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Audit Report
HQ-92-04
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**U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
OFFICE OF QUALITY ASSURANCE**

**AUDIT REPORT OF
OF THE
ENERGY INFORMATION ADMINISTRATION
OCRWM ACTIVITIES
WASHINGTON, DC**

AUDIT NUMBER HQ-92-04

SEPTEMBER 14 - 17, 1992

Prepared by: R. Dennis Brown

Date: 11/04/92

**R. Dennis Brown
Audit Team Leader
Headquarters Quality Assurance Division**

Approved by: R.W. Clarf

Date: 12/21/92

for **Donald G. Horton
Director
Office of Quality Assurance**

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1.0 EXECUTIVE SUMMARY

As a result of QA Audit HQ-92-04, the audit team determined that the Energy Information Administration (EIA) QA Program was not adequate nor was it being effectively implemented in accordance with the EIA Quality Assurance Program Description (QAPD) and implementing procedures. In general, EIA has been implementing internal quality assurance requirements mandated by the EIA Office of Statistical Standards (OSS) for all tasks. However, the EIA OSS standards are not adequate for implementing Office of Civilian Radioactive Waste Management (OCRWM) quality assurance program requirements as defined by the OCRWM Quality Assurance Requirements Document (QARD) (DOE/RW-214).

The EIA Office of Coal, Nuclear, Electric and Alternate Fuels has been performing two quality affecting tasks for OCRWM. One task is to develop and maintain the "Data Collection System - RW-859 Nuclear Fuel Data Survey." The system is a single, unified source of detailed technical data relative to potential repository wastes. The data describes factors such as physical descriptions, chemical composition, and radiological properties of spent nuclear fuel. The second task requires the development and maintenance of the "Automatic Data Model - International Nuclear Model (INM)." This computer model provides nuclear fuel cycle forecasts for uranium and enrichment service requirements, spent fuel discharges, and annual nuclear electric generation forecasts.

The audit team concluded that the technical adequacy of the two quality affecting tasks performed by EIA for OCRWM as being indeterminate. The EIA standards processes were not documented or approved in accordance with the OCRWM QARD Section 19 requirements.

Ten QARD program elements apply to the work being performed; all ten were addressed during this audit.

The audit team identified fourteen deficiencies during the course of the audit. Deficient areas included QAPD adequacy, preparation of implementing procedures, organizational independence, preparation of software Quality Assurance (QA) plans, procurement document control, indoctrination and training, personnel qualification, QA records, QA audits, QA document control, corrective action, and QA records indexing. One deficiency was corrected prior to the postaudit meeting. Thirteen of the deficiencies resulted in Corrective Action Requests.

2.0 SCOPE

The audit evaluated adequacy and implementation of the EIA QA program as described in the EIA QAPD, Revision 0 and supporting procedures.

2.1 QA PROGRAM ELEMENTS/REQUIREMENTS

The following QA program elements were evaluated during the audit:

1. Organization
2. Quality Assurance Program
4. Procurement Document Control
5. Instructions, Procedures, and Drawings
6. Document Control
7. Control of Purchased Items and Services
16. Corrective Action
17. Quality Assurance Records
18. Audits
19. Computer software

Requirements source documents include the DOE/RW-0214, *Quality Assurance Requirements Document*; EIA *Quality Assurance Program Description*; and the Energy Information Administration Standards Manual.

2.2 TECHNICAL AREAS

The following technical areas were reviewed:

1. Qualifications of technical personnel.
2. Personnel understanding of procedural requirements pertaining to the development, review and approval of technical documents.
3. The processes used to:
 - a. Collect, verify, correct, analyze, and report data and to maintain the computer program for the "Data Collection System - RW-859 Nuclear Fuel Data Survey."
 - b. Develop, operate and maintain the computer program for the "Automated Data Model - International Nuclear Model (INM)."

3.0 AUDIT TEAM AND OBSERVERS

The following is a list of audit team members, their assigned area of responsibility, and observers.

			QA Program Element or Technical Area
Audit Team Leader	R. Dennis Brown	CER/HQAD	1, 2, 18
Auditor	Donald C. Hendrix	CER/HQAD	19
Auditor	F. Hugh Lentz	CER/HQAD	4, 5, 6, 7
Auditor	Robert L. Howard	Weston/HQAD	16, 17, 18, 19
Technical Specialist	Michael D. Collins	TRW/HQAD	19

4.0 AUDIT MEETINGS AND PERSONNEL CONTACTED

The preaudit meeting was held at the DOE Headquarters Forrestal Building on September 14, 1992. A daily debriefing and coordination meeting was held with EIA management and staff. Daily audit team meetings were held to discuss issues and potential deficiencies. The audit concluded with a postaudit meeting held at the EIA Offices on September 17, 1992. Personnel contacted during the audit are listed in Attachment 1. The list indicates those who attended the pre and post audit meetings. The audit team also visited the offices of Z, INC. (subcontractor to EIA) in Silver Spring, MD.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Effectiveness

The audit team concluded that, in general, EIA's quality assurance program was not being fully implemented and for this reason was determined to be unsatisfactory. None of the QA program elements audited were being satisfactorily implemented.

