CITY OF SANTA ROSA’S USE OF LAVA ROCK AS BIOFILTER MEDIA
The Santa Rosa Compost Facility came on line in 1996 and is located adjacent to the Laguna WWTP, utilizes an in-vessel, forced air, agitated bed composting system. The facility processes up to 800 cubic yards per week of chipped yard waste (used as a bulking agent) and up to 300 wet tons of biosolids per week.

The facility utilizes a Biofilter to clean the air that is exhausted from the facility. The Compost Facility Biofilter was first constructed with 2 feet of rock media consisting of ¾ inch drain rock covered with a filter fabric. Over that, a 3 foot layer of filter wood media was installed with a top layer of 6 inches of bark mulch. The surface area of the Biofilter is slightly more than 1 acre: 500 feet long by 100 feet wide.
Compost Facility Biofilter:

Five large exhaust fans pull air from the active composting area through air ducts above the composting bins. Up to 12 air changes can be performed per hour at maximum blower speed or 152,000 cfm
Exhaust Fan Discharge System:

All of the exhaust fans discharge to a common 54” HDPE discharge air header.
Exhaust Fan Discharge System:

In the base of each Biofilter, air is distributed through a series of perforated PVC pipe laterals with 5/8” diameter holes evenly spaced.
Operational History:

The Biofilter was rebuilt twice before the lava rock was installed in 2007. The first rebuild was in 2000. Because of the large surface area, mini track loaders had to be used to push the expired material to an excavator to be removed. During the removal process, the filter fabric was torn and disturbed to the point that it had to be removed. When the new media was installed the fabric was not replaced.

The filter was rebuilt again in 2004.
Plugging Issue:

In November of 2006, the exhaust fans were not moving the air as they should. The air inside the composting area was strong with ammonia and the air temperature higher than normal. When walking on top of the Biofilter, there was no sound of any air flow. The perforated air lateral piping holes were found plugged with decomposed wood dust and in some cases small rocks. The Biofilter was almost completely plugged.
New Media Needed:

Because of the plugging problem caused by the wood chips and the difficulty trying to remove and install the wood chips every couple years, alternative media were investigated. Research on Lava rock found that it had been used successfully in many other similar odor control projects but yet not for a Compost Biofilter. Since the porous nature of the lava rock would allow a large surface area for the biological growth, the City decided that use of lava rock in this application would be worth a chance since it would likely filter odors efficiently and reduce the biofilter replacement frequency by several years, at least.
Lava Rock Installed:

The lava rock was purchased from a lava rock quarry North of Sonoma County – a local source of Biofilter material! Three feet of lava rock material were installed using a belt conveyor truck that could discharge up to 50 feet which allowed the placement of the lava rock without use of compact track loaders.
Water:

Water sprays in the inlet towers were also replaced with fine misters upstream of each of the five exhaust fans that discharge air into the Biofilter. These fine misters perform a dual purpose. First, the water mist absorbs around 50-60 % of the ammonia gas in the air being pulled from the composting area. Second, the fine misters provide moisture to the lower area of the Biofilter which helps to keep the biological growth alive that is growing on the lava rock.
Water:

Irrigation sprinklers on top of the Biofilter help keep the top half moist.
The City considers the installation of the lava rock to the Biofilter to be a huge success! There have been no noticeable increases in offensive odors. In fact, any smell is of an earthy nature like moist soil. Of highest importance and greatest benefit to the local community, the City has received no odor complaints from the public!

• More to come!?