

ENERGY DATA SYSTEM
DEVELOPMENT AND MAINTENANCE
FINAL REPORT

CONTRACT NUMBER 68-02-2399

EPA PROJECT OFFICER: ROBERT L. SHORT

STRATEGIES AND AIR STANDARDS DIVISION
OFFICE OF AIR QUALITY PLANNING AND STANDARDS
RESEARCH TRIANGLE PARK, NC 27711

PREPARED FOR:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR QUALITY PLANNING AND STANDARDS
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By

Thomas Dessent

Computer Sciences Corporation
5529 Chapel Hill Boulevard
Durham, North Carolina 27707

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A - Summary of Contract Activities by Task

INTRODUCTION

This report describes the work performed by Computer Sciences Corporation (CSC) for the U.S. Environmental Protection Agency (EPA) under contract number 68-02-2399 during the forty-two month period of performance that began 20 August 1976 and ended 20 February 1980.

Under the terms of the contract, CSC provided technical support to the Strategies and Air Standards Division (SASD), Office of Air Quality Planning and Standards (OAQPS), Research Triangle Park, North Carolina, for development, implementation, maintenance, and operation of the Energy Data System (EDS), a computerized data base. Work was performed in units designated "tasks" that were initiated by the EPA Project Officer, who provided verbal and written technical direction that specified the objective or scope of work for each task. In response to the technical directive, CSC prepared and presented to the Project Officer a plan of work that proposed the methodology, resources, and schedule for accomplishing the task objective. After the Project Officer approved the work plan, the work was performed and deliverable items were submitted to him for review. After all deliverable items of the task had been approved, the task was closed and no further resources were expended on it. The Project Officer was informed by CSC of the progress of work by informal discussions during meetings with him at intervals of two weeks (or more frequently if necessary), and by written reports (biweekly status reports and monthly progress summary reports). As a result of those discussions and reports, the Project Officer sometimes altered the scope of work for tasks to take into account new information or changed circumstances. Such alterations of scope included both the termination of projects found to be infeasible or impractical, and the expansion of projects to include additional features or to satisfy additional requirements.

The tasks performed by CSC included work in the following general categories:

- (1) EDS software development and maintenance - the implementation of new computer software for loading data into or retrieving data from the EDS data base, the modification or correction of existing software, and of documentation of both.
- (2) EDS data base maintenance - acquisition of data, execution of updates, validation of data, creation of backups, and related activities contributing to the availability, accuracy, and timeliness of information stored in the data base and ancillary data files.
- (3) Data retrieval and analysis - implementation of procedures for obtaining from EDS information requested by SASD personnel or by others through SASD.
- (4) Special projects - other work related to EDS but not included in the preceding categories.

The following sections of this report present an overview of the Energy Data System, its status at the end of this contract, and a summary of the work performed by CSC. A task-by-task description of technical activities is presented in Appendix A.

OVERVIEW OF THE ENERGY DATA SYSTEM

The Energy Data System was developed by the Strategies and Air Standards Division as a tool for assessing the effects on air quality of energy policies and environmental legislation. The computerized data system stores information related to the consumption of fossil fuels by electric power plants and large industrial plants, and to their emissions of three atmospheric pollutants: suspended particulates, sulfur oxides, and nitrogen oxides. The system also stores summaries of nationwide measurements of ambient air concentrations of those pollutants. The primary sources of information are other computerized data systems maintained by the Power Statistics Branch, Energy Information Administration, U.S. Department of Energy; and by the National Air Data Branch (NADB), Monitoring and Data Analysis Division, OAQPS, U.S. EPA. Additionally, SASD environmental engineers provide information pertaining to emission regulations and environmental policies. EDS has been implemented on the Univac 1100 computer at the EPA National Computer Center, Research Triangle Park, North Carolina.

The Energy Data System is comprised of two major parts: a data base that contains the information, and associated software for maintenance and use of the data base. Briefly, the associated software consists of programs and procedures for updating the data base, ancillary reference data files, and programs and procedures for extracting, computing, and reporting selected information. The EDS data base has been implemented using the System 2000* data management language, which provides a hierarchical data structure and allows access to the stored information via simple data management language commands as well as computer programs. The EDS data base structure has two major parts: one that contains information related to fossil fuel combustion by power plants and industrial plants, and another that contains information related to ambient air quality measured by pollutant monitoring stations.

*System 2000 is a registered trademark of MRI Systems Corporation, Austin, TX.

The most comprehensive and detailed type of information in the EDS data base pertains to electric power plants. Much of the power plant data are obtained from the Department of Energy FORM-67 data file, which provides detailed information about the physical equipment, operating conditions, and the quantity and quality of fuel consumed. Additional data on fuel procurements, fuel use, electric generation, and future generating capacity are obtained from other Department of Energy data files: FORM-423, FORM-4, and Generating Units Reference File (GURF). New or revised emission regulation data are periodically supplied by SASD engineers. Annual emissions of suspended particulates, sulfur oxides, and nitrogen oxides are computed for each power plant using FORM-67 data and stored in the data base. Other miscellaneous types of data have been loaded into the data base as they became available and/or were needed for special projects. Such miscellaneous data have included results of diffusion modeling studies, calculated maximum allowable pollutant emissions (based on emission regulations), and designation of geographical areas not in attainment of Federal ambient air quality standards.

The information in EDS pertaining to industrial plants is abstracted from the National Emissions Data System (NEDS), a computerized EPA data system maintained by the National Air Data Branch. The industrial plant data abstracted from NEDS pertain to three types of industrial processes: those involving external combustion boilers, internal combustion boilers, and inprocess fuel use. The EDS representation of industrial plant data is the same as for power plant data; that is, a plant is considered to have one or more "boilers" which burn fuel and emit pollutants that may be partially collected by pollution control equipment, and are exhausted through one or more stacks. Thus, the EDS data base contains data which characterizes the "boilers," stacks, and pollution control equipment. In addition, EDS contains values abstracted from NEDS for calculated "boiler" emissions of suspended particulates, sulfur oxides, and nitrogen oxides; the maximum amounts of those emissions permitted by applicable environmental regulations or permits; and the amounts of other "waste products" produced per year of plant operation.

Ambient air quality data in EDS is abstracted from the EPA Storage and Retrieval of Aerometric Data (SAROAD) system, also maintained by the National Air Data Branch. The SAROAD system contains a huge volume of data, consisting of the ambient air concentrations of numerous pollutants as measured by an extensive nationwide network of air sampling and pollutant measurement devices. Only a small subset of those data are abstracted from the SAROAD system and stored in the EDS data base. The EDS air quality data consist of yearly summaries of information pertaining to measured atmospheric concentrations of total suspended particulate, sulfur dioxide, nitrogen dioxide, and sulfate; and information characterizing the pollution monitoring equipment in terms of geographical location, measurement method, and sampling frequency.

A variety of System 2000 data management language commands have been developed by SASD and CSC personnel for retrieving information from the EDS data base and producing printed reports. The most useful and generally applicable of those commands have been collected together in one file and have been "documented" by storing abstracts of them in another System 2000 data base, named ASSIST. The ASSIST data base may be queried to determine which of the existing EDS data retrieval commands may be applicable to a particular subject area. The command(s) thereby identified may be obtained from the common command file and used "as is" or with appropriate modification to retrieve the desired information from EDS and present it in a printed report.