During the audit, the audit team determined that QA Program element 7, Control of Purchased Services, did not apply to tasks performed by EIA for OCRWM.

5.2 QA Program Audit Activities

Details of the QA program audit activities are provided in Attachment 2. A list of objective evidence reviewed during the audit is provided in Attachment 3.

5.3 Technical Activities

Details of technical audit activities are provided in Attachment 2. A list of objective evidence reviewed during the audit is provided in Attachment 3.

5.4 Summary of Deficiencies

The audit team identified fourteen deficiencies during the audit. One deficiency was corrected prior to the post audit conference.

A synopsis of the deficiencies documented as Corrective Action Requests (CARs) and those corrected during the audit are detailed below. Copies of the CARs are included in Attachment 4.

5.4.1 Corrective Action Requests (CARs)

CAR HQ-92-19

EIA has not incorporated certain requirements of the QARD into the EIA QAPD.

CAR HQ-92-20

EIA has not issued QA program implementing procedures.

CAR HQ-92-21

EIA's current organization for OCRWM tasks does not include a QA manager who is independent from cost and schedule.

CAR HQ-92-22

EIA has not prepared a SQAP. Certain software QA requirements from QARD Section 19 have not been incorporated into the RW-859 Data Collection System process.

CAR HQ-92-23

EIA has not prepared a SQAP. Certain software QA requirements from QARD Section 19 have not been incorporated into the development and maintenance of the International Nuclear Model (INM).

5.4.1 Corrective Action Requests (CARs) (Cont.)

CAR HQ-92-24

Four of six EIA subcontractor procurement documents sampled did not contain a requirement that support contractor's personnel work to EIA QA requirements. The same four documents were not reviewed by the EIA QA organization to assure applicable QA program requirements were included.

CAR HQ-92-25

Personnel performing quality affecting work have not been adequately indoctrinated and trained.

CAR HQ-92-26

EIA has not established position descriptions for personnel performing quality affecting work. Also, minimum education and experience for these personnel has not been verified.

CAR HQ-92-27

EIA is not adequately controlling QA Records.

CAR HQ-92-28

There is no documented evidence that an audit program has been established or implemented.

CAR HQ-92-29

Controlled documents are not being adequately controlled.

CAR HQ-92-30

Methods to identify, document, and correct conditions adverse to quality are not in place.

5.4.1 Corrective Action Requests (CARs) (CONT.)

CAR HQ-92-31

Sufficient evidence does not exist to verify that EIA QA management has been reporting regularly on QA program issues to upper management and OCRWM.

5.4.2 Deficiencies Corrected During the Audit

Contrary to the requirements of EIA QAPD Revision 0, Section 17.5, there was not an indexing system for the QA Records stored in the Duplicate Records Storage Facility. This condition was satisfactorily corrected prior to the postaudit meeting.

6.0 RECOMMENDATIONS

The audit team concluded that the audited processes (processing of the RW-859 data and development and maintenance of the INM) were technically adequate in accordance with the EIA standards. However, these processes were not documented or approved in accordance with OCRWM QARD requirements. In summary, the end products appeared technically adequate during the week of the audit, but it could not be determined if the processes were repeatable.

As a result of the audit, management personnel from OCRWM and EIA have begun to discuss the possibility of EIA functioning as a direct support contractor to OCRWM. EIA personnel would work to OCWRM's Quality Assurance Administrative Procedures (QAAPs). EIA would still have to develop and maintain implementing procedures for computer software activities (including preparing Software Quality Assurance Plans).

7.0 LIST OF ATTACHMENTS

- Attachment 1: Personnel Contacted During the Audit**
- Attachment 2: Audit Details**
- Attachment 3: List of Objective Evidence Reviewed During the Audit**
- Attachment 4: Copies of CARs**

ATTACHMENT 1

PERSONNEL CONTACTED DURING THE AUDIT

NAME	ORGANIZATION	TITLE	PRE	CONTACT	POST
D. Brown	DOE/CER	Audit Team Leader	X		X
H. Chou	EIA	Operations Research Analyst	X	X	X
R. Clark	DOE/OCRWM	Director, HQ QA Division			X
L. Cook	EIA	Contracting Officer's Rep.		X	
D. Collier	EIA	Contracting Officer's Rep.		X	
M. Collins	DOE/TRW	Technical Specialist	X		X
J. Disbrow	EIA	Supr. Ops. Research Analyst	X	X	X
G. Goodman	EIA	Contracting Officer's Rep.			X
C. Graziano	EIA/Z, Inc.	Programmer/Analyst	X	X	
K. Gibbard	EIA	Project Manager	X	X	X
D. Hendrix	DOE/CER	Lead Auditor-in-training	X		X
R. Howard	DOE/Weston	Auditor	X		X
D. Jackson	EIA	Operations Research Analyst	X	X	X
F. Lentz	DOE/CER	Auditor	X		X
B. Liggett	EIA	Operations Research Analyst	X	X	X
C. Little	EIA/Z, Inc.	Senior Research Analyst	X	X	X
F. Mayes	EIA	Branch Chief, SMD	X	X	X
B. McCarty	EIA/Z, Inc.	Research Analyst	X	X	
M. Miller	EIA	Contracting Officer's Rep.		X	
B. O'Brien	EIA	Branch Chief, SAB			X
M. Payton	DOE/OCRWM	Nuclear Utility Analyst	X	X	X
R. Schapp	EIA	Division Director			X
J. Thorpe	EIA/Z, Inc.	Project Manager	X	X	X
L. Walsh	EIA	Budget Analyst		X	X
D. Yao	EIA/Z, Inc.	Systems Analyst	X	X	

