



Landfill Gas Control and Monitoring Case Study

Shoreline Landfill: Landfill Gas and the Urban Legend of the Great Balls of Fire

Every rock venue, and especially those involving legendary concert promoter Bill Graham, has its tale and unique color. Such is also true in the San Francisco Bay Area for Shoreline Landfill and the Amphitheater, which is owned by Bill Graham Presents.

Shoreline Landfill, also called Mountain View Municipal Landfill, served as the municipal waste disposal site for Mountain View and nearby municipalities. The landfill took in millions of tons of municipal solid waste, or household wastes, up until 1993. When the landfill was finally closed in 1998, the wastes were capped with layers of compacted soil and protective moisture-prohibitive clay barriers, all in an effort to keep the waste from getting wet and excessively decomposing. The cap also constrains landfill gas within the landfill and protects the public from exposure to the waste.

The ultimate plan for a portion of Shoreline Landfill was to construct an entertainment amphitheater on the southeast flank of the largest waste disposal cell, creating a mound sufficiently high to provide a foundation for the amphitheater.

When completed, the landfill's operator ordered the contours to be sculpted aesthetically to purposely emulate a small range of rolling hills near the landfill, creating a natural form for passing viewers as well as future visitors to the planned recreational park and golf course. In addition, the amphitheater was melded into the rolling landscape to provide a venue for music and other performance arts in need of a stage and large audience seating. Only a small portion at the west end of the amphitheater actually rests on waste.

The bowl for the amphitheater was created and the stage and permanent seating were installed, along with an upper "green" for other concertgoers to enjoy a more "Woodstock"-like feel. The lawns were laid down and the first events were held.

To concert-goers' consternation, they were witness to bursts of flames darting among the attendees seated on the grass at the amphitheater's first few events. These incidents occurred several times, prompting the amphitheater operator to shut the facility until the problem could be corrected. Consultants hired by the City of Mountain View were brought in to analyze the problem. Tests for gas emissions within the amphitheater area found higher concentrations of landfill gas at the open lawn seating area, but not elsewhere on the site.

Gas monitoring wells are located around the perimeter of the landfill. These wells were tested, but only one well showed landfill gas—and the concentrations were well below the federal limits. Further testing focused on the soil cover area in the amphitheater's open-seating "green."

The cause was quickly determined for the unexpected fireballs. A pocket of waste had somehow been inadvertently commingled into the newly placed final cap in the area where the flame bursts were observed. Once buried, this hidden waste soon began to anaerobically decay and give off methane. The methane rose to the surface, where it was ignited by matches or cigarettes lit by the seated fans. The reaction triggered what quickly became known as "Great Balls of Fire," a tribute to the rock-and-roll song by the legendary Jerry Lee Lewis.

To fix the problem, the original landfill closure contractor removed the waste pocket from the soil cover on the amphitheater green and replaced it with new clean soil. The turf was re-installed, and the amphitheater was back in business.

There have been no recurrences of the "Great Balls of Fire" in the Shoreline Amphitheater. Further, there have been no problems caused by landfill gas migrating into the amphitheater from the adjacent landfill.

Rock history has its colorful legends, including Jimi, Elvis and Janis. The flame bursts are gone, as well, but the legend of "Great Balls of Fire" lives on at Shoreline Amphitheater.



Stage Venue at Shoreline Amphitheater. Lawn area to left. Hard seating and the stage are positioned to the right.

The upper lawn area of Shoreline Amphitheater, where the "Great Balls of Fire" occurred. With new soil in place, the landfill gas was held in check and the unexpected flame bursts stopped.



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