● GOVERNMENT

DOE funds carbon dioxide usage research

Projects selected for grants will develop, test new ways of creating useful products from CO2 emitted by coal-fired power stations

By ALAN BAILEY
Petroleum News

The Department of Energy's Office of Fossil Energy is issuing grants totaling $5.9 million to seven projects investigating novel ways of using carbon dioxide captured from coal-fired power plant exhaust, DOE announced Feb. 22. Each project will contribute to at least 20 percent of the project cost, the agency said.

Presumably the idea is to find means of improving the economics of carbon capture from coal burning plants by finding marketable uses for the carbon dioxide waste. Carbon dioxide is a commodity chemical with many commercial applications, such as enhanced oil recovery in oil fields, and the manufacture of products such as fuels and chemicals, DOE said.

In addition to the conversion of carbon dioxide to usable products, the projects will explore ways of partially offsetting the cost of carbon capture, or the use of carbon dioxide in situations where high-volume applications such as enhanced oil recovery may not be optimal, DOE said.

Three areas of interest

The selected projects come within three areas of interest: biological-based uses for carbon dioxide; mineralization through the use of carbon dioxide in combination with industrial wastes; and novel physical and chemical process for the beneficial use of carbon dioxide.

One project, a project to be conducted by the University of Kentucky Research Foundation, will address a biological-based process by developing a means of converting carbon dioxide from coal-fired flue gas to bioplastics, chemicals and fuels using carbon dioxide capture by micro-algae. The project team anticipates investigating the use of a combination of a photobioreactor and a pond cultivation process to decrease the cost of algae cultivation for the process, while also developing a strategy for maximizing the value obtained from the resulting algal biomass.

A project addressing potential mineralization will be conducted by the University of California. This project will develop and evaluate a process for using exhaust gas from coal combustion in combination with waste from iron and steel processing to produce a construction material comparable to traditional Portland cement-based concrete.

Novel processes

Five projects seek novel processes for the beneficial

see **CO2 RESEARCH** *page 11*

● UTILITIES

Helping with electrical emergencies

AEA's assistance program helps rural communities keep the lights on; data indicate significant improvement in supply reliability

By ALAN BAILEY
Petroleum News

As a bellwether for progress in improving the reliability of electricity supply systems in rural Alaska, statistics from the Alaska Energy Authority's electrical emergency assistance service provide unique insights into the impact of support for rural utilities, Michael Lamb, AEA interim executive director, told the House Energy Committee on Feb. 21. The remarks came as part of an overview by AEA staff to the committee of the various services that AEA provides.

"One of the best metrics we have to look at this is the emergency response," Lamb said, in reference to training and technical assistance that AEA provides in rural Alaska.

There are about 244 power generating utilities in the state, most of them in rural areas. And, when it comes to catastrophic failures of village electrical systems, failures in which village powerhouses were completely incapacitated, a few years ago there was on average one catastrophic failure per year. That failure rate has now dropped to one every five years, Lamb said.

Under AEA's regulations the agency is obliged to provide support to a utility in the event of a failure in the electrical system that constitutes an electrical emergency, a situation in which there is imminent danger to life or the likelihood of significant disruption to electrical services. Assistance can include financial or technical help, including emergency repairs, Lamb said.

Funding for the assistance normally comes from AEA's project budget. However, if sufficient funding is not available from this source, the Alaska Department of Military and Veteran's Affairs can step in with financial aid, Lamb explained.

Scope of assistance

And there are boundaries placed around the scope of the assistance.

A call to AEA from a utility experiencing an emergency situation trigger's AEA's help. Depending on the situation, an AEA expert may be able to assist the utility in diagnosing the problem, enabling the utility's own personnel to execute a fix. Or it may prove necessary to send an AEA technician to the community. Alternatively, AEA has contractors on call who can be dispatched to troubleshoot the problem.

"So, if the power goes out, we will do the triage, whatever's necessary, to get the power back on," Lamb said.

Once the immediate problem has been fixed and the imminent danger is past, the utility has to take responsibility to complete the repairs and take care of the situation: AEA takes no further part. Consequently, the utility, given its ultimate financial responsibility for making repairs to its system, is motivated to maintaining its system in good working order, Lamb explained.

And AEA does not generally assist the larger utilities, such as those in the Alaska Railbelt, that have the resources to be self sufficient.

72 emergencies in 10 years

Lamb said that between state fiscal years 2006 and 2016 there were a total of 72 electrical emergencies in the state, but with the rate of emergencies dropping significantly in recent years. During that 10-year period the majority of the impacted communities had four or fewer emergencies, with most of these communities only having one incident. Only five communities had more than four emergencies over that time period.

The cost to AEA of the electrical emergency assistance program over a 10-year period has averaged about $285,000 per year. Expressed as a percentage of the replacement cost of the electrical equipment, this support cost compares favorably with, say, the cost of roadside breakdown assistance for a car, Lamb suggested. ●

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