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Department of Nuclear Energy

October 17, 1983

Mr. Robert L. Dennig
Office for Analysis and Evaluation
of Operational Data
Mail Stop EWS-263
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Dennig:

Enclosed is the September monthly report for the activity sponsored by your Office. Also included is the computerized budget summary for the program. I would suggest that you and your staff review the report to determine whether there are any discrepancies. If there are, please notify the principal investigator.

We hope this meets with your approval. If there are any questions regarding format, distribution, or budget reporting, please contact Mr. A. J. Weiss, Administrative Technical Assistant, FTS 666-4473.

Sincerely yours,

Walter Y. Kato
Deputy Chairman

WYK/jw

Enclosures

cc: R. Bari, BNL
J. Boccio, BNL
R. Hall, BNL
F. Hebdon, NRC
A. J. Weiss, BNL
BNL Technical Monitors

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CONTRACTOR MONTHLY REPORT

SEPTEMBER 1983

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PROGRAM: Diversified Data-Gathering System

FIN: A-3196

CONTRACTOR: Brookhaven National Laboratory (BNL)

BUDGET PERIOD: 6/30/83-
6/30/84

NRC PROGRAM MANAGER: R.L. Dennig

BUDGET AMOUNT: [REDACTED]

PRINCIPAL INVESTIGATOR(S): W. Kato
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PROGRAM OBJECTIVES

To further develop and demonstrate the feasibility of applying multicase, multivariate statistical methods in the analysis of nuclear power plant operational data as an integral step towards the establishment of a more diversified data-gathering and analysis program.

ACTIVITIES DURING SEPTEMBER 1983

On September 19, a meeting was held at BNL between AEOD/NRC and the BNL personnel working on this project, wherein BNL presented the approach and the scope of work to meet the project's objective. In particular, data matrix development, data sources, computational needs, and statistical methods were discussed.

Considerable difficulty is anticipated in the data collection effort. In general, easily accessible data sources - LER, NPRDS, IPRDS, and SCSS - lack quantitative operational data. Nevertheless, these sources are being evaluated to provide the basis for selection of events and the parameters of the data matrix. Any information that can aid in postulating realistic data will also be extracted. However, the primary data source is expected to be the records kept at utilities. Help from AEOD/NRC has already been sought in this regard.

Work continued during this reporting period on defining appropriate statistical methods and the associated computational needs. Major emphasis was in exploring the (initially conventional) statistical properties of the

type of data which we anticipate must be treated. In the absence of any systematic data, "data matrices" were made up of

1. interval/ratio data,
2. interval/ratio and dichotomous data, and
3. ordinal data,

with a degree of approximate dependence. These are presently being explored using numerical correlation techniques. Subroutine CORRE from the SPSS package was used for this purpose. The objective here is to see how internal dependencies display themselves under such relatively direct treatment. The results of the computer runs are presently being analyzed. Other computer codes relating to principal component analysis, canonical correlations, and cluster analysis from the SPSS and BMDP packages will be analyzed in a similar manner next month.

Work is continuing on the analysis of major systems identified for development of data matrices. Final Safety Analysis Reports, technical specifications, and available Probabilistic Risk Assessment studies are being used to develop the parameters of the data matrices. Major emphasis will be placed on completion of this aspect in the next month.