The Energy Data System provides a unique combination of related data from disparate sources, organized in a hierarchical logical structure, from which data retrieval may be accomplished with simple directives. EDS therefore represents a valuable information resource for EPA.

STATUS OF THE ENERGY DATA SYSTEM

As of the end of the period of performance of this contract (February 1980) the Energy Data System was in a static state, and was in the process of being "mothballed." A shift in emphasis of the work of SASD personnel away from matters related to energy strategies greatly diminished the pertinence of EDS to the subjects of work being done. As a consequence, financial support for continuing maintenance of EDS was eliminated from the FY 1980 budget, and SASD implemented procedures for "mothballing" the system. The EDS base will be retained in a state such that it can be accessed by users of the EPA National Computer Center, but no data base updates are planned and most of the supporting software will be removed from the computer system. All the essential and most of the peripheral components of EDS have been stored on magnetic tape so the system could be reactivated at a later time, should that be desired.

SUMMARY OF WORK PERFORMED

The Energy Data System had been designed and its initial implementation completed prior to inception of Contract #68-02-2399. The data base and major update programs had been developed for SASD by a contractor, preliminary documentation had been written, and a few data base updates had been performed. The long-term plan for EDS was that physical maintenance of the data base -- performing updates, creating backups, etc. -- would be performed by data processing personnel of the National Air Data Branch (NADB) at the direction of the SASD Project Officer, while CSC would undertake further development and "fine tuning" of the system.

Accordingly, the first work performed by CSC was directed toward those two objectives: acceptance of existing EDS software into the NADB operating environment, and development of new software for performing necessary additional functions. Eleven of the first sixteen tasks initiated by the Project Officer directed CSC to document according to NADB standards the existing EDS update programs and procedures, to demonstrate they functioned correctly, and to obtain approval of them by NADB for placement into the NADB "production" operating system. Most of those tasks involved some program modification and development of new control procedures (runstreams); the software was documented and demonstrated operational within a few weeks to a few months after work was initiated. In two instances, however, extensive program modification and testing were required; those tasks (4 and 7, the SAROAD and FORM-67 updates) took longer to complete. All of these tasks remained open for approximately a year after work was completed pending final action by NADB and the Project Officer. Final action was postponed because a new Project Officer had been assigned who was reconsidering the philosophy of having data base maintenance done by NADB. While the question of maintenance responsibility was being re-evaluated, NADB suspended action on acceptance of software and documentation.

Consequently, a task was initiated in March 1977 for the purpose of evaluating the potential advantages and disadvantages of that arrangement. Based partly on the results of CSC's evaluation, the Project Officer determined that the interests of SASD would be better served if SASD retained responsibility for EDS maintenance, rather than transferring the responsibility to NADB. CSC assisted in the effort to establish SASD production update procedures and documentation standards for future EDS software documentation.

In June 1977, the Project Officer began assigning to CSC limited responsibility for performing updates of the EDS data base. The updates were performed on an ad hoc basis. The Project Officer scheduled each update, secured any necessary input data, then initiated a task that directed CSC to perform the data processing functions necessary for accomplishing the update. Ten tasks of that nature were initiated and completed during July 1977 through July 1978; however, that procedure for data base maintenance required more technical and administrative effort on the part of the Project Officer than was desirable. Therefore, he initiated in September 1978 a task delegating to CSC total responsibility for EDS maintenance, subject to periodic performance reviews. CSC developed a work plan that was approved by the Project Officer, and assumed responsibility for EDS maintenance on 1 November 1978. Work was performed under that task more or less continuously from then until the end of the contract period of performance. A Methodologies Manual was written that presented in detail the prescribed procedures for accomplishing each kind of data base update, as well as procedures for other maintenance activities. A total of 26 updates were performed, and all EDS-related disk files were backed up on tape on a daily basis. Near the end of the contract, work was performed under this task to "mothball" EDS, as discussed in the preceding section of this report.

Approximately fifteen tasks initiated by the Project Officer involved the improvement of existing software or development of new software. Three major new software units were implemented: a projections update procedure, for loading information about future power plants or new generating units into the EDS data base; programs for calculating pollutant emissions from power plants; and a procedure for reorganizing the data base by unloading and selectively reloading data. The programs for computing the maximum amounts of power plant emissions allowed under current pollutant emission regulations were extensively modified to assure correct operation. Several update procedures were modified to correct errors, accommodate changes of the input data format, and to optimize or extend capabilities.

Twelve tasks were initiated for the purpose of data retrievals from the EDS data base. They were generally of short duration and required quick response by CSC. The data retrievals were mostly in response to requests by EPA personnel for information pertaining to power plants. The purpose of one retrieval task was response to a Freedom of Information request for emission regulations data.

The other tasks initiated under this contract included a variety of projects. One accomplished the conversion of EDS to a new version of the System 2000 data management language, and involved modification of the data base and most update software. Another task directed CSC to revise or rewrite all EDS software documentation (16 documents) to satisfy SASD documentation standards. A third project was the consolidation of all the useful System 2000 data management language commands for data retrieval written by SASD and CSC personnel into one file, creation of an abstract of each command, and loading the abstracts into the ASSIST data base. The final task of this contract was for development of the procedures for "mothballing" and reactivating EDS.

A discussion of the objectives and accomplishments of each task is presented in Appendix A.

APPENDIX A

Summary of Contract Activities by Task

EDS TASK SUMMARY

Number: 0

Title: General administrative and technical activities

Objective: Accomplish the necessary administrative functions of the contract and to perform technical activities not directly related to individual tasks.

Work Performed

Administrative activities performed under this task consisted of periodic meetings (approximately every two weeks) of CSC personnel with the Project Officer to discuss the status of work in progress and to plan future work; and of writing periodic reports (biweekly status reports and monthly technical reports) and this final report. Technical activities included development of documentation standards for SASD and extensive revision of the "EDS Terminal User's Manual."

EDS TASK SUMMARY

Number: 1

Title: Modify and document the regulations update procedure

Objective: Modify the existing EDS update procedure for loading regulations data and document the revised update procedure according to NADB standards. The update procedure was to be modified by invoking the EDS update utility runstreams EDS000A and EDS000B, which prepare the data base for an update by loading from backup tape and create a new backup tape of the data base following an update, respectively.

Work Performed

The controlling runstream of the regulations update procedure, EDS026, was rewritten to invoke utility runstreams EDS000A & B. Separate versions were created for use by SASD and NADB that referenced the files appropriate to each operating environment. The program (ED026) and the new runstream were tested to verify correct operation. Documentation of the update procedure was written according to NADB standards and was submitted with the test run results to the Project Officer and to NADB for review. The document and runstream were subsequently approved; the program had been previously approved by NADB and accepted into its operating system.

EDS TASK SUMMARY

Number: 2

Title: Modify and document the SO₂ units conversion update procedure

Objective: Modify the EDS update procedure for converting units of measure of SO₂ regulations, document the update procedure according to NADB standards, and achieve acceptance of the procedure into the NADB operating system. The update procedure was to be modified to invoke the EDS update utility runstreams EDS000A and EDS000B.