ATTACHMENT 2

Audit Details

The following is a summary of the QA program activities covered during the audit. A list of objective evidence reviewed, by document identification and title, is given in Attachment 3.

A. QA Programmatic Activities

1.0 ORGANIZATION

The evaluation of this criterion was based on personnel interviews and a review of the current EIA organizational structure. Lines of authority, responsibility, and organizational interfaces were not adequately defined so that quality issues could be appropriately identified and acted upon. There was no evidence that the QA function was independent of cost and schedule. See CAR HQ-92-21.

2.0 QA PROGRAM

The audit team reviewed the available training files to verify compliance to the OCRWM QARD and the EIA QAPD, Section 2, *Quality Assurance Program*. Records presented for review contained I&T matrices that identified training requirements, dated September 10, 1992. The matrices referenced draft procedures. After reviewing the completed position descriptions and resumes of each person identified as performing quality affecting work, the audit team found that the minimum education and training requirements were not adequately referenced. Additionally, EIA management had not performed verifications of education or experience. See CARs HQ-92-25 and 26.

The audit team reviewed the EIA QAPD to determine compliance with the requirements of the OCRWM QARD. The audit team determined that EIA has not incorporated certain requirements of the QARD into the EIA QAPD. See CAR HQ-92-19.

4.0 Procurement Document Control

The audit team interviewed EIA personnel to determine procedural compliance regarding procurements. The team reviewed recent procurements issued to the four contractors working on the OCRWM tasks: NYMA, Inc.; Washington Consulting Group; SAIC; and Oak Ridge National Laboratory. In addition, the team traced these contracts to their subcontractors: Z, Inc; Andress Associates; and Automated Science Group. Several deficiencies were identified during the review of these procurement documents. See CAR HQ-92-024.

After reviewing six procurement documents, the auditor found that four procurement documents did not identify QA requirements for the OCRWM work being performed by the subcontractor. The same four documents also did not receive EIA QA organization review and concurrence. See CAR HQ-92-024.

5.0 Instructions and Procedures

The audit team interviewed EIA and Z, Inc. personnel to determine compliance to implementing procedures. The audit team determined that EIA had not issued any controlled procedures or instructions as required by the QARD and the EIA QAPD. Five implementing procedures were in draft awaiting signature; sixteen were scheduled for issuance on February 28, 1993. See CAR HQ-92-20.

6.0 Document Control

The auditors reviewed four types of controlled document manuals and interviewed EIA and Z, Inc. personnel to determine compliance with document control requirements identified in the QARD and EIA QAPD. Document control activities have been initiated, but an approved procedure to control and distribute documents was not in place. See CAR HQ-92-29.

7.0 Control of Purchased Services

Because all contractors and subcontractors provide direct support to EIA and work to the requirements of the EIA QAPD, the audit team deemed this criterion as "not applicable".

16.0 Corrective Action

The audit team interviewed EIA personnel to gain an understanding of how EIA identifies, documents, corrects, and trends conditions adverse to quality. The Form RW-859 Editing Procedures Manual describes a process for identifying errors in the data collection process. The procedure, however, does not describe the process for corrective actions once the errors are identified. The designated Quality Assurance Project Manager for EIA indicated that at present EIA is identifying and prioritizing quality assurance deficiencies in an informal manner.

The audit team determined that there was no documented evidence that a corrective action system had been prepared, documented, approved, controlled, and implemented for identifying, documenting, correcting and trending conditions adverse quality. See CARs HQ-92-20, 29 and 30.

17.0 Quality Assurance Records

The audit team interviewed the EIA staff and visited the Temporary Records Storage Facility (TRSF) located at the EIA's support contractor office [Z, Inc.]. The Operations Specialist is assigned as the custodian for the Z, Inc. office and the EIA records.

The audit team verified that the QA Records were retained at the TRSF in a one hour fire-rated safe. The audit team inspected the TRSF file cabinet (fire-rated safe) to verify that records are kept in binders or placed in folders or envelopes and that magnetic media are protected from electromagnetic fields, temperature, and humidity as required by the OCRWM QARD. QA records kept in the TRSF

17.0 Quality Assurance Records (Cont.)

were verified to be maintained in hanging folders. Magnetic tapes were also stored in the TRSF. There is a sign posted above the TRSF storage cabinet that reads: "No Magnetic or Electrical Devices are to be placed on or near the safe in order that physical media containing images and/or software may be protected from inadvertent damage or degradation."

