoping Plan will also increase the renewable energy standards from 20% in 2010 to 33% by 2020, calling for new sources of renewable green energy, from sources like landfill gas and woody biomass.

With new mandates and emerging legislation, the Clover Flat Landfill will become the ***Clover Flat Resource Recovery Park,*** shifting the focus from being a landfill into a resource recovery park which has a multitude of recycling facilities under the purview of UVDS. The ***Clover Flat Resource Recovery Park*** will have the ability to produce green energy from landfill gas and woody biomass and be able to supply landscape materials and commodities derived from recyclable material back to the community for sustainable business practices.

It is anticipated that the Solid Waste Facility Permit will need to be revised in 2010, to address a series of changes, which will be part of this Minor Modification to the Use Permit:

- Include Upper Valley Disposal Service, Inc. as the applicant along with Clover Flat Landfill, Inc. to operate the ***Clover Flat Resource Recovery Park.***
- Increase the storage of recyclable materials.
- Add a series of commodity bunkers for wood chips, compost, top soil blends, aggregate materials, and landscape materials for the general public to purchase recyclable materials.
- Add in-vessel food waste composting and food waste transfer and processing operations.
- Expand the entrance facilities and the Recycling Center from 1.4 acres to 3.2 acres.
- Move the existing canopied recycling processing line from the landfill deck to the expanded Recycling Center.
- Extend the estimated closure date to 2047 from 2021, due to increased compaction and the use of synthetic tarps as alternative daily cover.
- Allow new alternative daily cover (ADC) material.
- Add a biomass conversion facility that uses clean processed wood waste in a gasification unit.
- Allow the current landfill gas recovery system that is flared, to add an engine to produce renewable energy and/or fuel cells.

The following Site Maps are attached:

Figure 1	Site Map for CUP Modification
Figure 2	Detailed Site Map of the expansion of the Recycling Center
Figure 3	Existing Site Map

INCREASE THE STORAGE OF RECYCLABLE MATERIALS AND COMMODITIES

The current landfill operations have limited storage capacity, and with increased recycling, increased storage will be needed. The maximum holding time is based upon Title 14 state minimum standards for the storage amount for each material type. The maximum reasonable volume was determined based upon peak seasonal flows of source-separated materials during

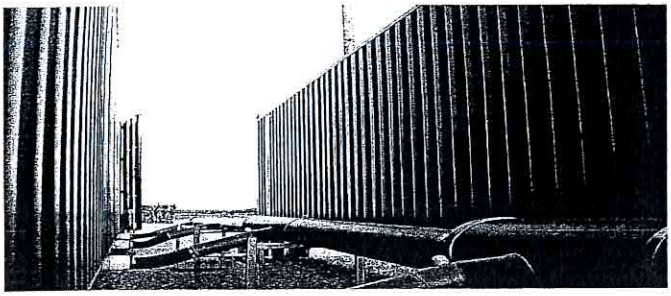
the peak construction season, and the amount of recovered material from the UVDS mixed construction and demolition (C&D) processing line. The location of the storage materials will be placed on top of the compacted intermediate cover of the Clover Flat Landfill, and may be moved quarterly or annually to adjust to the filling of the landfill and the construction schedule of future landfill phases. The amount of storage for each type of recyclable material and commodity is provided in Table 1.

The facility produces a series of construction and landscape products from the recovered recyclables. These materials will be offered to contractors and the general public to be used in the County for green construction projects. With the emerging LEED-certified construction practices, these materials recycled from waste by-products will allow contractors to construct LEED-certified buildings using local green materials for sustainable business practices. The recovered concrete, rock, and inert material is processed into an aggregate base rock that can be used in roads, foundations, and as structural fill material. The recovered wood waste is processed into wood chips for use as biomass fuel to produce renewable energy, or to be used as ground cover for erosion control. The recovered green waste is processed into a mulch that can also be used for erosion control or compost feedstock, which is delivered to a compost facility to produce custom compost and soil blends. These materials will be back-hauled by facility customers to be used as a ground cover and fertilizer replacement.

