

Andrew Malahoff
San Francisco Wastewater Treatment Plant Site Visit
January 2012

This report summarizes findings and observations during the recent site investigation and tour of several wastewater treatment plants in San Francisco. This trip was funded through a gift to the City from HRP 56, LLC ("HRP") for the aforementioned purposes. Through Resolution 11-350, FD1 the Council established a Permitted Interaction Group ("PIG") comprised of Councilmembers Ann Kobayashi, Romy Cachola and Councilmember Ikaika Anderson.

The PIG had the opportunity to visit San Francisco's Southeast Water Pollution Control Plant, located in the Bayview District, and the Oceanside Water Pollution Control Plant, located off the Great Highway near the San Francisco Zoo and immediately adjacent to the coastline. In addition, we also had an opportunity to meet and talk with project managers from HRP, several representatives of technology providers and a representative from Matrix Services Inc. which is an engineering firm familiar with digester design, construction and operation.

HRP is solutions provider that has proposed constructing and operating, at no capital cost to the City, a second digester at Sand Island Wastewater Treatment Plant. Unlike the existing digester program, HRP is proposing a electricity cogeneration program utilizing several emerging technologies. Under this proposal the energy produced by the cogeneration program would be sold at comparable market-rates to the City with the revenue serving to recover the capital expenses for construction of the facility. At the end of a set term HRP would transfer ownership of the capital assets to the City.

The process of capturing biogas from the digesting of sewage sludge to generate electricity is not an inherently new process. There are numerous wastewater facilities which operate cogeneration facilities that are, for the most part, cost effective.

The Southeast Water Pollution Control Plant has being operating a cogeneration facility for several years. Our group had an opportunity to speak with supervisory staff at the facility and hear their first-hand experiences with the cogeneration process. Until recently, the facility basically captured the biogas produced by a converted digester and fed it to a generator to produce electricity. Biogas is often confused with "natural gas" that is commercially produced. Although they are both chemically similar "natural gas" is processed and cleaned of impurities before it's delivered to the consumer. Biogas contains numerous impurities such as: carbon dioxide, hydrogen and nitrogen. As a result of these impurities the BTU value of biogas can be as much as 40% lower than natural gas. These impurities typically also cause accelerated wear on the generation components leading to more frequent equipment failures. By installing a filtering (or

“scrubbing”) system between the digester and the generator Southeast Water was able to remove the impurities and deliver a biogas to its generator which was far more similar to “natural gas”. The staff noted that since the installation of the biogas filter system they had seen notable improvements in the cogeneration facility’s efficiency, stability and reliability.

We also visited the Oceanside Water Treatment Plant, located off the Great Highway near the San Francisco Zoo. The facility utilizes four large egg-shaped digesters each with a maximum capacity of 750,000 gallons, although not all four digesters are typically in operation at the same time. Typical processing capacity of the Oceanside Water Treatment Plant is 17mgd in dry weather and 65 mgd during storm events. Currently methane gas, generated by the anaerobic digestion, is recaptured and used to produce some energy with the remaining gas being flared off. The treated biosolid is used as landfill cover or soil amendments for farmland; the current product is classified as Class B. Of interest is the fact that the facility is in the process of converting one of their digesters to a thermophilic batch process. The operator also noted that two of the largest problems that the facility has to deal with are the intrusion of windblown sand into the sewer system, which results in build-up within the digesters, and problems with corrosion of the equipment due to its close proximity to the ocean. Despite these issues, the facility has experienced virtually no down-time of its digesters; except for routine maintenance.

The experience of visiting these two facilities and having an opportunity to speak with facility staff made it clear that Honolulu’s failure to employ co-generation technology at its wastewater facilities, especially at Sand Island Wastewater Treatment Plant, has resulted in a significant lost opportunity to help reduce operating expenses. Although the use of raw biogas (i.e. unfiltered methane from the digester) is a less desirable approach, it is more preferable to put this gas to some use rather than simply flaring it off. The systems employed at both Oceanside and Southeast show that large-scale digesters, when operated in conjunction with a cogeneration facility, are an efficient and effective means of treating sewage sludge. Honolulu should be actively pursuing co-generation at all its waste water facilities.

City Council
City and County of Honolulu

CLAIM FOR TRAVEL REIMBURSEMENT

Date: 2/3/12

Traveler: Andrew Malahoff

Event: Site Visitation of Wastewater Treatment Plants

Location: San Francisco, CA

Dates: From January 14, 2012

To January 18, 2012

Description	Amount	Notes:
1. Registration Fee		
2. Airfare		
3. Hotel		
4. Meals	29.36	Receipts attached
5. Ground Transportation		
6. Tips		
7. Other	7.57	Receipt attached
Other		
Other		
8. Adjustment		
TOTAL REIMBURSEMENT	36.93	

This is to certify that the above data, based upon receipts submitted to Council Administrative Support Services via a CCLTRVL02 form, is accurate. Further, I am claiming reimbursement for expenses associated with a trip in which City business was conducted and personal funds were used to advance payment:



Signature of Traveler

2/6/12

Date