Work Performed

It was found that the SO₂ units conversion program, ED027A, did not work properly, and it was modified to correct the errors. The Project Officer requested that six additional program modifications be implemented to improve the quality of the processing and the report produced, and to extend the capabilities of the program. The requested modifications were implemented and the program was tested to verify correct operation. A runstream was written that invoked the utility runstreams EDS000A and EDS000B, and separate versions were created for use by SASD and NADB that referenced the files appropriate to each operating environment. Complete program and runstream documentation was written to NADB standards and submitted with test run results to the Project Officer and to NADB for review. The document, program, and runstream were subsequently approved.

EDS TASK SUMMARY

Number: 3

Title: Modify and document the FORM-423 update procedure

Objective: Modify the program (ED030) and runstream of the EDS update procedure that loads FORM-423 fuel procurement data, and document the update procedure to NADB standards. Program ED030 was to be modified to change the format of the data field for fuel amount, and the runstream was to be modified to invoke the EDS update utility runstreams EDS000A and EDS000B.

Work Performed

The program modification specified above was implemented, as well as an additional modification to punch a card containing the year of the data processed by the program. The runstream was rewritten to make use of the "year card" punched by the program and to invoke utility runstreams EDS000A&B. Separate versions of the new runstream were created for use by SASD and by NADB, each referencing the files appropriate to the two operating environments. The program and runstreams were tested to verify correct operation. Then complete program and runstream documentation was written to NADB standards. The document and test runs were submitted to the Project Officer and to NADB for review, and were subsequently approved.

EDS TASK SUMMARY

Number: 4

Title: Modify and document the SAROAD update procedure

Objective: Modify the runstreams of the EDS update procedure that loads SAROAD data and document the modification to NADB standards. The runstreams were to be modified to invoke the EDS update utility runstreams EDS000A and EDS000B. The EDS SAROAD update procedures had already been accepted into the NADB operating system.

Work Performed

The specified runstream modifications were implemented and NADB "Changes Documentation" was prepared. The revised runstreams and documentation were subsequently reviewed and accepted by NADB. However, a production run of the SAROAD update procedure produced results that indicated the programs were not functioning correctly. The Project Officer extended the scope of this task to include the identification and correction of the program errors. Extensive modification and testing of the SAROAD update programs, ED028A and ED028B, ensued. Correct operation of the programs was verified, and the program and corrected documentation were provided to NADB and the Project Officer. Within a few months, the format of NADB's data files from which SAROAD data are abstracted for loading into EDS was changed, rendering programs ED028A&B inoperable. The Project Officer further extended the scope of this task to include additional program modifications so the new SAROAD data file format could be accessed. The required program modifications were implemented and tested, and the program documentation was revised accordingly.

EDS TASK SUMMARY

Number: 5

Title: Document the existing EDS ad hoc update procedure

Objective: Document to NADB standards and achieve acceptance into the NADB operating system the existing procedure for ad hoc updates of the EDS data base.

Work Performed

The EDS ad hoc update procedure consisted of a runstream and a methodology for incorporating user-supplied System 2000 Natural Language commands to accomplish a non-standard update. The existing runstream was revised to create a new version suitable for use in the NADB production update environment. The runstream was documented to NADB standards. After review by NADB and the Project Officer, the document was approved. The runstream was then provided to NADB for acceptance testing.

EDS TASK SUMMARY

Number: 6

Title: Develop and document a program for selective data base reloads

Objective: Develop and document a program that would provide the capability for creating a "new" copy of the EDS data base by selectively transferring data from an existing copy of the data base. The program was to produce a report summarizing the activities performed.

Work Performed

Initial program design and implementation was performed, but due to limitations imposed by System 2000 on the number of data sets (repeating groups) that could be referenced, and due to other procedural problems, it was decided that program implementation would not be practical. By mutual agreement of CSC and the Project Officer, this task was terminated. Tentative plans were made to implement an equivalent procedure that would utilize the System 2000 Natural Language processor rather than a program (see Task 15).

EDS TASK SUMMARY

Number: 7

Title: Modify and document the Form-67 update procedure

Objective: Modify the FORM-67 update programs, ED032A and ED032B, to utilize a data base password card; modify the associated runstream to invoke update utility runstreams EDS000A and EDS000B; document each program and runstream to NADB standards; and achieve acceptance of the FORM-67 update procedure into the NADB operating system by demonstrating correct operation of the programs and runstreams.

Work Performed

The specified modifications of the existing program were implemented and the runstreams were revised to reference appropriate NADB files and to invoke utility runstreams EDS000A and EDS000B. When the programs were tested, numerous program logic and functional errors were detected. Considerable effort was expended to identify and correct those errors. Then each program and runstream was documented to NADB standards, and the documents were submitted to NADB and the Project Officer for review. Several rounds of document revision resulted in approval of the documents by NADB. The programs and runstreams were then provided to NADB for inclusion in production files.

EDS TASK SUMMARY

Number: 8

Title: Modify and document the diffusion modeling update program, ED034

Objective: Modify the diffusion modeling data load program, ED034, and its runstream, EDS034; document the program and runstream to NADB standards; and achieve acceptance of the program into the NADB operating system by demonstrating correct program and runstream operation. The scope of the task was later extended to include program modifications necessitated by a change in format of modeling input data.

Work Performed

All required program modifications were implemented and tested. The runstream was revised to invoke update utility runstreams EDS000A and EDS000B. Program and runstream documentation was written to NADB standards and submitted to NADB and the Project Officer for review. The task remained open but inactive for several months during which time it was decided that NADB would not assume responsibility for production maintenance of EDS. The program and documentation were then approved by the Project Officer.

EDS TASK SUMMARY

Number: 9

Title: Document the update runstreams EDS000A and EDS000B

Objective: Document to NADB standards and achieve acceptance into the NADB operating system the existing EDS update "utility" runstreams EDS000A and EDS000B.

Work Performed

New versions of the existing EDS runstreams were created that referenced file names appropriate for NADB production maintenance of EDS. The new runstreams were each documented to NADB standards. The two documents were reviewed and approved by NADB and the Project Officer. The runstreams were provided to NADB for inclusion in their files and for testing.

EDS TASK SUMMARY

Number: 10

Title: Document the update runstreams EDS000C and EDS000D

Objective: Document to NADB standards and achieve acceptance into the NADB operating system the existing EDS update "utility" runstreams EDS000C and EDS000D.

Work Performed

New versions of the existing runstreams were created that referenced the appropriate file names for NADB production maintenance of EDS. The new runstreams were each documented to NADB standards. The two runstreams were reviewed and approved by NADB and the Project Officer. The runstreams were provided to NADB for inclusion in their files and for testing.

EDS TASK SUMMARY

Number: 11

Title: Document the NEDS update procedure

Objective: Document to NADB standards and achieve acceptance into the NADB operating system the existing NEDS update procedure. The objective was later revised to specify documentation to SASD standards after it was decided that maintenance of EDS would not be turned over to NADB.

