**PROPOSAL TO REDUCE GREENHOUSE GAS EMISSIONS
VIA LANDFILL GAS MANAGEMENT IN
GREATER BUENOS AIRES, ARGENTINA**

Final Report

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INTRODUCTION

The purpose of this project was to evaluate the feasibility of reducing the emission of greenhouse gases by collection, flaring, and possibly beneficially using the gas from landfills in Greater Buenos Aires, Argentina (GBA). Another purpose was to prepare a proposal to the U.S. Initiative on Joint Implementation (USII) for a project to collect and possibly use the landfill gas (LFG).

The project was carried out from September 30, 1997 through September 30, 1998.

The objectives of the project were achieved. Collection and flaring of gas is feasible provided private firms have sufficient incentive to obtain greenhouse gas emission reduction benefits. The value of those benefits that would be required to motivate funding of an LFG management project was not explicitly determined. However, one independent power producer has expressed an interest in funding the first phase of the proposed project and paid for a detailed feasibility study which was conducted in August and September of 1998.

As a result of this project, a proposal was submitted to the USII Evaluation Panel in June, 1998 titled "Proposal to Reduce Greenhouse Gas Emissions via Landfill Gas Management in Greater Buenos Aires, Argentina. The proposal was reviewed by the USII Secretariat. Comments were issued by the Secretariat and responded to by Pacific Energy Systems. The only outstanding issue is that the proposal lacks host country acceptance.

The proposal was submitted to the Government GOA in July, 1998. In August, 1998, the GOA established an office for reviewing and approving joint implementation proposals. The proposal is currently under review by that office.

SUMMARY OF WORK

During September 1997 through the first half of March, 1998, the project team contacted several people in Argentina who had knowledge of the landfills in Argentina and of Argentina's climate change programs. The contacts that turned out to be of lasting importance included:

- Dr. Atilio Savino, Secretary General of CEAMSE (the solid waste management agency for Buenos Aires)
- Lic. Ana Corbi, Project Administrator for the Argentine Secretariat of Natural Resources and Sustainable Development (SRNyDS)
- Mr. Philip Covington, Science Counselor, U.S. Embassy in Buenos Aires

In mid-March, the project team traveled to Buenos Aires. It met with Dr. Savino and the President of CEAMSE, Dr Marcelo Kohan. Mr. Covington and Mr. Alvaro Mendez of the Commercial Section of the U.S. Embassy also attended the meeting. Dr. Savino and Dr. Kohan indicated their interest in studying the proposed project further and in cooperating on the implementation of a USJI project.

The project team visited two of CEAMSE's four operating landfills. They were found to be basically suitable for development of landfill gas collection systems. Security was good. Landfilling practices and the layout of the landfills were suitable. Some sections of the landfills have been recently closed and can be developed without interfering with filling operations.

The project team met with landfill supervisors and CEAMSE's contracted operators. The staffs were open to the idea of installing landfill gas collection systems.

Good opportunities for using the gas were not identified during this visit. However, on a second visit in August and September a factory was identified near one of the landfills that manufactures porous brick that is used to make lightweight concrete. Time commitments did not allow for a meeting with the factory management; but CEAMSE management expressed interest in following up on this lead.

Electricity and natural gas are inexpensive in Argentina. Using the LFG to generate electricity is not likely. However, there is some evidence of a lack of supply along the transmission grid in the vicinity of one of the landfill. Landfill operations, particularly leachate treatment, require more electricity than the local supplier is supplying now. The possibility of generating electricity for its own use will be investigated further if conditions warrant it.

The project team met with Ms. Corbi of SRNyDS who introduced the team to Dr. Miguel Craviotto. Dr. Craviotto is Director of the National Office for Environmental Regulation. He expressed support for the project. SRNyDS will provide external verification of the project.

After returning to the United States, the project team prepared a USIJI proposal which is included as an attachment to this final report. It gives more details of the meetings held in Buenos Aires and describes how the objectives of this project were addressed. The proposal was submitted to USIJI and to the Government of Argentina.

To date, several questions have been raised and answered regarding the proposal. The more significant ones follow.

- The current emissions of methane from the landfill have not been estimated with complete accuracy. Such an estimate is impractical due to the large size and heterogeneity of the landfills. However, emission reduction benefits claimed by the project will depend on a direct measurement of gas that is actually collected and burned. Some LFG will always continue to be emitted from the landfill to the atmosphere. The calculation of benefits does not depend on the amount of current or baseline emissions. It depends solely on the amount collected and burned.
- The duration of the project is uncertain. The project should yield benefits as long as CEAMSE continues to dispose refuse and as long as USIJI is a recognized program. The proposal states the minimum expected life is 20 years, but the actual life could be much longer.
- The implementation schedule is uncertain. The project is to be developed in phases. When CEAMSE and a potential project funder identify a section of landfill ready for gas collection and the funder is interested in obtaining emission reduction benefits, they will enter into negotiations for developing that phase of the project and for allocating the resulting emission reduction benefits.
- The project leaves open the possibility of beneficially using the LFG. More than 80 percent of the greenhouse gas reduction benefits of a collecting and using LFG to replace natural gas result from the conversion of methane to carbon dioxide. The remaining fraction results from displacing a fossil fuel. Using the gas often presents the most daunting challenges and sometimes proves to be impossible. It is not reasonable to forego the opportunity to get the majority of the benefits simply because some a small fraction of the benefits cannot be obtained or can only be obtained at a prohibitive cost.

This USIJI project takes the approach of focusing on collecting and flaring the LFG first. If, after the gas is being reliably collected, a beneficial and cost-effective use can be found, then that will be done.

One potential use is the evaporation of leachate from the landfill and combustion of the organic matter contained in the vapor. SRNyDS is very enthusiastic about this possibility because water pollution problems are severe in the Buenos Aires area and landfill leachate is known to be a contributing factor. However, one landfill already collects and treats its leachate at a state-of-the-art treatment plant. Integrating gas collection and leachate treatment will be done on a phase-by-phase basis as appropriate.

- The price of emission reduction benefits is not specified. The value of emission reduction benefits depends on the demand for them. If international agreements are ratified that require firms to reduce or to mitigate their emissions of greenhouse gases, the value of emission reductions from this project is likely to increase. CEAMSE could then find it worthwhile to develop the project more aggressively. The amount to be paid by a project funder to CEAMSE for a given phase of the project will be determined in negotiations between the funder and CEAMSE for that phase.
- Methane in LFG is partially oxidized as it seeps through landfill cover soil. There is some scientific evidence for this phenomenon, but how much it occurs in the field is not known. Fertile soil with oxygen in its pores and a moisture content of approximately 10 percent to 30 percent is believed to promote oxidation of methane. CEAMSE uses little fertile soil as landfill cover. It also installs vents that allow some of the gas to bypass the cover soil. For these reasons, the USIJI proposal does not assume that, in the baseline case, methane is oxidized as it leaves the landfill.

Drafts of the proposal were also submitted to the industry review panel members who had agreed to advise the project team. The panel members are

- Dr Wayne Lei, Portland General Electric/Enron
- Mr. Bill Edmonds, PacifiCorp

Both advisors were interested in the cost of implementing gas collection systems in terms of dollars per ton of greenhouse gas mitigation. Good cost estimates were not available for developing collection systems in Argentina. Using default values from the U.S. EPA's E-Plus software and other rough estimates yielded costs of approximately one to two dollars per ton of carbon dioxide equivalent.