Table 1 – Storage of Recyclables and Commodities

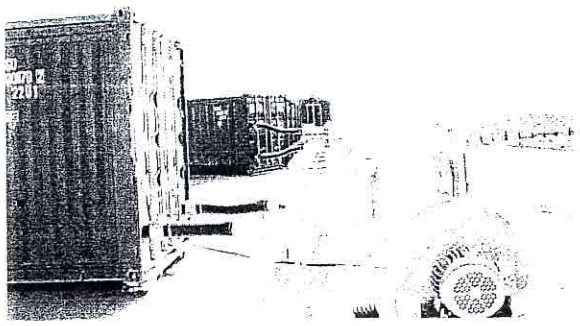
Material	Location See Site Map	Maximum Storage time	Maximum Storage Volume
Clean Green Material	CFL Intermediate Cover stockpile	7 days	2,000 cubic yards
Clean Concrete/Rock/Asphalt	CFL Intermediate Cover stockpile	90 days	5,000 cubic yards
Clean/Recovered Wood	CFL Intermediate Cover stockpile	30 days	5,000 cubic yards
Metals	CFL Intermediate Cover stockpile	90 days	3,000 cubic yards
Food Waste Storage	2 Bunkers on top of CFL intermediate cover	Rolling 24 hours	150 cubic yards
Commodity Sales (wood chips, compost, compost blends, top soils, aggregate base rock)	6 Bunkers on top of CFL intermediate cover	90 days	450 cubic yards

ADD IN-VESSEL FOOD WASTE COMPOSTING AND FOOD WASTE TRANSFER OPERATIONS



Clover Flat Resource Recovery Park proposes to add a containerized in-vessel food waste composting system using modified 40-cubic yard or 50-cubic yards corrosion resistant containers to convert source-separated food wastes into valuable compost products. Using containerized composting eliminates buildings, large concrete surfaces and stromwater basins since the food waste is containerized. Source-separated food wastes from local restaurants and from zero-waste special events will be delivered to one of 2 concrete bunkers on top of the intermediate cover on the landfill deck. The food waste will be stored for a period not to exceed 24 hours, and if stored overnight will be covered with a synthetic tarp. Each bunker will be approximately 20 feet by 20 feet and hold up to 75 cubic yards of food waste. The food waste will be mixed with processed green waste, and then loaded into the food waste composting vessel. As an alternative, the food waste processing may occur at Upper Valley Recycling, and the full vessels will be delivered to the facility and hooked up to the system. These bunkers may also be used to transfer food waste off-site to other permitted composting facilities should these systems not be economically feasible due to the smaller scale.

The in-vessel food waste compost system will consist up to 16 containers such as pictured below, with a capacity of up to 50 cubic yards, for a capacity of less than 800 cubic yards to start. The facility may need to expand to achieve economies of scale with additional containers, not to exceed 2,500 cubic yards.



Enclosed food waste composting systems keep odorous process air from escaping to the atmosphere. Fully aerated systems with temperature control will prevent fugitive emissions and volatile organic compound emissions from escaping, which may be certified for carbon credits under the Climate Action Reserve proposed protocols. The typical blower and aeration system is shown in the adjacent picture.

EXPAND THE ENTRANCE FACILITIES AND THE UVDS RECYCLING CENTER FROM 1.4 ACRES TO 3.2 ACRES

The current entrance, facilities and Recycling Center occupy 1.4 acres on an asphalt concrete pad area. The operations of the mixed C&D Processing Facility are on a temporary 1.1 acre location on top of the landfill. These operations will be combined on an expanded 3.2 acres Recycling Center at the entrance of the facilities as shown on Figure 2 in detail.

UVDS has aggressively diverted C&D materials since fall 2008. Phase 1 of the mixed C&D Processing Facility consisted of a processing line that is extremely durable and portable, and was developed with moderate costs with the construction of a concrete pad on the intermediate cover of the Clover Flat Landfill. The processing line was selected with the goal of installing and modifying and eventually moving the processing line as part of Phase 2 of this operation as highlighted below in Table 2:

Table 2 – Recycling Center Expansion

	Phase 1	Phase 2
Name	UVDS C&D Processing Facility	UVDS Recycling Center
Location	1.1 Acre Pad on top of CFL	Move the C&D Processing Facility to the Recycling Center at the gate of CFL, and increase the area from 1.4 acres to 3.2 acres.
Duration	Fall 2008 for approximately 5 years	Starting 2013

The processing line technology was chosen based on its proven results and has become the industry standard over the years. The processing line has the capability of handling 25 tons per hour of material, and for a 12 hour operating day, the capacity is 300 tons per day (TPD). For a typical 8 hour shift, the capacity is 200 TPD. This processing line has proven to be durable with low maintenance, and has disc screens on the front-end to produce an ADC material that meets state specifications. The ***Clover Flat Resource Recovery Park*** proposes to continue to aggressively divert materials in the expanded Recycling Center which is expected to be operational in 2013.