Worked Performed

The NEDS update procedure for EDS consisted of four programs and associated runstreams. Some known program and runstream errors were corrected by appropriate modifications, additional program changes were implemented, and the programs were renamed. The modified programs and runstreams were documented to SASD standards and the document was delivered to the Project Officer for review. Following that review, the document was revised and expanded as requested. The final document was approved by the Project Officer and the corrected programs and runstreams were placed in EDS library files.

EDS TASK SUMMARY

Number: 12

Title: Document the FORM-4 update procedure

Objective: Document to NADB standards and achieve acceptance into the NADB operating system the existing FORM-4 update procedure. The objective was later revised to specify documentation to SASD standards.

Work Performed

The FORM-4 update procedure for EDS consisted of four programs and associated runstreams. Work was begun on their documentation to NADB standards, but after it was decided that EDS would not be maintained by NADB, the document format was changed to satisfy SASD standards instead. During the process of developing the detailed program descriptions for the document, a few program logic errors were detected and corrected. The completed document and revised programs were delivered to the Project Officer for review. After a period of inactivity on this task, the document was returned to CSC for minor revision. The corrected document was approved by the Project Officer.

EDS TASK SUMMARY

Number: 13

Title: Develop a procedure for loading diffusion modeling notes

Objective: Develop a procedure for loading into the EDS data base notes (explanations, additional information) pertaining to plant diffusion modeling studies data previously inserted into the data base. The notes were not loaded with the other modeling data because the update program, ED034, was not capable of processing the notes at the time it was executed.

Work Performed

The records containing modeling notes were identified and extracted from the modeling data files. A one-shot program was developed for loading the notes into the EDS data base and was tested. The program, an associated runstream, instructions for using the program, and a data file containing edited diffusion modeling notes were delivered to the Project Officer.

EDS TASK SUMMARY

Number: 14

Title: Ranked emissions report program

Objective: Development and documentation of one or more programs to retrieve power plant data from the EDS data base and produce a report listing the calculated values for maximum allowable SO₂ emissions, uncontrolled SO₂ emissions, and the difference between the two for each power plant specified by selection criteria. The report would also include plant identification and location, fuel data, and applicable regulations.

Work Performed

Preliminary program requirements and design analysis was initiated, but was pre-empted by other tasks with higher priority. The task was later terminated at the request of the Project Officer.

EDS TASK SUMMARY

Number: 15

Title: Develop and implement procedures for data base unload/reload

Objective: Development of a standard procedure utilizing the System 2000 Natural Language processor to accomplish an unload and reload of the EDS data base, and performance of an unload/reload operation using the procedure developed.

Work Performed

A procedure was developed that facilitated the data base unload and reload processes, and was documented to SASD standards. The procedure employed the Univac SSG processor to generate runstreams for accomplishing specific user-directed tasks, such as unloading or reloading designated parts of the data base and creating backup tapes. CSC developed the set of SSG commands, or "skeleton," that caused generation of the appropriate unload or reload runstream based on simple directives supplied by the user. The procedure was then utilized to unload all data from the data base and to reload power plant data. Modifications of the data base definition were also implemented prior to the reload.

EDS TASK SUMMARY

Number: 16

Title: Data base turnover review

Objective: Review the advantages and disadvantages of turning over to the National Air Data Branch (NADB) responsibility for maintenance of EDS, and produce a report summarizing the findings.

Work Performed

CSC investigated the potential positive and negative aspects of EDS maintenance being performed by NADB personnel. A report stating the findings of the investigation was written and delivered to the Project Officer.

EDS TASK SUMMARY

Number: 17

Title: Quick response project #1 - analysis of future power plant sitings

Objective: Provide technical support as specified by the Project Officer to assist SASD personnel in the analysis of potential problems associated with the siting of power plants in locations designated by EPA as non-attainment areas.

Work Performed

CSC performed six projects under this task. (1) Program NE204 was executed from the NADB program library to produce national, regional, and selected state reports of pollutant emissions from industrial plants. (2) A one-shot program was developed and executed that produced a report of summary statistics pertinent to projected power plants using data contained in the Generating Units Reference File (GURF), obtained from the Federal Power Commission. (3) A one-shot program was developed and executed that selected projected power plant data from GURF and loaded it into the PROJECTIONS portion of the EDS data base. (4) A data base update was performed to load ambient air quality data abstracted from the SAROAD system. (5) Several ad hoc data base updates were performed to designate non-attainment areas and to convert the units of measure of pollutant emission regulations. (6) An existing, partially completed program for converting the units of TSP regulations was made operational and was executed (program ED027B).

EDS TASK SUMMARY

Number: 18

Title: Documentation of the TSP Units Conversion program (ED027B)

Objective: Documentation to NADB standards of program ED027B, which converts TSP regulation values to standard units of measure.

Work Performed

The required documentation was written and submitted to the Project Officer for review. After a period of inactivity, the task was reactivated and the documentation was revised to meet SASD documentation standards.

EDS TASK SUMMARY

Number: 19

Title: Consolidation of files on mass storage devices (discs)

Objective: Consolidation of software items related to the development, operation, and maintenance of EDS.

Work Performed

CSC evaluated the contents of data files and program files; identified the most recent version of each program and runstream contained in SASD, NADB or CSC files; collected together the most recent versions of those items in designated files; and provided the Project Officer with documentation of the status and location of those items. Following the consolidation, numerous files were deleted from the computer system in order to reduce charges for mass storage utilization.

EDS TASK SUMMARY

Number: 20

Title: Design and implement controlled emissions report program(s).

Objective: Development of one or more programs to retrieve data from the EDS data base, compute particulate emissions on a boiler-by-boiler basis, and produce a printed report. Computation of emissions was to take into account the parameters related to the type of combustion process employed and any applicable pollution control equipment. The Project Officer later extended the scope of the project to include computation of emissions of sulfur oxides and nitrogen oxides.

Work Performed

Three programs were developed and tested. The first retrieved data from portions of the data base holding boiler design, boiler operation, and plant fuel data; concatenated the data and computed boiler-level fuel consumption data; and created files containing boiler and plant design and operational data, and pollution control equipment data. The second program manipulated the pollution control equipment data and created a file in a format (indexed-sequential) that facilitated data retrieval. The third program utilized that file and the "boiler" file created by the first program to compute emissions and print a controlled emissions report for plants in user-specified geographical regions of the United States, including appropriate subtotals and totals of computed emissions and fuel consumption data. The programs were documented to SASD standards except that detailed program descriptions were not included. The detailed descriptions were written later after several planned program modifications were implemented (see Task 33).

EDS TASK SUMMARY

Number: 21

Title: Perform a data base unload, redefinition and reload

Objective: Unload in System 2000 value string format all power plant, industrial plant, and monitoring station data; revise the EDS data base definition and create a new "empty" data base; and load the power plant data into the new data base.

Work Performed

The existing EDS unload/reload procedure was utilized to unload data from the data base. The data base definition was modified to change the sizes of some components and to add a few new components. An empty data base was created employing the revised definition, and the previously unloaded power plant data were loaded into it.

EDS TASK SUMMARY

Number: 22

Title: Quick response project #2 - 1985 air quality estimation

Objective: Provide technical support as requested by the Project Officer to assist SASD personnel in the computation of 1975 pollutant emissions from utility power plants and the estimation of emissions in 1985.

