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Site Operator Program

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ABSTRACT

Collectively, the organizations participating in the Site Operator Program have over forty years of EV experience and have operated electric vehicles (EVs) for over 600,000 miles, providing the most extensive EV operating and knowledge base in the country.

The Site Operator Program is intended to provide financial and technical support and organizational resources to organizations active in the advancement of electric vehicles. Support is provided for the demonstration of vehicles and the test and evaluation of vehicles, components, and batteries. Support is also provided for the management and support of the program for the participating organizations. The Program provides a forum for participants to exchange information among the group, as well as with vehicle and equipment manufacturers and suppliers, and the public. A central data base at the Idaho National Engineering Laboratory provides a repository for data on the vehicles being operated by the Program participants. Data collection emphasis is in the areas of operations, maintenance, and life cycle costs.

The Program currently includes twelve participants, seven utilities, three universities, one technical college, and the U.S. Navy. This paper provides an overview of three of the participating organizations. These are Arizona Public Service, Texas A&M University, and York Technical College. These three were selected to demonstrate the diversity and range of efforts encompassed in the Site Operator Program. Information is provided on the organizations location, program background and current status, and areas of special interest for the program.

INTRODUCTION

The Site Operator Program is intended to provide financial and technical support and organizational resources to organizations active in the advancement of electric vehicles. Support is provided for the demonstration of vehicles and the test and evaluation of vehicles, components, and batteries. Support is also provided for the management and support of the program for the participating organizations. The Program provides a forum for participants to exchange information among the group, as well as with vehicle and equipment manufacturers and suppliers, and the public. A central data base at the Idaho National Engineering Laboratory provides a repository for data on the vehicles being operated by the Program participants. Data collection emphasis is in the areas of operations, maintenance, and life cycle costs.

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The Program currently includes twelve participants, seven utilities, three universities, one technical college, and the U.S. Navy. The physical locations include a diversity of geographical and meteorological conditions across the country. Several of the worst air quality areas in the country are included in the areas served by the participants. The sites and their locations are listed below:

Utilities/Locations:

Orcas Power and Light
Eastsound, Washington

Pacific Gas and Electric
San Francisco, California

Southern California Edison
Los Angeles, California

Los Angeles Dept. of Water and Power
Los Angeles, California

Arizona Public Service
Phoenix, Arizona

Platte River Power Authority
Fort Collins, Colorado

Public Service Electric & Gas
Newark, New Jersey

Educational Institutions

Kansas State University
Manhattan, Kansas

Texas A&M University
College Station, Texas

University of South Florida
Tampa, Florida

York Technical College
Rock Hill, South Carolina

Government

U.S. Navy
China Lake, California

Collectively, these organizations have over forty years of EV experience and have operated EVs for over 600,000 miles, providing the most extensive EV operating base and knowledge in the country.

This paper provides an overview of three of the participating organizations. These are Arizona Public Service, Texas A&M University, and York Technical College. These three were selected to demonstrate the diversity and range of efforts encompassed in the Site Operator Program. Information is provided on the organizations' location, program background and current status, and areas of special interest for the program.

ARIZONA PUBLIC SERVICE

Arizona Public Service Company (APS) has its corporate headquarters in Phoenix, Arizona and serves a major portion of the state. The Phoenix area provides a hot dry climate and, although not as severe as the Los Angeles basin, the metropolitan area

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has air quality problems of the same type. Summer conditions include temperature extremes not found in other Site Operator locations, providing a good location for testing the reliability of batteries and components in hot environments as well as long term Air-Conditioning testing.

APS was one of the early participants in the Site Operator Program and has logged over 450,000 miles in its electric fleet since 1979. The company is currently operating a fleet of fourteen vehicles, ranging from a 1915 Detroit Electric Sedan to State of the Art G-Vans and EVcort sedans. The third quarter of 1991 APS recorded 28,102 miles on the fleet. Of this, 19,778 were with the three EVcort sedans, and 8,324 with the four G-Vans. Cost figures for both the EVcorts and G-Vans compared favorably with similar ICE vehicles. APS has also donated seven other vehicles to educational, government, and private sector organizations in the Phoenix area.

