MASTER

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BENCHMARK SCRIPT AND EVALUATION CRITERIA

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Prepared For:

THE DEPARTMENT OF ENERGY
OFFICE OF THE ENERGY EMERGENCY MANAGEMENT
INFORMATION SYSTEM
1000 Independence Avenue
Washington, D. C.

Prepared By:

WILSON HILL ASSOCIATES
1025 Vermont Avenue, N.W., Ninth Floor
Washington, D.C. 20005

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TABLE OF CONTENTS

	Page
1.0 BENCHMARK SCRIPT.....	1-1
1.1 Introduction.....	1-1
1.2 Benchmark.....	1-1
1.3 Benchmark Evaluation.....	1-6
1.4 Status of Benchmark Development.....	1-6
1.5 Workload and Systems Life Cost.....	1-6
2.0 VENDOR EVALUATION CRITERIA.....	2-1
2.1 Evaluation Criteria.....	2-1

1.0 BENCHMARK SCRIPT

1.1 INTRODUCTION

The Department of Energy's Office of EEMIS requires timesharing and remote job entry (RJE) services for their state Energy Emergency Management Information System (EEMIS-S). The Office of EEMIS is soliciting timesharing services through use of the General Services Administration's TSP-MASC process. The functional mandatory and desirable requirements that candidate vendors should provide are described in the Functional Requirements Document, prepared for the Department of Energy, Office of EEMIS by Wilson Hill Associates. This document describes the Benchmark Scenario and Vendor Evaluation Criteria.

Section 1.0 describes the Benchmark, the Benchmark Evaluation and the Workload Definition. The Vendor Evaluation Criteria and mandatory and desirable hardware and service checklists are described in Section 2.0.

To prove compliance with these requirements, a benchmark test will be performed using the vendor's system. The following sections summarize the benchmark.

1.2 BENCHMARK

The vendor selected for benchmarking will receive a benchmark package. The benchmark will check the following functions:

- The system's ability to perform representative functions of the EEMIS-S
- The time needed to run the benchmark
- The cost of the run
- The compliance with mandatory requirements
- The cost of desirables offered
- The accounting mechanism.

The benchmark package will consist of the scenario, 2 tapes (one containing the data base and the other containing the EEMIS-S source programs), and copies of each of four evaluation forms. Each vendor, selected for benchmarking, will receive a benchmark package and instructions prior to the benchmark run date. The vendor will be notified of the actual benchmark test date and time on short notice. The benchmark will be executed with a vendor's full workload to test the capacity and response time during peak hours.

The benchmark test is divided into the following six (6) tasks:

TASK 1: Load/dump EEMIS-S data base onto system.

This is a batch job consisting of a system load/dump routine.

TASK 2: Run selected Information Retrieval requests and queries simultaneously against the Energy (RES) data on 5 and 20 terminals.

This is an on-line job. Four Information Retrieval requests and queries are given and mixed to run on 5 terminals simultaneously. In a second run the queries will be executed on 20 terminals (one retrieval sample to a terminal).

TASK 3: Run selected Information Retrieval requests and queries simultaneously on 5 terminals against the Contacts (EIA) and Microform (MF) data.

This is an on-line job involving 5 and 20 terminals simultaneously. Four Information Retrieval requests and queries are given and mixed to run simultaneously on 5 terminals. The samples will be distributed one to each of the 20 terminals for a second run.

TASK 4: A twelve line message will be sent and answered.

This is an on-line job requiring several terminals. A message will be sent from one terminal to the remaining ones. The following commands will be tested in this task: MCOMPOSE, MSCAN, MREAD, MSEND.

TASK 5: Two polls consisting of two questions each will be sent to five individuals and the poll responses compiled and analyzed using EEMIS-S commands.

This is an on-line job requiring 5 or more terminals to receive the polls, compose and send the responses. Almost all commands used for polling and sending messages will be employed in this task.

TASK 6: Unload/dump EEMIS-S data back to tape/disk.

This is a batch job consisting of a systems load/dump routine. The data will be copied back onto tape or disk pack.

Figure 1-1 summarizes the above tasks.

The benchmark is a representative sample of the most commonly used requests and maintenance runs on EEMIS-S. It is designed to test the real-life environment by simultaneous processing of on-line requests.