Work Performed

CSC completed a number of activities in response to directives from the Project Officer. Projections data in the EDS data base derived from the Generating Unit Reference file (GURF) were unloaded, edited, and reloaded. All 1975 fuel use data in the EDS data base were unloaded, extensively edited to improve data quality, and re-inserted into the data base. Fuel data from 42 files of the PRMS library was totaled into 10 fuel categories on a county by county basis for the nation; the procedure was repeated each time refinements were made to the PRMS data. Projections data supplied by Environmental Analysis Inc. was edited and loaded into the CONV data base after each of several refinements of those data. Numerous updates of the CONV data base were performed to correct, reorganize, or summarize data contained therein. And several reports were produced that listed consumption of coal, oil, and gas in 1975, and calculated emissions of particulates and sulfur dioxide in 1975. Other reports listed the estimated pollutant emissions in 1985 based on several different assumption concerning trends in fuel consumption and on the impact of proposed Federal emissions regulations.

EDS TASK SUMMARY

Number: 23

Title: Perform a data base update to load NEDS data

Objective: Update the EDS data base by loading data pertaining to industrial plants abstracted from NEDS.

Work Performed

The existing EDS update procedure for NEDS data was utilized to update the data base. Several program errors were detected as a result of the update and modifications of the COBOL source code were implemented to eliminate overprinting in the report, to write rejected UTM coordinates information in an alternate print file, and to correct the calculation of minutes of longitude. Since the program that was modified (NEDS6) was originally written in SCORE-IV language, the modifications of the generated COBOL program were retrofitted to the SCORE-IV source code at the Project Officer's request. The pertinent parts of the program documentation were changed to reflect the program modifications.

EDS TASK SUMMARY

Number: 24

Title: Conversion of EDS to Level 2.80 of System 2000

Objective: Conversion of the EDS data base and all associated software to operation with the "new" version (Level 2.80) of System 2000 from the current version (Level 2.65).

Work Performed

CSC proposed and the Project Officer approved a plan for conversion of EDS to Level 2.80 of System 2000. The plan included: revision of runstreams where necessary to reference the Level 2.80 Natural Language processor; revision of the data base definition to eliminate reserved words from data element names and to reduce the number of keyed components; creation of revised schemas incorporating the new data base definition, and revision of programs using the schemas where necessary; and recompilation of all programs that access the data base. All the above procedures were implemented and the revised software was stored in separate files so that normal EDS operations could proceed (using Level 2.65) while the conversion work was being done. Then the data base was unloaded to tape using Level 2.65, a new "empty" data base was created under Level 2.80 using the revised definition, and the data base was loaded from the tape files created previously. Finally, all the converted software items (programs and runstreams) were copied into EDS "production" library files.

EDS TASK SUMMARY

Number: 25

Title: Modification and documentation of maximum allowable emissions programs

Objective: Modify a series of programs developed by SASD for computing the maximum allowable emissions of sulfur dioxide and particulates (based on regulations and fuel data for power plants in the EDS data base), and document those programs to SASD standards.

Work Performed

The six maximum allowable emissions programs were originally implemented by SASD personnel using the SCORE-IV language and precompiler. CSC modified the COBOL language code, produced by the SCORE-IV precompiler, to improve processing logic and efficiency; to implement county, state, and national totals of pertinent data; and to function properly with Level 2.80 of System 2000. Program documentation was written according to NADB standards (the same standards as required by SASD at the time). The modified programs and the documentation were delivered to the Project Officer for review, during which several program logic errors and document deficiencies were found. Meanwhile, another task (48) was undertaken which invoked re-structuring a part of the data base (PROJECTIONS) accessed by the maximum allowable emissions programs; and an effort was initiated to redocument all programs to SASD's own standards (Task 56). A second round of program modifications was performed by CSC to correct logic errors in the programs, to allow access to the revised structure of the PROJECTIONS portion of the data base, to change the interpretation of some fields of parameter cards, and to revise the algorithm for computing emissions for plants subject to Federal NSPS regulations. Extensive testing was performed to assure correct program operation. Program documentation was then rewritten according to SASD standards. The Project Officer reviewed and approved both the documentation and the programs.

EDS TASK SUMMARY

Number: 26

Title: Implement a program for creating IBM-format tape files

Objective: Develop and document a program to read a UNIVAC SDF (card-image) file and create an IBM-compatible magnetic tape file.

Work Performed

A COBOL program, SDF2IBM, was developed that would read card-image data (UNIVAC SDF format) and write the data on magnetic tape in IBM-compatible format (80-character EBCDIC records, fixed-blocked format). Program documentation was written to SASD standards and approved by the Project Officer.

EDS TASK SUMMARY

Number: 27

Title: Develop a plan for an automated task management system

Objective: Investigate possible methods for implementing a computerized system to assist in the management of EDS tasks, and recommend an appropriate implementation.

Work Performed

A preliminary examination of available task management systems by CSC indicated that none were suitable for use with EDS due to excessive cost and/or complexity. At the request of the Project Officer, this task was terminated.

EDS TASK SUMMARY

Number: 28

Title: Modification of regulations update program, ED026

Objective: Modification of the regulations update program, ED026, to improve its data error handling techniques.

Work Performed

Program ED026 was modified to improve the quality of error messages pertaining to input data errors, and to scan all fields of input data cards instead of terminating the scan when the first error was detected. A test version of the program and its associated runstream were also created that would permit error checking of the regulations data cards without accessing the data base. The program documentation was revised to reflect the program modifications.

EDS TASK SUMMARY

Number: 29

Title: Perform a data base update to load regulations data

Objective: Update the EDS data base by loading NO_x regulations data.

Work Performed

The existing EDS update procedure for regulations data was utilized to accomplish the desired update. The NO_x regulations data supplied as an SDF file by the Project Officer were inserted into the data base using the revised ED026 program (see Task 28). The results of the update were reviewed and approved by the Project Officer.

EDS TASK SUMMARY

Number: 30

Title: Perform a data base update to load FORM-423 data

Objective: Update the EDS data base by inserting FORM-423 fuel procurement data for January through September 1977.

Work Performed

The existing EDS update procedure for FORM-423 data was utilized to accomplish the desired update. FORM-423 data tapes for each of the specified months were obtained from the tape library of the National Air Data Branch. The nine IBM-format tapes were concatenated and sorted to create one UNIVAC-format tape that was used as input for the update program. The results of the update were reviewed and approved by the Project Officer.

EDS TASK SUMMARY

Number: 31

Title: Perform a data base update to load NEDS data

Objective: Update the EDS data base by loading data pertaining to industrial plants abstracted from NEDS.

Work Performed

The existing EDS update procedure for NEDS data was utilized to update the data base. Some runstream modifications were implemented and the program documentation was modified to reflect those changes. The results of the update were reviewed and approved by the Project Officer.

EDS TASK SUMMARY

Number: 32

Title: Perform a data base update to load SAROAD data

Objective: Update the EDS data base by loading data pertaining to SAROAD monitoring stations.

Work Performed

The existing EDS update procedure for SAROAD data was utilized to load SAROAD data for 1973-1978 into the EDS data base. The results of the update were reviewed and approved by the Project Officer.