Initial efforts of the program were directed toward vehicle, component, and battery testing. Electric vehicles were assigned to operating units within the company and were driven on routine missions, replacing ICE vehicles. This provided a good basis for evaluating EV performance and driver acceptance. In the area of driver acceptance it was quickly realized that in hotter climates, such as Phoenix, air-conditioning would be required if EVs were to gain acceptance from the public. This was one of the factors contributing to the increased effort in finding more efficient cooling systems for EVs. This evaluation process continues in addition to a new emphasis within the program. This new emphasis is directed toward making other organizations and the public more aware of the capabilities and advantages of EV operation.

APS has loaned EVs from their fleet to several government agencies at the city, state, and federal levels and several private sector organizations. This loan program has resulted in the purchase of EVs by some of the organizations and an expressed intent by others to add EVs to their fleets in the near future.

During 1991 APS launched an incentive and public awareness program for the battery powered electric bus, which is produced and operated in Santa Barbara, California by CleanAir Transit. APS met with officials from local governments and the National Park Service to increase the public awareness of the battery powered electric bus. APS has announced that the company would contribute 20% of the cost for the first three busses bought for use in Arizona. The cities of Phoenix and Glendale each ordered one of the busses, and the National Park Service has expressed a strong interest in obtaining electric busses for use in the Grand Canyon National Park.

In the research area APS is actively involved with other organizations in the areas of battery and electronics development. APS, as part of a joint agreement with Southern California Edison, supports Dreisbach Electromotive Inc. (DEMI) in their research on Zinc-Air batteries and was one of the corporate sponsors of the Zinc-Air powered car which won the electric car race at the Phoenix International Raceway last April. The vehicle completed 108 miles in two hours and set a national lap speed record of 69.5 MPH. Off the track, the car traveled 214 miles on the first discharge of the battery. APS plans to enter two Zinc-Air powered sedans in the races next April.

In the electronics area, APS is involved in a joint research project with Motorola. The program is being worked in conjunction with the Zinc-Air battery and is expected to result in further improvements of the battery performance. In a September press conference Environmental Protection Agency Administrator William Reilly spoke in support of the EV concept. Arizona Governor Fife Symington committed the state to support electric vehicles.

The Electric Vehicle Program at APS is a team effort, with resources contributed from Research and Development, Transportation Services, Public Relations, Media Relations, Property Services, and the Marketing areas of the company.

TEXAS A&M UNIVERSITY

The Texas Engineering Experiment Station (TEES) is a department in the Texas A&M University System (TAMUS). Within this department the Center for Electrochemical Systems and Hydrogen Research (CESHR) has been operating an electric vehicle program
since 1987 and has taken a leadership role in promoting the use of electricity as an alternate fuel in Texas and the South Central region.

The South Central Electric Vehicle Consortium (SCEVC) was organized by CESHR in 1988. CESHR currently serves as the headquarters for the organization. SCEVC was formed to facilitate the commercialization of electric vehicles by education and demonstration in Texas and the adjoining states. The consortium currently has nine members, as listed below:

Organization/Location:

Central and South West Services
Dallas, Texas

Houston Lighting and Power Company
Houston, Texas

Lower Colorado River Authority
Austin, Texas

Southwestern Public Service Company
Amarillo, Texas

VEHMA International Company
Ontario, Canada

Electric Power Research Institute
Palo Alto, California

Electric Vehicle Development Corporation
Cupertino, California

Texas A&M University System College Station, Texas

Texas Utilities Company
Dallas, Texas

Activities of the consortium fall into three areas:

1) Regional Demonstrations of Electric Vehicles - The demonstration of electric vehicles is necessary to obtain public confidence that they provide a viable alternative to IC powered vehicles. Consortium members are purchasing EVs for regional fleet testing and public demonstrations. Planning is underway for a large demonstration of EV technology to be concentrated in a Texas urban area. Members will also set up EV demonstrations upon the request of member companies and organizations.

2) Regional Studies - The environmental benefit of EVs is dependent on the regional electric utility fuel mix. The consortium has completed an environmental study concluding that EVs are by a wide margin the cleanest alternative fueled vehicle choice, even when utility emissions are considered. The initial success of EVs will depend on the selected missions and regional parameters, such as economics and climate. The consortium will coordinate the collection of performance data from member vehicles. This data will be analyzed and recommendations made about the best regional applications for electric vehicles. This data will also be used for comparison with vehicles using other alternative fuels.

