

WATER

SLUDGE MANAGEMENT IN OKLAHOMA

Using Land Application to Conserve Energy

Energy Conservation - Reduction in energy consumption by land application and subsequent beneficial reuse of the valuable nutrients contained in treated wastewater sludges is demonstrated in the following three areas:

- ⊖ Reduced energy consumption at landfill operations.
- ⊖ Reduced energy consumption in the production of commercial fertilizer and soil conditioners.
- ⊖ Reduced fuel consumption in distribution methods currently utilized by farmers preparation of soils for agricultural uses.



Based on the typical domestic sludges, the following nutrient level per dry ton would be available

Nutrient Level in Sludges	(%) lbs./Dry Ton
Nitrogen (N)	3.3 66
Phosphorus (P)	2.3 46
Potassium (K)	0.3 6
The corresponding energy which would have been used to produce these commercially and the related savings per dry ton are:	
Nitrogen (N)	30 BTU/lb. x 66 lbs./DT 1,980.0 BTU/DT
Phosphorus (P)	6 BTU/lb. x 46 lbs./DT 276.0 BTU/DT
Potassium (K)	4.4 BTU/lb. x 6 lbs./DT 26.4 BTU/DT
TOTAL 2,282.4 BTU/DT	

The estimated overall net energy savings (including savings from landfill, nutrient reuse, and farming applications) that can be realized from land application of one ton of dry stockpiled sludge is approximately 80,000 BTUs. This estimate was derived prior

to the pilot project and is based on general sludge fertilizer characteristics as shown above and acceptable landfill operations of a typical municipal sludge.

Project Location and Validation of Energy Savings -

The City of Guymon was identified to have a large amount of dry stockpiled sludge and agricultural land available for sludge application. Due to these factors, Guymon was chosen as the site for a demonstration project to validate the energy savings derived above.

According to project records, 6,335 dry tons of sludge were applied over 253.4 acres during March of 1993. The total

energy savings for the demonstration project, when compared to the energy requirements if disposal in a landfill was used, was 81,570 BTUs per dry ton of sludge handled. Energy savings may vary due to the fertilizer characteristics of the sludge being used.

This is slightly higher energy savings than was originally estimated before the project began. The results show that energy savings can be realized through the land application and subsequent beneficial reuse of valuable nutrients contained in wastewater sludge.

The following summary of the fertilizer characteristics of the Guymon sludge. Sludge nutrient characteristics for other communities will vary. Typical sludge characteristics are shown on this fact sheet.

City of Guymon Sludge Fertilizer Characteristics

Constituent	lbs./Dry Ton*	Total lbs.**
Nitrogen (N)	9.7	61,450
Phosphorus (P)	24.2	153,307
Potassium (K)	4.6	29,141
* Based on actual Guymon sludge characteristics.		
** Based on total application of 6,335 dry tons.		

For Additional Information On This Subject You May Contact Your Local Deq Representative Or The Water Quality Division Of The Department Of Environmental Quality At (405) 702-8100.