The audit team sampled the files in the TRSF to verify that the QA records were complete and legible. QA records related to the RW-859 Data Collection Survey were stored in the facility. These documents, although not authenticated as records, appeared to be complete and were legible. An electronic copy of the RW-859 data was stored in the facility along with the hard copy documentation. The audit team also reviewed the QA records related to the INM stored in the TRSF. There were contract deliverable memos related to the INM and documentation for using the INM in the QA records package; however, the INM software was not in the QA records package. See CAR HQ-92-27.

The audit team reviewed a sample of the Energy Information Standards and draft EIAPs in order to verify that they appropriately specify the records to be generated, supplied, or maintained by the organization. The following draft EIAPs specify records to be generated as a result of implementing the procedure:

Draft EIAP 2.3 *Quality Assurance Program Controls*
Draft EIAP 5.1 *Quality Assurance Program Procedures* *
Draft EIAP 6.1 *Document Control*
Draft EIAP 16.1 *Corrective Action*
Draft EIAP 17.1 *QA Records Management*

The following Energy Information Administration Standards were sampled:

EIA Standard 91-01-01 *Model Acceptance Standard* specifies requirements for Model Developer's Reports, but does not identify any records to be generated, supplied, or maintained by the model development organization.

EIA Standard 91-01-03 *Model Documentation* requires that procedures, equations, and assumptions, which define the EIA models, does not specify records to be generated, supplied, or maintained by the model development organization.

EIA Standard 91-01-04 *Model Archival* specifies requirements to ensure that the EIA model calculations are reproducible and requires that model archival packages be submitted to the Office of Statistical Standards, but does not describe how the archival packages are to be maintained by the Office of Statistical Standards.

Form RW-859 Editing Procedures Manual does not specify records to be generated, supplied, or maintained as a result of implementing the procedures.

The audit team determined that there was no documented evidence that the RW-859 Nuclear Fuel Data or the International Nuclear Model are required to be maintained as quality records. No procedure specified what was to be retained or distributed to the OCRWM Quality Records Center. See CAR HQ-92-27.

The audit team noted that there was not an indexing system for the QA records stored in the TRSF. However, by the end of the audit the EIA staff had established and implemented an indexing system. The audit team was able to use the indexing system to locate files within the storage facility.

18.0 Quality Assurance Audit Program

The audit team interviewed the EIA Project Manager to gain an understanding of the EIA Quality Assurance Audit Program. He indicated that the audit program is not being implemented. See CAR HQ-92-28.

EIA indicated that the Office of Statistical Standards (OSS) has conducted software audits of the RW-859 Nuclear Fuel Data Survey process and the International Nuclear Model. The OSS software audits are required by the EIA QAPD. There was no documented evidence, however, that OSS software audits had been scheduled since the approval of the EIA QAPD in November of 1991. Mr. Disbrow provided the auditor with copies of an OSS audit of the RW-859 Nuclear Fuel Data Survey performed in December of 1987 and an OSS audit of the International Nuclear Model performed in August of 1989.

19.0 Computer Software

The review of this QA program element began at the EIA offices and continued at Z, Inc.. The audit team concentrated on reviewing the processes used to implement the RW-859 database and the INM in accordance with the OCRWM QARD, the approved EIA QAPD, and the appropriate EIA implementing procedures.

The audit team reviewed the process for "Computer Code Verification" to determine compliance to the OCRWM QARD Section 19 and the EIA QAPD Section 19, "Computer Software." No formal QA procedure describes the basic requirements for the content and format for reporting and documenting verification activities. However, EIA personnel were following approved EIA standards for this process.

The EIA has not formalized QA controls for computer software transfer. However, Z, Inc. was using EIA approved "commercially available software" (Clipper) to control the software transferred to the users.

The audit team verified the editing process used for input of the data received from the respondents into the RW-859 database. The audit team witnessed the input of data to the DOE mainframe containing the RW-859 database via modem access from a designated personal computer. The results were verified by comparing a hard copy printout of the updated mainframe file to a randomly selected sample of the input data record files. Although personnel were following an unapproved editing procedure the process went smoothly. Personnel performing the verification of data could not provide evidence of having sufficient independence from the input process. See CARs HQ-92-22 & HQ-92-23.

B. Technical Audit Activities

1.0 Qualification of Technical Personnel

Eight qualification files were reviewed for personnel supporting the "Data Collection System - RW-859, Nuclear Fuel Survey" and the "International Nuclear Model" for qualifications of technical personnel. It appears that EIA personnel had education and experience commensurate with the type of work they were supporting. Formal position requirements will be developed to respond CAR HQ-92-26.

2.0 Personnel Understanding of Requirements

The audit team interviewed personnel supporting the "Data Collection System - RW-859, Nuclear Fuel Survey" and the "International Nuclear Model" and verified that personnel have a good understanding of EIA procedural requirements pertaining to the development, review and approval of technical documents.