3) Dissemination of Information - Information that is gathered and developed by the consortium will be disseminated through regional and national conferences and newsletters. Reports on regional demonstrations and studies will be made available to the public and decision makers.

In August 1991 CESHR greatly expanded the electric vehicle program by becoming a participant in the Department of Energy (DOE) Site Operator Program. As a Site Operator CESHR will collect data on the performance and operation of electric vehicles in Texas and the surrounding region. This will be accomplished through field testing of EVs in different sections of Texas and the adjoining states, to see how different driving missions and climatic conditions affect the vehicle and/or its components. The data can be used by vehicle manufacturers to build a better product that will better meet the needs of the region.

At the present time TA&M and the members of the consortium operate twelve G-Vans, one Jet van and one Jet sedan. Data from the operation is collected and
Another important benefit of the program is the training of students in EV technology in order to fill an anticipated high demand for individuals with expertise in this field. With an enrollment of over 42,000 students, including 7,800 undergraduate and 2,000 graduate engineering, TA&M is one of the largest engineering schools in the United States and has an excellent source of students qualified to enter the field.

YORK TECHNICAL COLLEGE

York Technical College (York) is a publicly accredited two year comprehensive college, founded in 1964 to serve the counties of York, Lancaster, and Chester, South Carolina. The campus is located in Rock Hill, SC, approximately 20 miles from Charlotte, North Carolina and 70 miles from Columbia, SC. The school is accredited by the Commission on Colleges, Southern Association of Colleges and Schools. In addition, many of the major fields of study, particularly in the Medical and Engineering Technology areas, are accredited by their individual professional organizations.

York joined the Site Operator Program in June 1989 and began building up an EV fleet. At this time the college operates a fleet of seventeen vehicles. Included are:

- Griffon Vans 5 ea.
- VW pick up trucks (Ni-Fe battery) 4 ea.
- VW sedan (Ni-Fe battery) 1 ea.
- Jet Industries Escorts 3 ea.
- Eagle Pitcher Escorts 2 ea.
- Unique Mobility 2 ea.

The Griffon vans are a predecessor to the G-Van, designed and manufactured by Chloride in England. They are operated on public roads in the United States under an exemption to Federal Regulations issued by the Department of Transportation. This exemption will expire in 1993 at which time the vans will be removed from public roads, either by exporting them or utilizing them on private properties.

In addition, York is currently operating the DOE owned G-Van. Upon completion of the initial break-in and testing, this vehicle will be transferred to Washington, DC for demonstration. The DOE owned EVcor, currently in Washington will be transferred to York where a set of Ni-Cd batteries will be installed and the vehicle brought up to "state-of-the-art" electronic status. After completing the battery installation and up-date, York will test the vehicle then return it to the DC area for field testing.

York has undertaken a strong program to increase the awareness and acceptance of EVs in the area it serves. As part of this program the Griffon vans have been loaned to the City of Rock Hill for use in their fleet. The vans have been placed in service as replacements for ICE vehicles in the city operations. York is using other vehicles in the college vehicle fleet as replacements for ICE vehicles for routine service. This includes security patrols, pick-up and delivery and personnel transportation to school functions.

The program also includes demonstration of the vehicles to a wide range of audiences in South Carolina and the adjoining states. Audiences have included state and local government agencies and private sector organizations ranging from manufacturing companies to resorts. Acceptance has been good, with several organizations expressing an interest in purchasing vehicles for their own fleets.

York has established a close relationship with Duke Power (Duke), a major electric utility in the area. Duke is interested in the development of EVs and is actively supporting the York program. At the present time Duke is planning on moving some or all of the Griffon vans to be used on the sites of their generating facilities.

The main thrust of the York program is in the education area. The school recognizes the need for trained technicians to maintain the growing number of electric vehicles in the country. With this in mind York will develop and institute a comprehensive course devoted to educating and training students in this area. Engineers and technicians having experience in the EV area will be interviewed to determine what knowledge and skills are necessary and should be included in the program. From this courses will be designed and a curriculum developed and instituted.

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The development of this program, with the resultant availability of trained technicians, will be a significant part of the infrastructure development necessary to insure the success of electric vehicles in the country.