



## Landfill Gas Control and Monitoring Case Study

### Passive Gas Control: San Quentin Landfill

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Landfill gas (LFG) is a product of bacterial decomposition of organic wastes deposited in a landfill, combined with integrated moisture within the waste or from moisture invading the waste. Landfill gas production will continue until all of the organic matter in the waste decomposes. Landfills with design capacity in excess of 2.5 million cubic meters (Approx 3.3 million cu yd) are subject to the requirements of 40 CFR 60.752 (b) through 60.759. Landfill gas consists of methane, carbon dioxide and other gases.

San Quentin Landfill employs a "Passive Gas Control" system, in which landfill gas is controlled or diverted via barriers and gas conduction systems that function without need of powering systems such as fans, diverting and venting the gas, through natural gas pressure, from the landfill, into the atmosphere.

In this project, a large warehouse retail store was constructed on top of the closed landfill. To prevent landfill gas from invading the closed space of the building being constructed on the landfill, the project was fitted with two important components. These protective systems include: passive gas permeability barriers consisting of high-density polyethylene, HDPE flexible plastic sheet, and gravel for a porous gas conductor under the concrete floor slab. Venting systems consisting of underground articulated, perforated PVC piping embedded in the gravel under the slab collect the gas and conduct it by natural gas pressure to vertical venting stand pipes located away from the building, proper. The articulated piping for storm drain and gas allows the pipes to flex with the compacting, decomposing waste, avoiding breakage and potential for gas leaks. Gravel filling the trenches further allows gas to escape controllably in the trenches to release points.



Plastic Sheetting



Porous Gas Conductor Under the Concrete Floor



Vertical Venting



Stand Pipes Located Away from the Building



Articulated Piping



Gravel Filling the Trenches

In addition, the structure is placed on top of concrete support pilings that bear the weight of the building. The concrete floor slab is heavily reinforced with "re-bar" for rigidity. This design feature keeps the structure from loading and compressing the landfill with its weight. In turn, with the reinforced floor and piles, the building will not subside and settle with the uneven settling of the landfill as the waste decomposes and reduces in volume.

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Support Pilings



Re-bar

Without these design elements, the project can result in uneven settling and damage to the building facility as well as potential for landfill gas to enter the inside of the building. The landfill is covered with asphalt parking lots in addition to the building, which helps to prevent moisture invading the landfill.



Inside the Building



Parking Lots and Building



