3.0 RW-859 Process in Accordance with EIA Requirements and Procedures

The audit team reviewed the processes used to collect, verify, correct, analyze, and report data and to maintain the computer program for the "Data Collection System - RW-859 Nuclear Fuel Data Survey."

Data Collection Process:

The audit team reviewed the RW-859 data collection process to ensure that it was being developed in accordance with the following EIA standards: 88-03-02 (Data Systems Development), 88-03-03 (Data Systems Documentation), 88-03-04 (Programming), and FIPS PUB 38 (Guidelines for Documentation of Computer Programs and Automated Data Systems).

The form RW-859 data collection process is comprised of the following activities:

- (1) previous year data preparation and survey mailout,
- (2) preliminary data processing of respondent submissions,
- (3) data upload to the EIA mainframe computer,
- (4) SAS processing of data on the mainframe,
- (5) QA analysis on the mainframe, and
- (6) generation of the final data tape and archival.

This process uses IBM compatible personal computers and a modem link to the DOE mainframe computer.

Correction Process:

The audit team reviewed the correction process used throughout the processing cycle. The EIA staff and contractors reviewed all data submitted to them, via diskette, from respondents. They authenticated the completeness of information and changes relative to previous year's data. Hardcopies of respondents data were reviewed and compared to the submitted diskettes. Data that satisfied the EIA and contractor's confirmation were copied to archive diskettes and kept on file.

RW-859 Process (Cont.)

Verification Process:

The audit team reviewed the data verification process, which utilizes designated personal computers to upload DOS text files via modem to partitioned data sets on the DOE mainframe. Each time the DOE mainframe partitioned data sets are uploaded, a program is automatically invoked that calculates the parity bit check total for each uploaded reactor file and stores the date and time in the upload log file. This file is used to check for errors during an upload and automatically halts the program prior to file update until an error-free upload is obtained.

Analysis Process:

The audit team reviewed the automatic analysis process, which utilizes a PASCAL QA program. The software program automatically notifies users of all error occurrences throughout the processing cycle, and ensures that the submitted data was correctly uploaded from the diskettes to the DOE mainframe.

Report Data:

The audit team did not verify the correctness or accuracy of the data submitted from the respondents.

Maintenance Process:

The project manager was responsible for ensuring that all project libraries (files) were backed up at least once a year. All computer software was sent to the mainframe for reference storage and all software diskettes were duplicated and filed. Daily backups were also performed for the RW-859 system.

The audit team concluded that the above processes were technically adequate in accordance with the EIA standards; however, those processes were not documented or approved in accordance with the OCRWM QARD Section 19 requirements and NUREG-0856 guidelines. Therefore, the results of the technical review of the RW-859 system are considered to be indeterminate. See CAR HQ-92-22.

4.0 INM Process in Accordance with EIA Requirements and Procedures

The audit team reviewed the processes used to develop, operate, and maintain the computer program for the "Automated Data Model - International Nuclear Model (INM)." The INM model consists of a program running on the DOE mainframe computer (INM) and an identical program designed to run on personal computers (PCINM).

Due to the time restraints and unavailability of the INM program running on the DOE mainframe, the audit team reviewed the PCINM processes to ensure that they were being performed in accordance with the following EIA standards: 91-01-01 *Model Acceptance Standard*, 91-01-02 *Requirements*, 91-01-03 *Model Documentation*, 88-03-02 *Data Systems Development*, and 91-01-04 *Model Archival*.

INM Process (Cont.)

The audit team reviewed the following Model Documentation:

- (1) The Model Abstract which described the purpose and use of the model.
- (2) The hardcopies of the Clipper source code listings and the PCSAS source code listings depicted in the Model Documentation.
- (3) The Model Overview describing the model and how forecasts are produced.
- (4) A flowchart describing data inputs and outputs.
- (5) The methodology utilized for the model run.
- (6) The cross-reference tables showing:
 - Locations in the computer code for each equation in the model.
 - Variables correspondence between documentation and computer code.
- (7) Variable, data, and parameter listing(s).
- (8) The mathematical specifications (Model Technical Specifications).

The audit team concluded that the PCINM process was technically adequate in accordance with the EIA standards; however, it was not documented or approved in accordance with the QARD Section 19 requirements and NUREG-0856 guidelines. Therefore, the results of the technical review of the PCINM are considered to be indeterminate.