The benchmark-sample queries will use most of the existing commands for retrieval and status information in EEMIS-S (Fig. 1-2). The security aspect of users will be tested in connection with the sending and retrieving of messages.

BENCHMARK TASKS	
TASK #	DESCRIPTION
1	Load Data Base
2	Run Information Retrieval requests on Energy (RES) data
3	Run Information Retrieval requests on Contacts (EIA) and Microform (MF) data
4	Compose Message, send, retrieve, answer and retrieve
5	Compose Poll, send, retrieve, answer and analyze
6	Unload Data Base

FIGURE 1-1

EEMIS COMMANDS

GENERAL

ECHO - CANCEL, RESUME

END

HELP

LOGOFF

SKILL

STATUS

INFO. RETRIEVAL (FOR ALL SYSTEMS)

ACTIVATE (LIST)

IN (DATA TYPE)

LIST

SELECT

SHOW

COM. + POLL ONLY

ANALYZE

DISPLAY

EDIT

GT

HIGH

LIST

LOW

MCOMPOSE (P) (R)

MEAN

MODIFY

MREAD (P)

MSCAN (P)

MSEND (P) (R)

PURGE

SAVE

STD

SUM

TALLY

FIGURE 1-2

1.3 BENCHMARK EVALUATION

Prior to distributing the benchmark package to the vendor a sample run of the benchmark test will be performed on the EIA computer and all output listings documented and analyzed. These listings and results will serve as the baseline for the evaluation of the vendors performance. All output produced by the vendor's system will be carefully compared to the baseline results. The findings from this comparison will be marked in a matrix (Fig. 1-3). The names of the vendors will be listed as columns and the tasks as rows. The number of recognized errors and the time needed to perform the task will be used as measure. The benchmark will produce a list of vendors ranked first by number of errors (least to most). Ties between vendors will be broken by ranking the tied vendors on time to complete the benchmark (shortest to longest).

1.4 STATUS OF BENCHMARK DEVELOPMENT

Under the current schedule to acquire timesharing services for EEMIS-S, we project that the program and data tapes will be prepared, the baseline tests carried out and analyzed by February 6, 1981. This date is subject to uncertainty because of possible delays.

1.5 WORKLOAD AND SYSTEMS LIFE COST

The benchmark only samples the ability of the vendor's systems to handle the EEMIS-S functions. To extrapolate the benchmark results to those likely to occur over the 18-month lifetime, we need to define workload factors by which to multiply the results. The estimate of the workload factor is based on: (1) the expected growth rate of the EEMIS-S, (2) how well the benchmark represents typical EEMIS-S functions, (3) the number of days the vendor can expect to provide EEMIS-S on his system.

SAMPLE
BENCHMARK EVALUATION FORM

<div style="text-align: right;">VENDOR</div> <div style="text-align: left;">TASK NO.</div>	1		2		3	
	NO. OF ERRORS	TIME	NO. OF ERRORS	TIME	NO. OF ERRORS	TIME
I						
II						
III						
IV						
V						
VI						
TOTAL						

FIGURE 1-3

The expected growth rate for EEMIS-S over 18 months is 150 percent, the benchmark represents one-sixth of daily expected usage and the number of EEMIS-S required operational days in a year is 365.

The workload factor representing daily functions for EEMIS-S Task 2 through 5 therefore will be 3285 ($6 \times 365 \times 1.5$). The workload factor representing monthly functions Task 1 and 6 for EEMIS-S is 18 = system life time. (Growth rate is not applied.)

Information on connect time, CPU, disk storage and cost will be collected for each terminal and task. The vendor will be required to supply all the information needed for the evaluation of his system. The information is collected on four forms shown in Tables 1-4.

TABLE 1: Collects information on the connect time, CPU units used and disk storage required and the incurred cost for each terminal and task.

TABLE 2: Is the summary of Table 1 and gives information on the total cost and usage for the whole benchmark. Tasks 1 and 6 should be multiplied by the factor 18 and Task 2 through 5 by 3285 to represent the systems estimated workload.

TABLE 3: Is a summary of the vendors total charges for the systems life (18 month). Discounts should be specified separately and applied to the charges where applicable.

TABLE 4: Is a price list of the vendor's desirables he can offer.

