



WASTE WATER  
**Facility Report**  
#164



Metro Denver  
Sewage Disposal  
District



**SERPENTIX CONVEYOR CORPORATION**

# 194' Serpentix Elevates Sludge At Denver Plant 64 Feet Above Centrifuges For Discharge Into Hopper

At the heart of a dual utilization sludge management program, pioneered by the Metropolitan Denver Sewage Disposal District #1 (Metro Denver), is a 194-foot Continuous Path Serpentix conveyor and two 750 gallon per minute centrifuges, as part of a \$15 million sludge processing modification project completed in 1986.

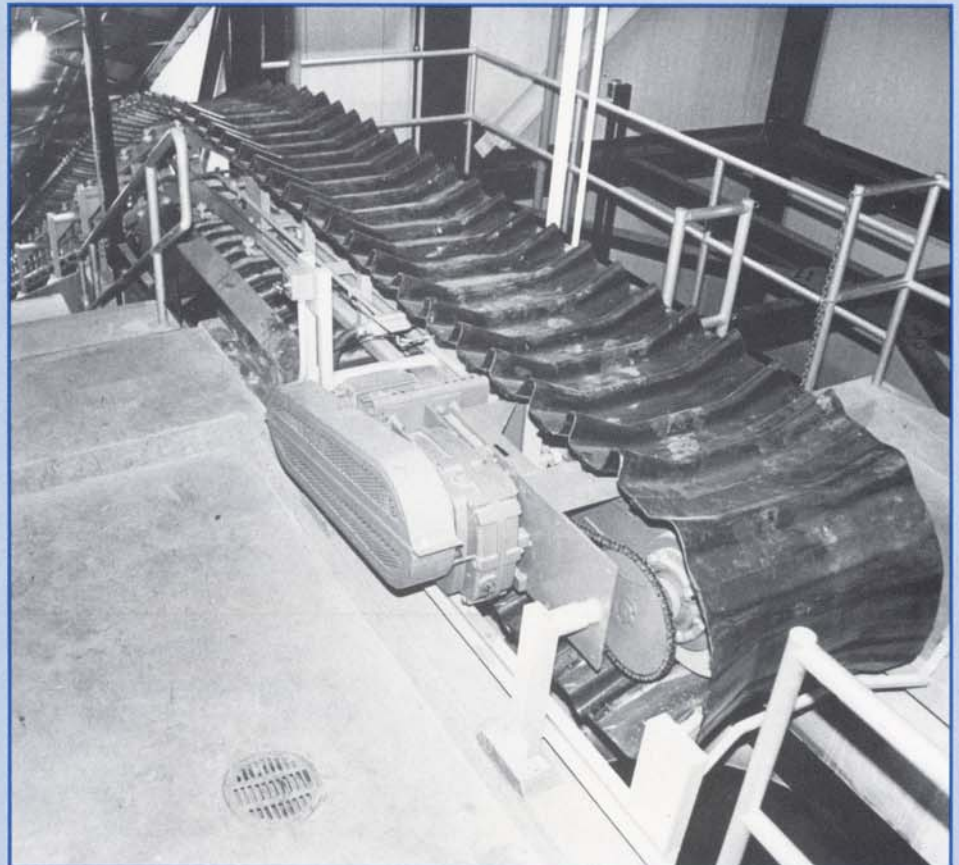
The district's Central Wastewater Treatment Plant, located northeast of Denver on the South Platte River, currently produces approximately 75 tons of anaerobically digested sludge each day. The anticipated sludge load, when the present 150 million gallons/day (mgd) facility hits its design flow of 185 mgd in the year 2004, will be 105 tons per day.

Metro Denver's Dual Utilization

Concept is a combined approach of windrow composting and land application of liquid sludges. It came into being in the early 1980s after the district's land application program — started in 1979 — proved successful.

By mid-1984 ground had been

broken for a new \$12 million composting facility as work proceeded on modifications to the sludge processing facility. Two centrifuges — with provisions for a third — were designed into the facility to provide the necessary flexibility for producing liquid sludge



**THE 194' SERPENTIX CONVEYOR AT Denver's Central Wastewater Treatment Plant completes a 64' elevation gain to discharge centrifuge sludge into an overhead, truck loadout hopper.**

(for land application) or, sludge cake (for composting).

Critical to the success of the Dual Utilization Concept was the location of a new sludge processing modifications project. The storage facility was essential to meet a number of needs. One was for loading sludge cake from an overhead hopper into trucks for transfer to the composting areas, and for loading liquid sludge into 7,000 gallon tanker trucks for transfer to land application sites throughout the region.

The only logical site for the storage facility, according to Metro Denver officials, was one which was at right angles and immediately adjacent to the building being renovated for sludge processing. This also meant that sludge cake loaded into the hopper would have to be conveyed from the ground level centrifuge pickup point to a height of 64 feet for discharge into the hopper.