ATTACHMENT 3

List of Objective Evidence Reviewed During the Audit

Documents Reviewed:

EIA Indoctrination and Training Manual (Undated)

Form RW-859 Editing Procedures Manual, February 7, 1992

EIA Standard 91-01-01 Model Acceptance Standard, February 9, 1991

EIA Standard 91-01-03 Model Documentation, October 29, 1991

EIA Standard 91-01-04 Model Archival, October 29, 1991

Energy Information Administration (EIA) Service Report: Spent Nuclear Fuel Discharges from U.S. Reactors March 1990 - March 1992

Federal Information Processing Standards Publication (FIPS PUB 38): Guidelines for Documentation of Computer Programs and Automated Data Systems - February 15, 1976

The Energy Information Administration Standards Manual - October 21, 1991

OCRWM QA Requirements Matrix (Undated)

Statement of Work: Data Collection and Processing Systems Assessments (Undated)

Energy Information Administration Quality Assurance Program Description - November 1991

RW-859 Nuclear Fuel Data Survey Documentation (Undated)

RW-859 System Maintenance Report (Undated)

Automated Nuclear Fuel Data Collection System (ANFDCS): Microcomputer System Design Document - December 2, 1992

Form RW-859 "Nuclear Fuel Data" Survey: Mainframe Software System Workplan - October 31, 1991

Form RW-859 "Nuclear Fuel Data" Survey: Mainframe Software System Workplan - December 31, 1991

International Nuclear Model Personal Computer (PCINM) Model Documentation - August 1992

Model Document Evaluation Form (Undated)

International Nuclear Model: Benchmarking - February 12, 1992

Model Abstract Features (Undated)

Office of Statistical Standards Audit Report on the Nuclear Fuel Data Survey RW-859, dated December 18, 1987

Office of Statistical Standards Audit Report on the International Nuclear Model, dated August 27, 1989

EIA QA Procedures

- Draft EIAP 2.3 Quality Assurance Program Controls
- Draft EIAP 5.1 Quality Assurance Program Procedures
- Draft EIAP 6.1 Document Control
- Draft EIAP 16.1 Corrective Action, dated September 8, 1992
- Draft EIAP 17.1 QA Records Management

Personnel Qualifications

a. Resumes for:

- J. Thorpe
- D. Yao
- M. Chien
- W. Graziano
- A. Address
- D. Address

b. SF171's for:

- D. Jackson
- H. Chou

Task Assignments to NYMA, Inc. (Subcontractor: Z, Inc.)

- Task No. 51020C
- Task No. 92020A
- Task No. 92047
- U.S. Department of Energy Task Assignment Modification to NYMA, Inc. (May 23, 1991 to December 31, 1991)
- U.S. Department of Energy Task Assignment Modification to NYMA, Inc. (December 31, 1991 to May 22, 1992)

Task Assignments to SAIC (Subcontractor: Z, Inc.)

- Task No. 92039

Task Assignments to Washington Consulting Group (Subcontractor: Address, Assoc.)

- Task No. N/A

Work Authorization for ORNL (Subcontractor: Automated Science Group)

- Task No. 91331

Routing and Transmittal Slips

- April 2, 1992 to August 19, 1992

ANFDCS Mainframe System Status Meeting Minutes
- October 17, 1991 to May 27, 1992

NYMA, Inc. memos to U.S. Department of Energy
- October 31, 1991 to May 22, 1992

ANFDCS System Status Meeting Minutes
- May 24, 1991 to November 7, 1991

NYMA, Inc. memos to U.S. Department of Energy
- May 29, 1991 to December 31, 1991

ATTACHMENT 4

Copies of Corrective Action Requests

[CARs HQ-92-19 through 31]

**OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.**

*** CAR NO.** HQ-92-19
DATE: 9/17/92
PAGE: 1 OF
QA

CORRECTIVE ACTION REQUEST

¹ Controlling Document
 QARD (DOE/RW-214), Rev. 4

² Related Report No.
 HQ-92-04

³ Responsible Organization
 Energy Information Administration (EIA)

⁴ Discussed With
 Fred Mayes

⁵ Requirement:

QARD, Section 2.1 states, "Affected organizations shall develop QA program documents that address QA program requirements applicable to their respective program scope-of-work. The QA program shall meet the requirements established by this document."

⁶ Adverse Condition:

Contrary to the above, certain requirements of the QARD have not been incorporated into the EIA Quality Assurance Program Description (examples include requirements for: stop work authority, surveillance, management assessments, and verification of minimum education and experience of personnel).

⁸ Does a significant condition adverse to quality exist? Yes ___ No X
 If Yes, Circle One: A B C

¹⁰ Does a stop work condition exist? Yes ___ No ___; If Yes - Attach copy of SWO
 If Yes, Circle One: A B C D

¹¹ Response Due Date:
 11/13/92

¹² Required Actions: Remedial Extent of Deficiency Preclude Recurrence Root Cause Determination

¹³ Recommended Actions:

Incorporate requirements of QARD into EIA Quality Assurance Program Description.