The proposed grading for the expanded UVDS Recycling Center pad will follow the best management practices to reduce erosion and sedimentation. Installation and maintenance of erosion control measures are the responsibility of the Contractor. Grading, as shown on Figure 2, will be conducted for the prevention of significant erosion and siltation entering the storm drain system, natural drainage courses, and/or intruding upon adjacent roadways and properties. Slopes shall not be greater than 2:1 as is limited to the entrance facilities, not exposed to the scenic view sheds of the Silverado Trial.

Preservation of existing vegetation shall occur to the maximum extent practicable. Exposed slopes shall be protected by using erosion prevention measures to the maximum extent practicable, such as establishing 70% vegetation coverage, hydroseeding, straw mulch, geotextiles, plastic covers, blankets or mats. Whenever it is not possible to utilize erosion prevention measures, exposed slopes shall employ sediment control devices, such as fiber rolls and silt fences. Fiber rolls and silt fences shall be trenched and keyed into the soil and installed on contour. Silt fences shall be installed approximately two to five feet from toe of slope. Soil and material stockpiles shall be properly protected to minimize sediment and pollutant transport from the construction site. The existing drainage facilities will be protected from sedimentation during all phases of construction, where the toe of the fill will be over 100 feet from the natural watercourse as shown on Figure 1.

EXTEND THE ESTIMATED CLOSURE DATE TO 2047 FROM 2021

The remaining landfill capacity of 3.33 million cubic yards was calculated on August 7, 2009 based on a recent aerial topographic map. With increased compaction and decrease in use of soil daily cover, and based upon a historical landfill filling rate of up to 50,000 tons per year, the landfill's estimated closure date is 2047, where the current SWFP had an estimated closure date of 2021.

ALLOW NEW ALTERNATIVE DAILY COVER MATERIAL

Re-processed glass chards generated from single-stream recycling practices are back-hauled to the facility and used as an alternative daily cover (ADC). Since this type of ADC is not pre-approved by the state with state minimum standards, the applicant proposes a demonstration project to include re-processed glass as ADC. This ADC will consist of clean glass shards re-processed in San Leandro to remove contamination and fines. The uses of this ADC material shall only occur during periods of low wind to minimize dust generation, and will be routinely sprayed with water to retain a level of moisturize. This ADC will not be exposed for more than 7 days, and will only be used on the slopes of cells that will be covered by additional MSW within a week.

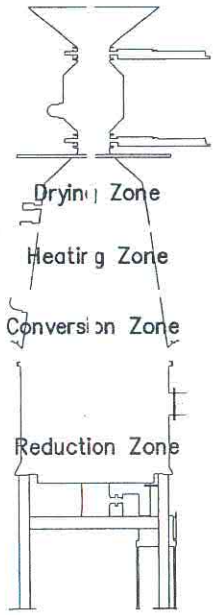
ADD A BIOMASS CONVERSION FACILITY

Biomass Conversion Operations

The applicant proposes to add biomass conversion operations at the base of the landfill slope next to the landfill gas flare unit as shown on Figure 2 - Site Plan, to produce electricity out of the clean processed wood waste materials that are currently recovered and planning to be recovered. The applicant proposes to utilize 40 tons per day (TPD) of clean wood chips

processed on-site from the wood recovery operations to generate approximately 1 MW of electricity. The biomass conversion facility will only receive clean processed wood chips, and will obtain the necessary air permits from the Bay Area Air Quality Management District. The lumber that is recovered and processed into biomass wood chips is currently being hauled to the Central Valley (to Woodland, Tracy, Rocklin or Andersen), to be combusted at biomass-to-energy facilities. The electricity is considered renewable power and is sold to the utilities for their achievement of the state mandate of utilizing 20% renewable energy by 2010. Current state policy and future laws could increase the amount of renewable energy used in California to 33% by 2020.

The applicant proposes to use technologies that convert biomass into a synthetic natural gas ("syngas") through the process of thermo-chemical conversion in a gasification unit. This syngas is then used to fuel a specially modified natural gas genset that provides renewable electricity and heat. The biomass gasification process is a thermo-chemical one that 'cooks' biomass in an oxygen starved environment. By depriving the fuel of sufficient oxygen the biomass does not burn, but rather gives off a hydrogen rich syngas. As the biomass gives off the syngas, it is transformed into bio-char and ash of approximately 1-5% of the volume of biomass fuel. The syngas is then captured, cleaned and cooled before being sent as fuel to the Genset. The Gensets are provided by a variety of nationally known vendors such as Cummins, Caterpillar, or GE. This ensures that there are readily available spare parts and maintenance technicians available locally. The bio-char has demonstrated ability to sequester carbon in solid form for upward of 1,000 years if applied as a soil amendment.



