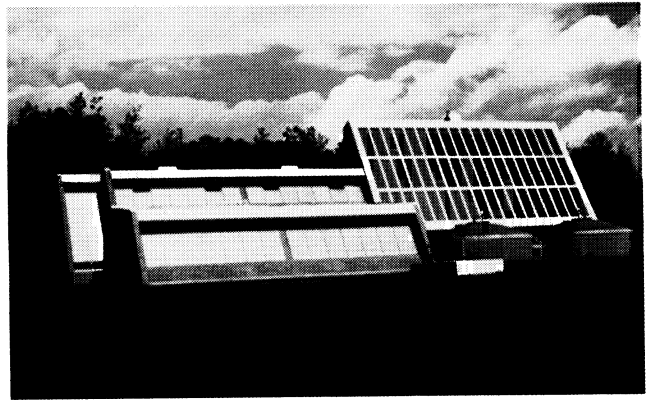


Solar Energy Systems

The structure in the upper photo is a wastewater treatment plant in Wilton, Maine, where sewage sludge is converted to methane gas. The array of solar collectors which forms the roof of the building plays an important part in the chemical conversion of waste to energy; it supplies heat for the bacteria which "digest" the sludge and generate gas in the process. In the lower photo is Monsanto Company's Environmental Health Laboratory in St. Louis, Missouri, where more than 200 solar collectors provide preheating of boiler feed water for laboratory use; solar energy furnishes about 30 percent of the facility's hot water requirements.

The collectors shown are representative of the Grumman Sunstream line of solar energy equipment, produced by Grumman Energy Systems, Inc., Bohemia, New York. The firm is a subsidiary of the company which built the Apollo Lunar Module that enabled NASA astronauts to descend to the surface of the moon. Technology derived from the Lunar Module program benefited development of the Grumman Sunstream line. Under contract to Johnson Space Center, Grumman Aerospace Corporation, Bethpage, New York, conducted "thermal modeling" studies to determine the effects of heat on a wide variety of spacecraft



components. The project included formulation of computer programs to simulate and display the reactions of various materials and structures to thermal stress. Grumman Aerospace prepared a handbook detailing procedures for modeling the effects of heat loads and describing the associated computer programs. This technology was later applied to development of Grumman's thermal analyzer system for testing solar collectors to insure maximum efficiency. Grumman Energy Systems reported that use of NASA-developed thermal modeling techniques contributed to the design of its collectors and saved years of engineering test time.

