INTERIM REPORT

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This document was prepared primarily for preliminary or internal use. It has not received full review and approval. Since there may be substantive changes, this document should not be considered final.

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Oak Ridge, Tennessee 37830
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for the
Department of Energy

INTERIM REPORT

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1.    TECHNICAL OBJECTIVES: Develop econometric and simulation models for forecasting electricity demand (energy and peak demand) by states and by utility service areas.

2.    MAJOR MILESTONES ANTICIPATED AND ACCOMPLISHED:

|  | | Date Anticipated | Date Attained |
|---|---|---|---|
| a. | Draft report, Integrated Forecasting System | 11/80 | |
| b. | Draft report, Version III of the SLED model with updated Forecasts | 3/81 | |
| c. | Updating of the Data Base | 5/81 | |
| d. | Final report, Version IV of the SLED Model with Forecasts of Appliance Saturations | 9/81 | |

Notes:  (1) Anticipated milestones have been updated to reflect the current status of the project and the plan for FY 81. The delay for completing the report of the integrated forecasting system was caused by the recent reorganization of the program in which the responsibilities of service area forecasts were transferred from Rich Tepel and John Trimble to Colleen Gallagher after Tepel and Trimble finished the methodological development. These changes were necessary because of tightening the budget for the project. Colleen has been responsible for conducting the sensitivity analyses of the SLED Model, and it is logical for her to undertake the integration of the forecasting system.

(2) These milestones do not include the papers which will be prepared during the course of the year for submission for publication in open literature.

3.    MAJOR ACCOMPLISHMENTS AND PROGRESS DURING THIS PERIOD:

a.   State-Level Electricity Demand Forecasting

(i)   Since the draft report, "A Varying Elasticity Model of Electricity Demand with Given Appliance Saturation," (Version III SLED Model) was prepared in April 1980, we have undertaken further analysis of estimated structural coefficients to determine the causes for (1) the unexpected sign of the estimated price elasticity of residential demand for several states, and (2) some unplausible estimates of the marginal price elasticity for several states. As a first attempt, we imposed constraints to force the estimated average price elasticities to have the expected negative sign. As it turned out, several saturation variables need to be deleted to satisfy the constraint. However, when this

was done, the variation of the estimated average price
elasticities among states becomes very small. These
results, thus, remain unsatisfactory. Further examina-
tion of the model specification is necessary. Also, we
are attempting to examine alternative specifications of
the price equation for correcting the problem associated
with the computation of the marginal price elasticities.
H. S. Chang was called upon to conduct these further
analyses under my direction. We hope to obtain more
satisfactory results soon.

(ii) As a test of model performance, we had used the Version
II SLED model to analyze the electricity demand growth
for 1979. The preliminary results obtained in August
show that the SLED model forecasts a 4.5% growth of total
electricity demand in 1979 as compared with the actual
growth of 3.1%. The overestimation of demand occurs in
the West North Central, South Atlantic, and East South
Central regions. A careful examination of the results
reveal that the overestimation may result from the very
high increase in natural gas price in 1979. (The estimated
cross elasticities of natural gas price are fairly sig-
nificant in these regions.) When this analysis was
conducted in August, 1979 data on natural gas prices were
available only for the nation as a whole. Since natural
gas prices historically vary substantially among regions,
these preliminary results are thus subject to this data
imperfection. In September, we obtained the regional
data of natural gas price and customers from the American
Gas Association. We are currently conducting model
simulation with this additional data and the results
should be available in October. Since this exercise is
important for examining the potential of structural
changes as well as the applicability of the SLED model for
short-run forecasts, we intend to conduct this analysis
very carefully.

(iii) I have been talking with Martin Baughman (Associate
Director, Center for Energy Studies, The University of
Texas at Austin) about the integration of the SLED model
and his Regionalized Electricity Model (REM). The REM
Model focuses on the supply side of the utility industry
(forecasting of the mix of generation plants and financial
situation including capital requirements etc.). Baughman's
work is primarily for EPRI. I believe that it will be
mutually beneficial for us to pursue this model integra-
tion so that we can expand the SLED model to deal with the
supply analysis of the utility sector. Baughman will
visit ORNL to discuss this collaborative effort on
October 22.

b. <u>Integrated Forecasting System</u>

Two major accomplishments have been achieved with the service area model during the past two months. First, Brady Holcomb has modified the forecasting program so that the forecasts of both price and quantity have been extended. Previously, sectorial forecasts of price and quantity were for 1976-1990. The forecast now includes ten extra years, 1991-2000. This is now consistent with the SLED model.

The second accomplishment is completion of the alternate scenario forecasts for the service area. There are now three separate price cases for each utility. As with SLED, these scenarios are called the base case, low-price and high-price cases. In the service areas, the cases are differentiated by two of the inputs: the SLED sectorial quantity and price forecasts and the growth rate of the total operating costs for the utility. In the base case, SLED base case forecasts of sectorial quantity and price are input for the years 1976-2000; in the low (high)-price case, SLED low (high)-price forecasts are input to the service area model.

Ongoing efforts are currently directed toward adjusting the exogenous variable growth rates in the service area model to account for the ten extra forecast years. It is our first priority now to complete the report for the integrated forecasting system.

4. COMMUNICATIONS

a. I presented the paper, "Aggregation and Specification of Durable Choice and Durable Use Equations for Market Level Econometric Analysis" at the 4th World Congress of the Econometric Society; Aix-en-Provence, France, August 28-September 2, 1980. This paper was also presented by Richard E. Just at the American Economic Association Annual Meetings, Denver, Colorado, September 5-7, 1980.

b. Colleen Gallagher presented the paper, "Econometric Analysis of Electricity Demand in 1979" at the American Statistical Association Annual Meetings, Houston, Texas, August 11-14, 1980. As discussed above, the preliminary results in this paper are being revised and further examined.

c. We have received requests for information about the SLED model from Dow Bailey (South Carolina Public Service Commission), Dave LaPlant (New Hampshire State Energy Office), and Judy Lawrence (Governor's Energy Office, Rhode Island).

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