A conveyor fed hopper provides the most flexible solution to deliver biomass wood chips into the unit into the fuel hopper. Once in the hopper, the system uses a robust platform and fuel metering sensors to continuously feed the conversion unit in small batches as needed.

The biomass conversion chamber as shown in the adjacent figure is essentially a chemical reactor where various complex thermo-chemical processes take place. As it flows through the reactor, the biomass gets dried, heated, converted into gas and reduced into bio-char and ash. Although there is a considerable overlap, each process can be considered to be occupying a separate zone, in which fundamentally different chemical and thermal reactions take place. The fuel must pass through all of these zones to be completely converted.

The downdraft conversion unit, employed by the technology, is under vacuum drawn by a high-pressure blower ("negative air"). The essential characteristic of the downdraft design is that the tars given off in the heating zone are drawn through the conversion zone, where they will be

broken down or oxidized. When this happens, the energy they contain is usefully recovered and the mixture of gases in the exit stream is relatively clean. Expected total gas contaminant concentration prior to filtration is up to 100 times less than is often seen in updraft and fluid bed systems.

Gas Cleansing

After the syngas has been extracted from the conversion chamber it is cooled and cleaned by a series of scrubbers and filters. First the gas passes through a venturi scrubber, which is known to remove particulate in the submicrometer range. The gas is then passed through a series of four filters. The first is a coarse filter to coalesce residual liquids. The second is a rejuvenating active sawdust filter, the third is a similar passive filter, and the fourth is a fabric bag filter. The filter media are sawdust and biomass chips so instead of using expensive synthetic filters that need to be thrown away, the used filter media can be simply placed into the fuel hopper and consumed.

Power Generation

The power units are based on a spark-ignited engine genset. Depending on the model chosen, the engines are capable of providing up to 1 mega-watt (net) operating on syngas. The applicant will customize to allow syngas carburetion for this engine and provide standard paralleling switchgear for electrical output with up to 1 mega-watt.

The applicant plans to utilize a CAT 3516 or the Cummins 1710 as the most attractive engine options. These engines also have unique features of better fuel economy, better emissions, durability, and extended oil and filter change period. Both CAT and Cummins engines have been designed to combine compact size, low emission levels and excellent performance characteristics of high-speed technology with the medium speed benefits of water-cooled exhaust valve seats, steel-crown pistons & combustion control. A Bay Area Air Management Quality District Permit to Operate will be obtained. The San Joaquin Valley Air Pollution Control District has issued a Permit to operate for similar biomass conversion unit.

Bio-char & Ash Handling

Bio-char & ash is removed from the conversion chamber using pumped slurry. Scrubbed particulate is combined with the bio-char stream. A closed water loop is used for cooling as well as to provide a seal to the bottom of the gasifier. Water slurry level is maintained in a tank and pumped to an automated filter. The automated filter is typical for river sludge treatment and separates the solids from the recirculated water. The char byproduct, also called biochar, is separated out using a special mechanical separator for resale as a soil amendment, sequestering carbon in the ground in solid form for up to 1,000 years. Water leaving the filter is passed through a final stationary filter prior to heat exchange. The scrubbing water is absorbing heat from the product gas and must be cooled in a cooling tower prior to returning to the closed-loop scrubber.

ADD A LANDFILL GAS RECOVERY ENERGY SYSTEM

Allow the current landfill gas recovery system that is flared, to add an engine to produce renewable energy and/or fuel cells. Reduction of methane emissions from landfill gas at the Clover Flat Landfill is currently performed through the landfill gas collection and enclosed flare. The applicant proposes to add a landfill gas co-generation plant using the landfill gas methane for energy production and carbon sequestration.

Raw landfill gas would be collected and pretreated through a standard Pressure Swing Adsorption / Vacuum Swing Adsorption (PSA) process. A catalytic reactor would then be used to crack methane from the treated landfill gas. The methane would then be used in a conventional internal combustion (IC) engine to generate electricity. However, IC engine electricity production results in air pollution emissions of criteria pollutants such as sulfur dioxide (SO2), particulate matter, nitrogen oxides (NOx), and carbon dioxide (CO2). Restrictive emission regulations could eliminate the option of IC engines without costly injection solutions to achieve emission standards.

Alternatively, the landfill gas methane can be further treated to form free hydrogen and sequestered carbon in the form of stacked graphene platelet nanofibers, a high value product. No other by-products are formed in this process. The hydrogen would then be used in low temperature Fuel Cells to generate zero emissions green electricity. In addition, the methane produced from the proposed biomass conversion facility (syngas) could also be processed through a second PSA to produce hydrogen for Fuel Cell electrical generation.