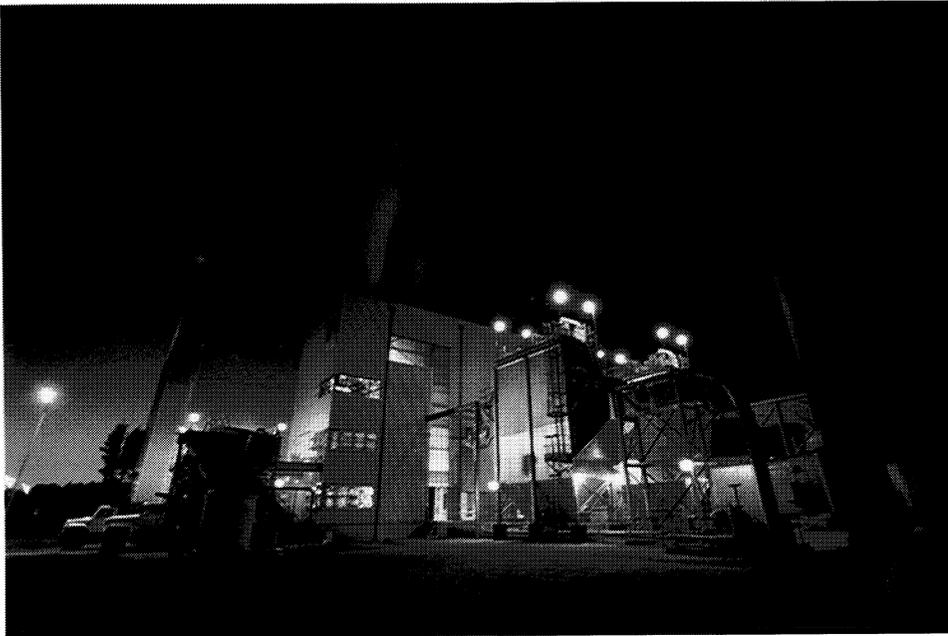


*A device that increases efficiency in smoke-cleaning precipitators leads a sampling of environment related spinoffs*

Started in 1980, Project Recoup was a program for applying advanced technology to solution of a problem shared by a growing number of U.S. communities: how to dispose of refuse in areas where acceptable landfill sites are scarce. Jointly sponsored by Langley Research Center, Langley Air Force Base and the adjoining City of Hampton, Virginia, the program involved development of a Refuse-fired Steam Generating Facility that incinerates trash, reduces it to a readily-disposable ash, and employs the heat of trash-burning to create steam for practical use at Langley Research Center.

A design base for modeling similar projects elsewhere, the facility has proved eminently successful. It disposes of all solid waste from the NASA center, the Air Force Base and other government installations in the area, and it also accommodates about 70 percent of Hampton's municipal waste. Hampton, principal financier for the project, realizes revenue from trash disposal fees and from the sale of steam to Langley Research Center. And there is an energy conservation bonus in that the steam generated by burning waste cuts the amount of fuel normally used at Langley by some two million gallons a year.

The project produced another bonus that has largely escaped notice: an air pollution equipment control device, developed of necessity in the course of the program, that is now commercially available. The device is an advanced electronic control for electrostatic precipitators, widely used in pollution control applications throughout industry. It is built by Kinetic Controls, Inc., Newport News, Virginia, a company formed by two NASA/Langley employees—T. K. Lusby, Jr. and David F. Johnston—who developed the control as their contribution to Project Recoup, working for the most part on personal time and with private funds.



*Shown above is the Refuse-fired Steam Generating Facility at Hampton, Virginia, a highly efficient trash-burning, energy-producing plant jointly developed by NASA, the Air Force and the City of Hampton. Effective air pollution control required development of an advanced electronic control system for the facility's precipitators, which remove pollutant particles from smoke.*

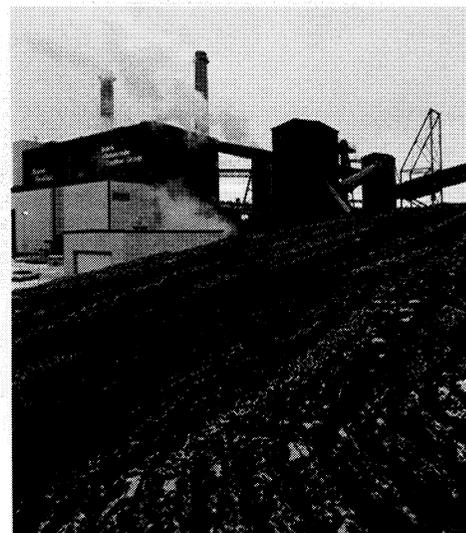
The function of an electrostatic precipitator is to remove particulate matter from the combustion gas created by the burning of a fuel before the gas is expelled through a smokestack. The gas is passed through a precipitator chamber and exposed to an electrostatic field; dust particles in the gas become electrically charged and migrate to collecting surfaces under the influence of the field, thus cleaning the smoke. To maximize the capture of particles, a precipitator must be operated at the highest practical voltage; the limiting factors are phenomena known as "sparking" and "arcing," essentially electrical breakdowns of the gas that, uncontrolled, would decrease the precipitator's efficiency.

In developing the Hampton Refuse-fired Steam Generating Facility, researchers encountered a problem. When standard fuels are burned, the smoke is of relatively constant composition and the highest practical voltage is fairly constant; once the voltage is set, as long as the same type of fuel is used, only small changes in precipitator voltage are needed. But when refuse is used as a fuel, the composition of the smoke changes continually—and that requires corresponding changes in precipitator voltage over a very wide range. If a constant voltage were applied in a refuse-burning facility, it would have to be set very low to prevent sparking and the precipitator would, therefore, be less efficient.

So, to insure minimal pollution of the atmosphere, the two NASA-Langley employees undertook to develop an innovative, microprocessor-based control that automatically senses and compen-

sates for the changes in smoke composition by adjusting the precipitator's voltage and current to permit maximum particle collection. It proved to be the answer to efficient precipitator operation at the Refuse-fired Steam Generating Facility, but it has much broader applicability. Because its developers included a number of advanced features—such as constant monitoring and control of sparking and built-in diagnostic capability—and because the control is adaptable to any electrostatic precipitator, it offers a reliable, high technology means of upgrading existing precipitators, regardless of whether they burn coal, oil or refuse.

Since late 1983, when they formed Kinetic Controls, developers Lusby and Johnston have been busy readying their product for the commercial market and building the first units. The controls are marketed through PrecipTech, A BHA Group Company, Kansas City, Missouri. In addition, Western Precipitation Division of Joy Manufacturing Company, Los Angeles, California, a manufacturer of electrostatic precipitators, also uses the technology in its systems. Both companies design customized units for their customers and Kinetic Controls manufactures the controls to the companies' specifications. Each of the companies has made its first installations and the future of the spinoff device appears promising. ▲



*The spinoff electronic control system is in use at General Motors' Flint, Michigan plant (top). Above, a company technician is inspecting one of the installation's four control panels. The microprocessor-based control automatically senses changes in smoke composition and adjusts precipitator voltage and current to assure maximal removal of pollutant particles.*