VENDOR: _____			TASK NO. _____			
TERMINAL #	CLOCK TIME		CONNECT TIME	CPU	STORAGE	COST*
	START	END				
1						
2						
3						
4						
5						
TOTAL						
* Give formula for cost computation						

TABLE 1

BENCHMARK EVALUATION FORM

VENDOR: _____

TASK #	CONNECT TIME	CPU	STORAGE	BENCHMARK COST	WORKLOAD FACTOR	SYSTEM COST
1					18	
2					3285	
3					3285	
4					3285	
5					3285	
6					18	
TOTAL						

TABLE 2

TOTAL SYSTEMS LIFE COST

VENDOR: _____

CHARGES *

\$

Benchmark Cost x Workload Factors *

Specify any other (if any) i.e.

Terminal connect charges

On-line Disk Charges

Dedicated Disk Charges

Peripherals

CPU

Conversion Cost

TOTAL SYSTEMS LIFE COST (18 month)

* Apply discounts where appropriate and specify.

TABLE 3

VENDOR: _____	
DESIRABLE OFFERED	COST \$
TOTAL	
TOTAL	

TABLE 4

2.0 VENDOR EVALUATION CRITERIA

The vendor's compliance with the functional and mandatory requirements will be tested by the benchmark. This section deals with the evaluation of the competitive vendors and the selection criteria employed.

2.1 EVALUATION CRITERIA

Selection from among the competing offerors will be done by employing the following criteria:

- Compliance with the Mandatory Requirements
- Successful performance of the Benchmark test
- Lowest Systems-Life Cost.

The evaluation and selection procedures are described in the next paragraphs.

The selection of the competing offerors will be done in two stages. The first stage will check the offeror's compliance with the mandatory requirements. The vendor's offer will be checked against the mandatory checklist (Figure 2-1). Offerors not able to comply with the mandatory requirements described in

the Functional Requirements Document and summarized in the checklist will be excluded from further consideration. The offerors will be notified of their exclusion in writing.

The second stage consists of a benchmark test. The remaining offerors will be notified of the intent to benchmark. A benchmark package consisting of the benchmark script, data base and program tapes, and the evaluation forms will be distributed to the offeror prior to the benchmark test date.

The offerors will be ranked on the number of errors in the benchmark test. In the case of equal number of errors the offeror with the shorter time will be given the better ranking. The top 10 offerors will be selected for final evaluation.

The final selection will be done using a scoring formula that incorporates both cost and desirables offered.

Desirables: The desirable requirements with desirability factors are listed in Figure 2-2. The vendor will be rated on the presence or absence of these desirables and his price for each. In the evaluation of a vendor's proposal, the desirables will not account for more than 10% of the vendor's score.

System Life Cost: The System Life Cost is the vendor's total cost for the DOE's EEMIS-S system over 18 months of its life cycle.

The vendor's point score will be determined from the following formula:

$$90 \left(1 - \frac{SL_i - SL_{min}}{SL_{min}} \right) + 10 \sum_{j=1}^n a_j (1 - \beta_j),$$

where: SL is the Systems Life Cost,

$i = 1, m$ is the offeror; m = the number of fixed offerors = 10

$j = 1, n$ is the desirable feature; n = the number of desirables = 4

a_j = is the desirability factor

$$\sum_{j=1}^n a_j = 1;$$

$\beta_j = \frac{P_{i,j}}{P_{\max_j}}$ is the i th offeror's relative-price ratio for the j th desirable.

$P_{i,j}$ - is the i th offeror's price for the j th desirable

$P_{\max_j}$ - is the highest price offered for desirable

(If a vendor does not offer the desirable, his price is taken to be $P_{\max_j}$.)

The offeror with the highest point score will be the winner.

DESIRABLE EQUIPMENT AND SERVICE

	<u>DESIRABILITY FACTOR</u>
RJE Station	.5
Alternate Teleprocessing Network	.25
Vendor Location	.20
Low Storage Protection	.05

FIGURE 2-2

MANDATORY CHECKLIST

EQUIPMENT

CPU (one megabyte direct access)

Disk Storage (25 millisec., 200 megabytes)

Tape Storage (7 track with 556 or 800 BPI and
9 track with 800, 1600 or 3200 BPI)

Communication Controllers

Teleprocessing Network (all 50 states)

Power Supply

SERVICES

Processing Service (24 hours, 7 days a week)

Recovery System (within 15 min.)

Technical Support

Training

Inquiry

Transport Materials (24 hour)

Security