EDS TASK SUMMARY

Number: 33

Title: Modification of Controlled Emissions Programs

Objective: Modification of the Controlled Emissions Report programs to improve the format of the printed report and change the names of the programs; and revision of the program documentation to improve the detailed program descriptions and to reflect the changed program names.

Work Performed

The existing program, TSP-REPORT, was modified to alter the format of the printed Controlled Emissions Report to improve its readability. The program names were changed from TSP-SELECT, TSP-SORT, and TSP-REPORT to SELECT/CONTR-EMISS, SORT/CONTR-EMISS, and REPORT/CONTR-EMISS respectively; and runstreams and documentation was modified to reference the new program names. Section 4 of the program documentation was revised to present a more detailed description of the processing performed by the three programs.

EDS TASK SUMMARY

Number: 34

Title: Develop an approach for transferring EDS maintenance to CSC

Objective: Development of a plan by which responsibility for the routine maintenance of EDS could be transferred from SASD to CSC.
"Routine maintenance" would include regular periodic updates of the EDS data base and ad hoc updates of the ASSIST data base.

Work Performed

CSC produced a technical report that recommended the areas of responsibility that could be assumed, specific activities that could be performed, and a general plan and schedule for implementation of the recommendations.

EDS TASK SUMMARY

Number: 35

Title: Modification of Controlled Emissions Programs

Objective: Modification of the existing Controlled Emissions Report programs to generate a card-image file containing the requisite System 2000 Natural Language commands and data to enable loading the pollutant emission values calculated by the programs into the PLANT-EMISSIONS repeating group of the EDS data base. The format and content of the generated file was to be such that, if the file were @ADDED while accessing the data base with the System 2000 Natural Language processor, insertion of the calculated plantwide annual emissions of each pollutant (total suspended particulate, sulfur oxide, and nitrogen oxides) into the data base would be effected.

Work Performed

Program REPORT/CONTR-EMISS was modified to produce the specified card image output file, and the associated runstream was modified to perform the necessary file assignment. The program was tested after modification to verify correct operation, and the program documentation was updated to include a description of the card-image output file. The modified software was made available to the Project Officer for inclusion in EDS library files.

EDS TASK SUMMARY

Number: 36

Title: Perform a data base update to load FORM-423 data

Objective: Load FORM-423 fuel procurement data for the months October, November, and December 1977 into the EDS data base.

Work Performed

Three tapes containing FORM-423 data for the specified months were obtained from the tape library of the National Air Data Branch. A program written by SASD personnel and modified by CSC was executed to concatenate the data from the three IBM-format tapes and create one UNIVAC-format tape containing the concatenated, sorted data. The existing FORM-423 update procedure was then used to load the data into the EDS data base.

EDS TASK SUMMARY

Number: 37

Title: Perform a data base update to load FORM-67 data

Objective: Load 1974 FORM-67 data into the EDS data base.

Work Performed

Using the FORM-67 data tape supplied by the Project Officer, CSC executed the FORM-67 update programs to load the data into the data base. The update was unsuccessful in initial attempts due to errors in the update programs, ED032A and ED032B. Considerable effort was expended to identify and correct the errors prior to successful completion of the update. The corrected programs were made available to the Project Officer for inclusion in EDS library files.

EDS TASK SUMMARY

Number: 38

Title: Perform a data base update to correct NEDS IDs of power plants

Objective: Correct the NEDS identification codes (C21) of certain power plants in the EDS data base. A list of power plants with erroneous NEDS ID codes was supplied to the Project Officer in a memo from Sue Kimbrough, NADB/MDAD.

Work Performed

CSC constructed the requisite System 2000 Natural Language commands for correcting the erroneous NEDS ID codes, and implemented those corrections by performing an ad hoc update of the EDS data base.

EDS TASK SUMMARY

Number: 39

Title: Perform a data base update to load FORM-4 data

Objective: Load "preliminary" 1977 FORM-4 fuel use data into the EDS data base.

Work Performed

Using the FORM-4 data tape supplied by the Project Officer, CSC executed the FORM-4 update programs to load the data into the data base. Some runstream modification and program compilation was necessary to permit successful execution of the update. The corrected software items were made available to the Project Officers for inclusion in EDS library files.

EDS TASK SUMMARY

Number: 40

Title: Develop Project Accounting Procedures and Reports

Objective: Implementation of an automated procedure for reporting contract costs (primarily computer changes) by work category (primarily the project ID of computer runs).

Work Performed

It was determined that most of the desired information might be made available through revised computer utilization/cost reports issued by the National Computer Center. The Project Officer cancelled this task and no work was performed.

EDS TASK SUMMARY

Number: 41

Title: Revision of flue gas cleaning equipment data

Objective: "Clean up" flue gas cleaning equipment data in the EDS data base by unloading, editing, and reloading the corrected data.

Work Performed

It was decided that the "cleanup" would effectively be accomplished by other planned major updates of the data base. The Project Officer cancelled this task and no work was performed.

EDS TASK SUMMARY

Number: 42

Title: Modification of Controlled Emissions Programs

Objective: Modification of the existing Controlled Emissions programs to produce a card-image output file containing information pertaining to the age of power plant boilers. One card image was to be created for each boiler processed by program REPORT/CONTR-EMISS that contained the plant and boiler ID codes, the year of boiler installation, and computed boiler emissions.

Work Performed

Program SELECT/CONTR-EMISS was modified to retrieve from the EDS data base and store in the output file, BOILER-FILE, the year of boiler installation. Program REPORT/CONTR-EMISS was modified to produce the desired card-image output file, and the associated runstream was modified to perform the necessary file assignment. Both programs were tested to verify correct operation after modification, and the program documentation was updated to include a description of the card-image output file.

EDS TASK SUMMARY

Number: 43

Title: Maintenance of EDS

Objective: The long-term maintenance of the EDS data base and ancillary files by CSC. Maintenance activities were to include: scheduling data base updates, acquiring input data, performing the updates, and verifying their successful completion; periodic updates of the ASSIST data base and the S2K-COMMANDS file; and maintenance of EDS files by daily backup to tape and periodic consolidation (deletion of unnecessary files).

Work Performed

CSC developed a plan of work for this task, approved by the Project Officer 10/11/78, that proposed three phases of EDS maintenance that commenced 11/01/78. In the first phase, CSC worked closely with the Project Officer to define in detail the maintenance procedures, establish a schedule for updates, and write a Methodologies Manual describing the update procedures and schedule. The Manual was completed in February 1978. In the second phase, CSC assumed the role of Data Base Administrator and began performing updates and daily file backup. Before each update was performed for the first time, CSC presented a detailed plan of work for approval by the Project Officer, executed the planned work, and provided extensive data verifying the validity of the update. It was frequently necessary during this time to revise update programs and/or the associated runstreams to correct errors or improve operational efficiency. In the third phase, CSC continued the activities of the second phase by performing data base updates for the second time (or more, as dictated by the schedule) but without providing a detailed plan of work or extensive verification data to the Project Officer; CSC assumed complete responsibility for the integrity of the data base and for insuring the validity of updates. CSC performed a total of 26 updates of the EDS data base during the course of this task, performed daily file backup and monthly file consolidation, and revised the Methodologies Manual several times to reflect changes in operating procedures.