⁷ Initiator
R. Donnie Brown 10/5/92
 Date

¹⁴ Issuance Approved by:
 QADD *[Signature]* Date 10/12/92

¹⁵ Response Accepted
 QAR Date

¹⁶ Response Accepted
 QADD Date

¹⁷ Amended Response Accepted
 QAR Date

¹⁸ Amended Response Accepted
 QADD Date

¹⁹ Corrective Actions Verified
 QAR Date

²⁰ Closure Approved by:
 QADD Date

**OFFICE OF CIVILIAN
RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY
WASHINGTON, D.C.**

⁸ CAR NO. HQ-92-23
DATE: 9/17/92
PAGE: 1 OF
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CORRECTIVE ACTION REQUEST

¹ Controlling Document QARD (DOE/RW-214), Rev 4 ²Related Report No. HQ-92-04

³ Responsible Organization Energy Information Administration (EIA) ⁴ Discussed With Diane Jackson, Bill Liggett

⁵ Requirement:

QARD, Section 19.1 states, "The application of the computer software life cycle to computer software development and use shall be described in a computer Software Quality Assurance Plan (SQAP)."

⁶ Adverse Condition:

Contrary to the above, no SQAP has been prepared and approved, and certain requirements of QARD section 19 have not been incorporated into the development and maintenance of the International Nuclear Model (INM).
Examples:

(1) No Software Configuration Management system is documented that describes the software configuration management process.
(2) No Verification and Validation process is documented to determine how and when verification and validation occurs.
(3) No formal software discrepancy system has been established.
(4) Model documentation was not prepared in accordance with NUREG-0856.
(5) Technical reviews of software development activities are not being documented.

⁹ Does a significant condition adverse to quality exist? Yes X No
If Yes, Circle One: A (B) C
¹⁰ Does a stop work condition exist? Yes No X; If Yes - Attach copy of SWO
If Yes, Circle One: A B C D
¹¹ Response Due Date: 11/13/92

¹² Required Actions: Remedial Extent of Deficiency Preclude Recurrence Root Cause Determination
¹³ Recommended Actions:

Prepared, approve and issue a SQAP in accordance with appropriate QA controls. The impact assessment performed for CAR HQ-92-20 will address this deficient condition also.

⁷ Initiator R. Donnie Brown Date 10/5/92 ¹⁴ Issuance Approved by: [Signature] Date 10/12/92
QADD [Signature]

¹⁵ Response Accepted QAR Date ¹⁶ Response Accepted QADD Date

¹⁷ Amended Response Accepted QAR Date ¹⁸ Amended Response Accepted QADD Date

¹⁹ Corrective Actions Verified QAR Date ²⁰ Closure Approved by: QADD Date

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³ CAR NO. HQ-92-24
DATE: 9/17/92
PAGE: 1 OF
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CORRECTIVE ACTION REQUEST

¹ Controlling Document QARD (DOE/RW-214), Rev 4		² Related Report No. HQ-92-04	
³ Responsible Organization Energy Information Administration (EIA)		⁴ Discussed With Kathy Gibbard	
⁵ Requirement: QARD, para. 4.1 states, "Procurement documents shall be reviewed by affected organization's technical and QA organization representatives to assure that applicable technical and QA program requirements are included." QARD, para. 4.2 states, "When deemed appropriate, the purchaser may permit some or all supplier activities to be performed under the jurisdiction of the purchaser's QA program provided that the scope of the activity is adequately addressed therein."			
⁶ Adverse Condition: Contrary to the above requirements, four of six procurement documents (task assignments for Washington Consulting Group, SAIC, ORNL, and NYMA, (INM task only)) sampled during the audit do not address the requirement that the support contractor's personnel work to EIA QA requirements. The same four procurement documents were not reviewed by the EIA QA organization to assure applicable QA program requirements were included.			
⁹ Does a significant condition adverse to quality exist? Yes <u> </u> No <u>X</u> If Yes, Circle One: A B C		¹⁰ Does a stop work condition exist? Yes <u> </u> No <u> </u> ; If Yes - Attach copy of SWO If Yes, Circle One: A B C D	
		¹¹ Response Due Date: 11/13/92	
¹² Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination			
¹³ Recommended Actions: Review all quality affecting procurement documents for evidence of QA program requirements.			
⁷ Initiator <i>RD Dennis Brown</i> Date <i>10/5/92</i>		¹⁴ Issuance Approved by: QADD <i>[Signature]</i> Date <i>10/15/92</i>	
¹⁵ Response Accepted QAR Date		¹⁶ Response Accepted QADD Date	
¹⁷ Amended Response Accepted QAR Date		¹⁸ Amended Response Accepted QADD Date	
¹⁹ Corrective Actions Verified QAR Date		²⁰ Closure Approved by: QADD Date	

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⁸ CAR NO. HO-92-28
DATE: 9/17/92
PAGE: 1 OF
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CORRECTIVE ACTION REQUEST

