City of Riverside

# WASTEWATER COLLECTION AND TREATMENT FACILITIES INTEGRATED MASTER PLAN

## VOLUME 8: SOLIDS TREATMENT AND HANDLING
## CHAPTER 7: SOLIDS DISPOSAL

**FINAL**
February 2008

carollo
Engineers...Working Wonders With Water™

10540 TALBERT AVENUE, SUITE 200 EAST • FOUNTAIN VALLEY, CALIFORNIA 92708 • (714) 593-5100 • FAX (714) 593-5101

City of Riverside

**WASTEWATER COLLECTION AND TREATMENT FACILITIES INTEGRATED MASTER PLAN**

**VOLUME 8: SOLIDS TREATMENT AND HANDLING**
**CHAPTER 7: SOLIDS DISPOSAL**

## TABLE OF CONTENTS

**Page No.**

Chapter 7

# SOLIDS DISPOSAL

## 7.1 PURPOSE

The purpose of this chapter is to provide a brief summary of the City of Riverside's (City) solids (biosolids) disposal plan for the next 20 years. The schedule and cost information provided from the City will be used for input into the Capital Improvement Plan (CIP), Master Plan Manager™ (MPM™) and Financial Planning Tool™ (FPT™).

## 7.2 BACKGROUND

The City began evaluating alternative methods for biosolids disposal in April 2002. The 2003 Bio-Solids Handling Improvement Report by Brown and Caldwell recommended $60 million in capital expenditures and an additional $1 million/year in operating costs to convert the City's current Class B biosolids treatment facility to a Class A facility, in accordance with industry and regulatory trends. Since then, the Public Works Department has been working to reduce and postpone the need for these improvements through operating modifications and by improving process efficiencies.

## 7.3 CURRENT DISPOSAL METHOD

As mentioned above, the City of Riverside Regional Water Quality Control Plant (RWQCP) currently produces Class B sludge. To minimize odors, the RWQCP limits on-site solids storage of dewatered solids to the existing sludge storage hopper. Fleet transportation services sends trucks to the RWQCP daily to pick up the dewatered solids and delivers it to alfalfa and cotton farms in Arizona, where it is used as a soil amendment.

Currently the RWQCP generates and requires disposal of 140 Wet Tons Per Day (WTPD) of dewatered solids. According to the City, the 2006 to 2007 disposal cost is about $3 million (all-inclusive costs, $57.53/wet ton (wt)). The cost varies based on the price of diesel fuel. This price is expected to increase more than 10 percent as all Southern California counties either have banned the land application of Class B biosolids or do not have acreage that has a permit that allows land application.

## 7.4 CITY'S FUTURE SOLIDS DISPOSAL PLAN

The City has entered into an agreement with EnerTech Environmental California, LLC (EnerTech) to participate in the Rialto Regional Biosolids Project as a component of the City's long-term biosolids management strategy. The decision was made after a discussion with industry experts from the University of California Riverside Center for Environmental Research and Technology (UCR CE-CERT) that the Rialto project's technology is sound

and pricing is advantageous. Furthermore, experts from UCR CE-CERT said that emerging technology such as converting biomass into vehicle fuel is only in the development stage and would not be available to the City for quite some time.

The Rialto project is an outcome from the Orange County Sanitation Districts (OCSD) December 2003 Long-Range Biosolids Management Plan (LRBMP). The study evaluated four technology areas: composting, heat drying, energy recovery, and organo-mineral fertilizer manufacturing. Among the eight proposals received, the EnerTech proposal ranked the highest, based on a set of comprehensive criteria.

According to the City analysis, participation in this project would result in a net present value savings of more than $27 million to the City over the 20-year life of the Rialto project, when compared to making improvements to improve the City's Class B biosolids to Class A. The following describes the EnerTech SlurryCarb™ process.

### 7.4.1 Enertech SlurryCarb™ Process

Biosolids at up to 20-percent solids content are brought to a central manufacturing facility where they are processed as a pumpable slurry. The biosolids slurry is continuously pumped and pressurized above its saturated steam pressure to maintain a liquid state throughout processing. By avoiding evaporation, thermal energy inputs for the evaporation of water are minimized. According to Enertech, the SlurryCarb™ process requires approximately two-thirds less energy than traditional drying methods.

Upon reaching the desired reaction pressure and temperature, the biosolids undergo a molecular reconfiguration. The cellular structure of the biosolids ruptures and carbon dioxide gas splits off, a step called "carbonization." According to the company, this reaction significantly reduces the size and improves the uniformity of the biosolids molecules. The reacted product becomes extremely hydrophobic and can be mechanically dewatered to greater than 50-percent solids. This dewatered, reacted product is concentrated in carbon, and over 80 percent of the original water present in the biosolids is removed without evaporation.

The reacted, dewatered product is dried to form a fuel that has a heating value of approximately 6,500 Btu/lb. This fuel, called E-Fuel, is exported to a customer and utilized as a renewable fuel. The filtrate from dewatering is pretreated to the standards of the local wastewater treatment plant.

### 7.4.2 City's Agreement with EnerTech

The following lists the highlights of the City's agreement with Enertech:

1. Agreement term is for 20 years.

2. The City's participation is capped at the solids production level of 150 WTPD, allowing the City to employ other technologies for expected increases in biosolids production.

3. The project commencement date is March 30, 2008, with a tipping fee of $54.15/wt, exclusive of transportation which is expected to be approximately $3/wt for a total cost of $57.15/wt.

4. The agreement guarantees that the City's tipping fee would be 10 percent below the tipping fee charged to other project participants.

## 7.5 OTHER SOLIDS DISPOSAL OPTIONS

Because it is possible that the Enertech facility will not be able to process all of the RWQCP biosolids for the 20-year planning period, the City is exploring an option using biosolids to produce biodiesel. UCR CE-CERT is currently performing a study to test the feasibility of using RWQCP biosolids for biodiesel production. The final report will be available in April 2007.