The final work performed under this task was implementation of the EDS "mothballing" procedures developed under Task 62. Backup tapes were created that contain copies of all EDS-related files and that can be used to reactivate EDS in the future.

EDS TASK SUMMARY

Number: 44

Title: Retrieval of SO_x emissions data from the "county" data base

Objective: Retrieval from the SASD "county" data base the estimated emissions of sulfur oxides from utility and non-utility sources by fuel type (coal, oil, gas, other) in 1975 and 1985. A report was to be produced that listed the appropriate state totals of SO_x emissions. The information was requested by J. Bachmann (SASD).

Work Performed

The requested information was retrieved from the "county" data base using S2K Natural Language commands. The reports were delivered to the Project Officer for transmittal to the requestor.

EDS TASK SUMMARY

Number: 45

Title: Propose work plans for implementation of alternative projections update procedures

Objective: Development of a technical report specifying proposed work plans and estimates of resources required for implementation of four alternative PROJECTIONS update procedures suggested by the Project Officer.

Work Performed

The four procedures were analyzed and the work plans and resource requirements were developed. A technical report describing the alternative plans/resources was written and delivered to the Project Officer.

EDS TASK SUMMARY

Number: 46

Title: Retrieval of regulations data for Gordian Associates, Inc.
(FOI request)

Objective: Creation of a data tape in IBM-compatible format containing power plant emissions regulations data for particulates, sulfur dioxide, and nitrogen oxides. The information was requested by Gordian Associates, Inc., through the Freedom of Information Act.

Work Performed

S2K Natural Language commands were used to retrieve the regulations data from the EDS data base and to create a disk file containing the data. The existing program "SDF2IBM" was used to read the disc file and create a tape file having IBM fixed-blocked format. A listing of the tape file contents and documentation of the record format was delivered to the Project Officer with a draft letter of transmittal to the data requestor. The Project Officer forwarded those materials with the tape to the requestor.

EDS TASK SUMMARY

Number: 47

Title: Freedom of Information data retrievals

Objective: The Project Officer tentatively planned to initiate a long-term task for the purpose of responding to requests for data retrievals from EDS made through the Freedom of Information Act. Task number 47 was reserved for that effort. It was later decided that the task would not be initiated, and no charges were incurred under this task number.

EDS TASK SUMMARY

Number: 48

Title: Implementation of a PROJECTIONS update procedure

Objective: Implementation of a new design of the portion of the EDS data base for power plant projections data; implementation of one or more programs and runstreams for performing "production" updates of the new projections data base definition; development of program documentation; and execution of the new programs to load currently available projections data into the EDS data base.

Work Performed

A new definition for the PROJECTIONS portion of the EDS data base was developed, in cooperation with the Project Officer, that would accommodate all pertinent data available from either of two sources: the "Generating Units Reference File" (GURF) and the "New Power Plants File" (NPPF). Design specifications were developed and approved by the Project Officer for two programs. One (COPY/PROJECTIONS) would select appropriate data from either source data file and create an output file containing the selected data in the same format irrespective of the original source (GURF or NPPF). The second program (LOAD/PROJECTIONS) would insert all or part of the selected projections data into the EDS data base. The programs and associated runstreams were written and tested; two updates were performed (one using GURF data, the other using NPPF); and program documentation was prepared.

EDS TASK SUMMARY

Number: 49

Title: Optimization of the "controlled emissions" SELECT program

Objective: Modify of the "controlled emissions" program, SELECT/CONTR-EMISS, to reduce the amount of time required for its execution; and demonstrate correct program operation following modification.

Work Performed

The SELECT/CONTR-EMISS program abstracts boiler-related data from the EDS data base and creates a COBOL file used as input to program REPORT/CONTR-EMISS for generation of a "controlled emissions" report. A test version of the SELECT program was created that printed the time required for each S2K retrieval operation when executed. By analysis of that information, it was deduced that an S2K "GET1" retrieval operation was responsible for much of the time used during program execution. The test program was modified to substitute an S2K "GETD" retrieval procedure for the "GET1," and was executed. The resulting timing information revealed a decrease of about 80% in execution time. The original version of the program was similarly modified and executed; the data file thus created was identical with the file produced by the original program. Additionally, the SELECT program was modified to eliminate leading zeros in numeric fields of card output produced by the program (files EMIS-LOADSTR and BOILER-AGE).

EDS TASK SUMMARY

Number: 50

Title: Retrieval of data pertaining to oil- and gas-fired power plants

Objective: Retrieval of information from EDS that could be used to determine the potential impact on power plants of decreased availability of crude oil from Iran. Three reports were to be produced: (1) a list of oil suppliers from which power plants purchased oil in 1977-78, and the amounts and cost of the purchases; (2) an inventory of power plants that can use both oil and natural gas, and the yearly amounts of each fuel used by them; and (3) an inventory of power plants that use natural gas exclusively, and the yearly amount of gas used.

Work Performed

The report of oil suppliers was produced, but very little information was available in the EDS data base with respect to the source of oil procurements. The U.S. Department of Energy and the Federal Energy Administration were contacted by telephone but could provide no additional information. The other two reports were produced by execution of versions of existing program "REPORT/CONTR-EMISS" modified to select oil and gas dual-fired boilers and gas-only fired boilers. The reports were delivered to the Project Officer.

EDS TASK SUMMARY

Number: 51

Title: Retrieval of data pertaining to power plants affecting visibility

Objective: Retrieval of data from EDS pertaining to the relative design generating capacities from coal-fired and oil-fired boilers installed after 1961 in power plants having a total generating capacity of at least 750 megawatts. That information would then be used to identify the plants within 150 kilometers of Federal Class I areas (those areas designated by the National Park Service as requiring a high degree of visibility, e.g., National Parks). The information was requested by G. Crane (ESED).

Work Performed

Two reports were produced, one for coal-fired and the other for oil-fired boilers; using a modified version of an existing program, "LIST-BLR-FIL." The reports listed the name and location of plants and detailed information about boilers that satisfied the constraints given above. The generating capacity of each boiler and the national total (in millions of BTU per hour) was computed and printed. The reports were delivered to the Project Officer, who forwarded them to the requestor along with a list of plants within 150 kilometers of Class I areas.

EDS TASK SUMMARY

Number: 52

Title: Creation of a data tape

Objective: Creation of a data tape in IBM-compatible format containing the data from a small S2K data base pertaining to chemical storage tanks. Creation of the tape was requested by J. Robson, EPA/RTP.

Work Performed

A program was written that retrieved all data from the S2K data base "TANKEMIS," sorted the data by tank ID code, wrote one record per tank ID on tape in IBM-compatible format, and printed the contents of each record. Documentation of the record format was also provided.

EDS TASK SUMMARY

Number: 53

Title: Retrieval of data pertaining to boiler operation, boiler design, and stacks

Objective: Retrieval from EDS of the design and operational data pertaining to power plant boilers and stacks.

Work Performed

Three reports were produced: (1) a "controlled emissions" report including all available detail for all power plants; (2) a report produced by S2K Natural Language commands listing the design generating capacity and fuel consumption rates for each boiler; and (3) a report produced by S2K Natural Language commands listing the design/measured properties of each stack. Each report included the name and location of each power plant.

