

US EPA ARCHIVE DOCUMENT



Project XL: Yolo County Bioreactor Landfill



WHAT IS PROJECT XL?



SUMMARY OF THE YOLO COUNTY LANDFILL PROJECT

Project XL, which stands for eXcellence and Leadership, is a national initiative that tests innovative ways of achieving better and more cost-effective public health and environmental protection. The information and lessons learned from Project XL are being used to assist the U.S. Environmental Protection Agency (EPA) in redesigning its current regulatory and policy-setting approaches. Project XL encourages testing of cleaner, cheaper, and smarter ways to attain environmental results superior to those achieved under current regulations and policies, in conjunction with greater accountability to stakeholders. It is vital that each project tests new ideas with the potential for wide application and broad environmental benefits. As of September 2000, over thirty pilot experiments are being implemented and several additional projects are in various stages of development.

The Yolo County Central Landfill (YCCL) in Davis, California, is a 722-acre disposal site for non-hazardous solid waste, construction debris, and non-hazardous liquid waste. Existing on-site operations include an 11-year old methane gas recovery and energy generation facility, a drop-off area for recyclables, a metal recovery facility, a wood and yard waste recovery and processing area, and a concrete recycling area. Yolo County proposes a two-phase project to operate a 20-acre section of the YCCL as a controlled bioreactor landfill to attain a number of superior environmental and cost savings benefits. In a bioreactor landfill, controlled quantities of liquids are added and circulated through waste to accelerate the natural biodegradation rate of waste and therefore decrease the waste stabilization and composting time compared to what would occur within a conventional landfill. If the waste decomposes in the absence of oxygen (anaerobic decomposition), landfill gas is produced. This gas is primarily a mixture of methane, a potent greenhouse gas, and carbon dioxide, and volatile organic compounds (VOCs), both of which are ambient air pollutants. Methane is also a fuel. This by-product of anaerobic waste decomposition can be a substantial renewable energy resource when recovered to generate electricity or other uses.

In the first phase of this 20-acre project, a 12-acre section has been constructed. This 12-acre section contains one 9.5-acre area, which will be operated anaerobically, and a 2.5-acre area operated aerobically. Horizontal gas wells will be constructed in both the aerobic and anaerobic cells. As waste fills the cells, gas also will be extracted from the base layer of both cells. This extraction system is designed to lower the levels of methane that normally would be emitted to the atmosphere as the waste decomposes. An impermeable cover will be placed over each cell shortly after waste filling has been completed. Landfill gas will be collected from the anaerobic cell, and in the aerobic cell, atmospheric air will be pulled or pushed through the waste. In the aerobic cell, it is expected that this will increase the rate of degradation but inhibit methane formation. The gas and leachate will be monitored during the operation of these cells to collect data for laboratory analysis.

Yolo County will construct the second phase of this 20-acre project in two years, and depending on the results of the first phase, Yolo County may operate the second phase either anaerobically or aerobically. The second phase is not included in this XL project, since Yolo County intends to revise the project in the two years, when more data becomes available from phase one. Yolo County decided to construct this 20-acre cell in two phases to reduce the construction costs of the project and to be able to apply what is learned from the first phase to the second phase. Yolo County, EPA's 40th XL project, was signed on September 14, 2000.

SUPERIOR ENVIRONMENTAL PERFORMANCE

By composting waste anaerobically, Yolo County expects to recover more methane, which will be used to generate electricity, and to extend landfill life. Present landfill capacity is sufficient until the year 2020, but Yolo County wants to extend that to 2030 or 2040. Yolo County also is very interested in reducing the anticipated postclosure expenses and liabilities that are associated with closing conventional landfills. Other benefits include:

- " Improved landfill gas control and capture of methane and VOC emissions;
- " Greater capture of leachate and a decrease in the pollutant loads of leachate; and
- " More rapid waste stabilization.

FLEXIBILITY

Yolo County is requesting regulatory flexibility from Resource Conservation and Recovery Act regulations that control the addition of useful bulk or non-containerized liquids. Yolo County proposes to supplement the liquid addition with ground water and possibly other liquids such as gray-water from a waste water treatment plant, septic waste, and food-processing wastes that currently are applied to land. Liquid wastes such as these, that normally have no beneficial use, instead may enhance the biodegradation of solid waste in a landfill.

Yolo County also requests similar flexibility. Yolo County also requests similar flexibility from California control of recirculating liquids in lined municipal waste landfills. While the control specifically endorses bioreactors, regulatory flexibility is available.

STAKEHOLDER INVOLVEMENT

For this XL project, Yolo County is using an existing community advisory committee to identify potential members for its local stakeholder group. Yolo County has convened periodic meetings of the stakeholder group to obtain comment on this proposal, as well as to brief the group on their progress.

APPROACHES TO BE TESTED

- « Will the use of a bioreactor landfill provide the same level of protection as existing regulatory requirements for conventional landfills?
- * In the bioreactor landfill, will the aerobic bioreactor prove to be more consistent and effective than the anaerobic bioreactor?
- * Will the bioreactor landfill ensure significantly lower fugitive air emissions? And can Yolo County effectively quantify those emissions ?
- * Will the methane from the project become a substantial energy resource ?
- * Will the alternative safeguards proposed by Yolo County effectively prevent leachate contamination ?

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FOR ELECTRONIC INFORMATION

More information about this XL project, or the Project XL Program, is available on the Internet at <http://www.epa.gov/projectxl> under Information on Specific XL Projects, or via Project XL's Information Line at (202) 260-5754.