These circumstances would have made it impossible to convey sludge to the hopper in a straight, unbroken line, they explained. In addition, the extreme elevation gain necessary and the relation of the hopper to the sludge cake pickup point would have required two, or possibly even three conventional conveyors. One of those would also have to make a very severe climb to the hopper.

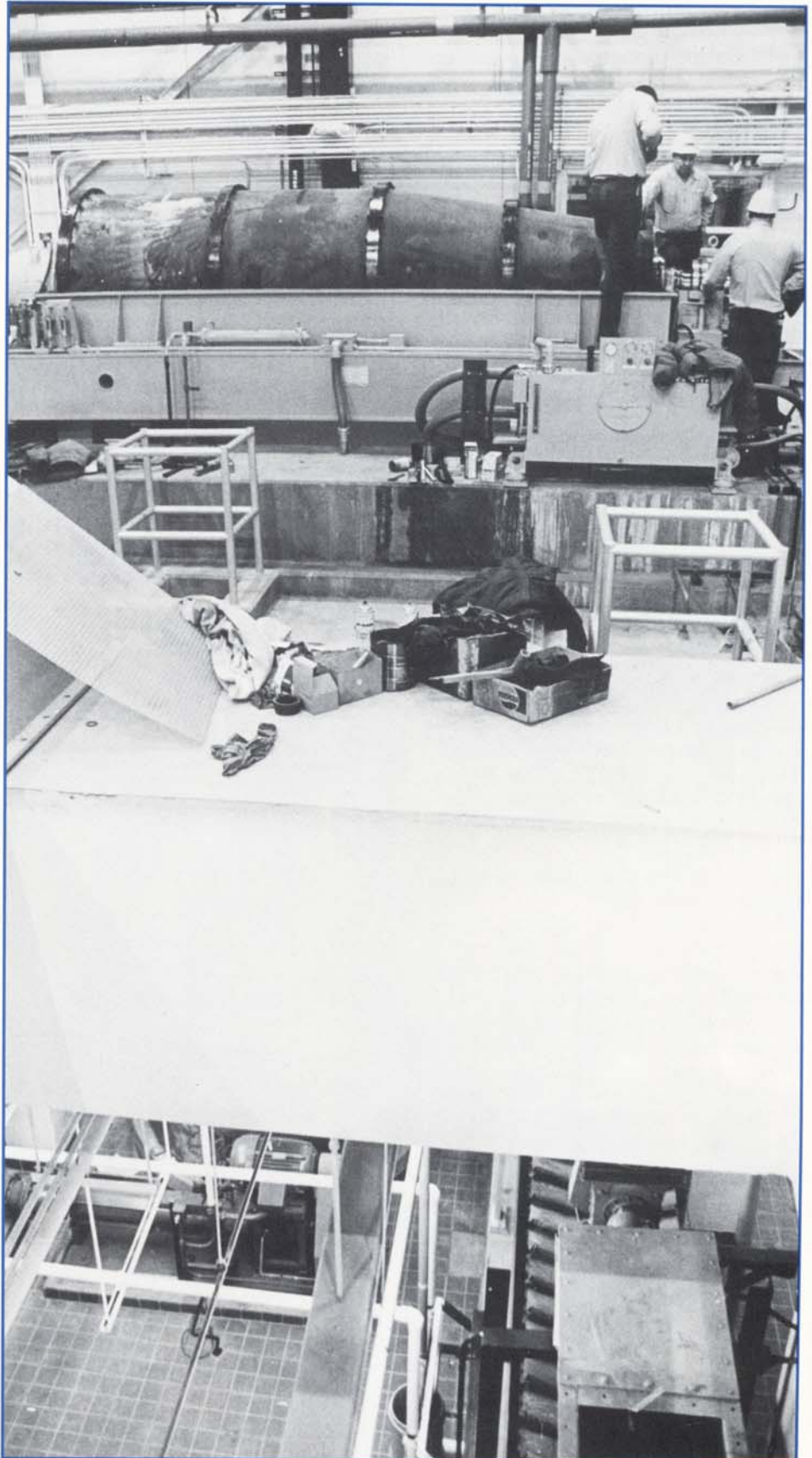
The problems were resolved by Metro Denver's design consultants, the firm of Black & Veatch Engineering. They recommended a single, three-dimensional Continuous Path Conveyor due to its horizontal turning capabilities, and the ability of its con-

volved belt to transport sludge up steep inclines.

Designed to handle 70 to 100 tons of dry sludge cake per day, the Model "H" Serpentix conveyor selected has a 32-inch wide belt that is powered by

a 3 to 15 horsepower variable speed motor. The belt has a design capacity of 60 tons per hour and conveys the material at a vertical speed of 60 fpm.

The two centrifuges now in operation at Metro Denver include the first one



**THE NEWEST (SECOND) CENTRIFUGE** is shown being installed in the sludge processing building in early 1986. In immediate foreground, the opening for another centrifuge reveals a lower level where the Serpentix conveyor runs beneath the centrifuges to receive sludge cake. The oldest (first) centrifuge was installed in the opening later in 1986 when it was removed from the old vacuum filter building.