EDS TASK SUMMARY

Number: 54

Title: Retrieval of data pertaining to distillate oil procurements
by power plants in California

Objective: Retrieval of information from EDS to identify California
power plants having the capability to burn either oil or
gas, and to determine the relative amounts of distillate and
residual oil used by those plants. The information was
requested by J. Schwartz (EPA-Washington, DC).

Work Performed

The requested information was obtained from two separate data retrievals. One identified the plants that purchased distillate oil in 1977 and the amounts purchased. The other identified plants having boilers capable of burning either oil or gas. From those two retrievals a summary report was manually produced that contained all the requested information.

EDS TASK SUMMARY

Number: 55

Title: Retrieval of oil procurement data

Objective: Retrieval of data from EDS pertaining to the procurements of distillate and residual oil in 1977 and 1978 by power plants east of the Mississippi River. The relative amounts and the average sulfur content of each oil type for each plant was desired.

Work Performed

Because of the manner in which fuel procurement data are stored in the EDS data base, it was not possible to obtain the relative amounts of distillate and residual oil procured without writing a special program. A report was produced using S2K Natural Language commands that listed, for each power plant east of 90 degrees longitude that purchased distillate and/or residual oil in 1977-78: plant name and location, the latest available generating capacity, and the total amount and average percent sulfur content of all oil purchased in 1977 and in the first six months of 1978. (Data were not available for purchases during the last six months of 1978.)

EDS TASK SUMMARY

Number: 56

Title: Revision of EDS documentation

Objective: Revision of the documentation of EDS programs and of the EDS Methodologies Manual.

Work Performed

Each of 15 program documents was revised or rewritten to bring it into conformance with SASD documentation standards and to include an accurate description of the current program capabilities and procedures for its use. The Methodologies Manual was updated to reflect current practices and procedures. Each document was extensively reviewed by CSC to insure accuracy of technical content and freedom from typographical errors prior to delivery. After review of the Project Officer, three documents underwent further revision to correct minor errors in style or content. Six copies of each document were delivered.

EDS TASK SUMMARY

Number: 57

Title: Retrieval of data to identify power plants with natural draft cooling towers

Objective: Identification of all power plants that use natural draft cooling towers.

Work Performed

Since the type of cooling tower information is not stored in the EDS data base, the required information was abstracted from the 1975 Department of Energy FORM-67 data tape. A program was written to abstract every record that specified cooling tower type (derived from page 17, line 29 of FORM #67). The abstracted records were sorted by cooling tower type so that all "natural draft" records were contiguous. The power plants were then identified from their codes, also present in the records.

EDS TASK SUMMARY

Number: 58

Title: Retrieval of power plant SO₂ emissions and related data

Objective: Retrieval of information related to power plant SO₂ emissions in order to identify the "dirtiest" plants (those emitting the most SO₂). The information was requested by D. Carter (U.S. Department of Energy).

Work Performed

The requested information was retrieved from EDS by executing S2K Natural Language commands devised for that purpose, and by executing the EDS "Controlled Emissions" report program and the "LIST-BLR-FIL" program.

EDS TASK SUMMARY

Number: 59

Title: Retrieval of net heat rate, boiler design, and stack data for coal-fired plants

Objective: Rank coal-fired power plants according to their net heat rate (amount of heat input per unit of electricity generated), and provide detailed information about the characteristics of boilers, stacks, and flue gas cleaning equipment. The information was requested by C. Amato, Office of Radiation Programs, EPA.

Work Performed

S2K Natural Language commands were devised and executed to produce four reports that provided the requested information. The reports contained the following information: (1) net heat rate of coal-fired plants, ordered by plant location and by computed net heat rate; (2) detailed boiler design data for coal-fired boilers, including the design capability for use of fuels other than coal; (3) stack data for all plants, with indication of which boiler was associated with each stack; and (4) flue gas cleaning equipment data on a boiler-by-boiler basis, ranked by equipment efficiency, including estimated emissions of major pollutants.

EDS TASK SUMMARY

Number: 60

Title: Retrieval of data related to the variability of sulfur content in coal procurements

Objective: Determination of any relationships among the size (generating capacity) of power plants, the sulfur content of coal procured, and calculated SO₂ emissions. The information was requested by B. Steigerwald (OAQPS).

Work Performed

The Maximum Allowable SO₂ Emissions report program was executed to calculate the maximum amount of SO₂ that could be emitted by power plants based on their 1978 coal procurements. S2K Natural Language retrieval commands were devised and executed to compute SO₂ emissions for those plants using the same fuel data, and to compute the difference between the computed and maximum allowable SO₂ emissions. These data were used to obtain distributions of the numbers of plants in various categories of plant size, maximum allowable emissions, and sulfur content.

EDS TASK SUMMARY

Number: 61

Title: Consolidation of S2K commands and ASSIST data base update

Objective: Consolidate into one file, EDS*S2K-COMMANDS, all the useful System 2000 Natural Language retrieval and update commands; create a command abstract for each of the consolidated commands; and update the ASSIST data base by insertion of the text and abstract for each consolidated command.

Work Performed

The user-written S2K commands in files EDS*S2K-COMMANDS, EDS*COMMAND-POOL, EDS*RLS-COMMANDS, EDS*TCH-COMMANDS, EDS*BAA-COMMANDS, EDS*SSS-COMMANDS, and FUEL*TAD-COMMANDS were listed and examined. Those deemed useful were extracted, modified if necessary to correct errors or to improve their quality, and tested. Duplicate commands were eliminated, and all commands were renamed to better connote their functions. An abstract of each command was generated using text editor macro procedures developed for that purpose. The text of all commands were removed from file EDS*S2K-COMMANDS and the abstracts of all commands were removed from the ASSIST data base. Then the new commands and abstracts were loaded into file EDS*S2K-COMMANDS and the ASSIST data base, respectively. A backup tape copy of the ASSIST data base was created, and a listing of all the information in the data base was produced and delivered to the Project Officer. In addition the Project Officer was provided with a cross-reference list that showed the corresponding "old" and "new" file.element/version names of each command.

EDS TASK SUMMARY

Number: 62

Title: Develop procedures for mothballing EDS

Objective: Development of procedures for "mothballing" EDS and for its reactivation.

Work Performed

CSC developed a plan for the "mothballing" of EDS and for its potential reactivation, and presented the plan in a technical report. The "mothballing" was to be accomplished by creating copies of all EDS-related files on magnetic tape, after which maintenance of those files by SASD would cease. Four tapes were to be created in duplicate -- one copy to be retained in the NCC tape library, the other in the NCC archival tape storage area. The first tape would contain a copy of the data base files and all other files necessary for routine operation of EDS. The second and third tapes would contain copies of all files on disk packs DSD061 and DSD089. The fourth tape would contain the EDS data base definition and all data from the data base in System 2000 value string format. The technical report described in general terms the procedures for reactivation of EDS and potential problems that might be encountered.

The Project Officer approved the technical report after minor revision, and authorized implementation of the "mothballing" procedures specified therein.

TECHNICAL REPORT DATA <i>(Please read Instructions on the reverse before completing)</i>		
1. REPORT NO. EPA 450/5-80-005	2.	3. RECIPIENT'S ACCESSION NO.
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