¹ Controlling Document EIA QAPD, dated 11/91		² Related Report No. HO-92-04	
³ Responsible Organization Energy Information Administration (EIA)		⁴ Discussed With James Disbrow	
⁵ Requirement: EIA QAPD, Section 18.1, Audit Program Implementation states, " EIA plans and conducts audits of the affected organization activities as well as activities performed by EIA staff."			
⁶ Adverse Condition: Contrary to the above, there is not documented evidence that an audit program has been established or implemented.			
⁹ Does a significant condition adverse to quality exist? Yes <u> </u> No <u>X</u> If Yes, Circle One: A B C		¹⁰ Does a stop work condition exist? Yes <u> </u> No <u> </u> ; If Yes - Attach copy of SWO If Yes, Circle One: A B C D	
¹¹ Response Due Date: 11/13/92			
¹² Required Actions: <input checked="" type="checkbox"/> Remedial <input type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination			
¹³ Recommended Actions: Establish and implement an audit program.			
⁷ Initiator <i>R. Dennis Brown</i> <i>10/5/92</i> Date		¹⁴ Issuance Approved by: <i>[Signature]</i> <i>10/13/92</i> QADD Date	
¹⁵ Response Accepted QAR Date		¹⁶ Response Accepted QADD Date	
¹⁷ Amended Response Accepted QAR Date		¹⁸ Amended Response Accepted QADD Date	
¹⁹ Corrective Actions Verified QAR Date		²⁰ Closure Approved by: QADD Date	

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⁸ CAR NO. HO-92-29
DATE: 9/17/92
PAGE: 1 OF
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CORRECTIVE ACTION REQUEST

¹ Controlling Document QARD (DOE/RW-214), Rev 4		² Related Report No. HO-92-04
³ Responsible Organization Energy Information Administration (EIA)		⁴ Discussed With Kathy Gibbard
⁵ Requirement: QARD, Para. 6.0 - Basic Requirement (NQA-1-1989) states: "The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed."		
⁶ Adverse Condition: Contrary to above requirement, three of five types of quality affecting documents sampled during the audit (EIA Standards, Federal Information Processing Standards, and Form RW-859 Editing Procedures Manual) are not being controlled.		
⁹ Does a significant condition adverse to quality exist? Yes <u> </u> No <u>X</u> If Yes, Circle One: A B C	¹⁰ Does a stop work condition exist? Yes <u> </u> No <u> </u> ; If Yes - Attach copy of SWO If Yes, Circle One: A B C D	¹¹ Response Due Date: 11/13/92
¹² Required Actions: <input checked="" type="checkbox"/> Remedial <input checked="" type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination		
¹³ Recommended Actions: Establish and implement a document control system.		
⁷ Initiator <i>R. Dennis Brown</i> Date <u>10/5/92</u>	¹⁴ Issuance Approved by: QADD <i>[Signature]</i> Date <u>10/12/92</u>	
¹⁵ Response Accepted QAR Date	¹⁶ Response Accepted QADD Date	
¹⁷ Amended Response Accepted QAR Date	¹⁸ Amended Response Accepted QADD Date	
¹⁹ Corrective Actions Verified QAR Date	²⁰ Closure Approved by: QADD Date	

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⁸ CAR NO. HQ-92-30
DATE: 9/17/92
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CORRECTIVE ACTION REQUEST

¹ Controlling Document EIA QAPD, dated 11/92		² Related Report No. HQ-92-04	
³ Responsible Organization Energy Information Administration (EIA)		⁴ Discussed With James Disbrow	
⁵ Requirement: EIA QAPD, Section 16 states, "Conditions adverse to quality are identified promptly, documented, and corrected as soon as practical."			
⁶ Adverse Condition: Contrary to the above, methods to identify, document, and correct conditions adverse to quality are not in place.			
⁹ Does a significant condition adverse to quality exist? Yes <u> </u> No <u>X</u> If Yes, Circle One: A B C		¹⁰ Does a stop work condition exist? Yes <u> </u> No <u> </u> ; If Yes - Attach copy of SWO If Yes, Circle One: A B C D	
¹¹ Response Due Date: 11/13/92			
¹² Required Actions: <input checked="" type="checkbox"/> Remedial <input type="checkbox"/> Extent of Deficiency <input type="checkbox"/> Preclude Recurrence <input type="checkbox"/> Root Cause Determination			
¹³ Recommended Actions: In accordance with approved procedures, establish and implement a corrective action system.			
⁷ Initiator <i>R. Dennis Brown</i> Date <u>9/17/92</u>		¹⁴ Issuance Approved by: QADD <i>[Signature]</i> Date <u>9/17/92</u>	
¹⁵ Response Accepted QAR Date		¹⁶ Response Accepted QADD Date	
¹⁷ Amended Response Accepted QAR Date		¹⁸ Amended Response Accepted QADD Date	
¹⁹ Corrective Actions Verified QAR Date		²⁰ Closure Approved by: QADD Date	

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³ CAR NO. HQ-92-31
DATE: 9/17/92
PAGE: 1 OF
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CORRECTIVE ACTION REQUEST

¹ Controlling Document QARD (DOE/RW-214), Rev 4 ²Related Report No. HQ-92-04

³ Responsible Organization Energy Information Administration (EIA) ⁴ Discussed With Fred Mayes

⁵ Requirement:

QARD, Section 2.11b states, "Quality assurance program management information shall be reported at least quarterly to the appropriate level of management and the next higher affected organizational level."

⁶ Adverse Condition:

Contrary to the above, there is not sufficient evidence that EIA QA management has been reporting regularly on QA program issues to upper management and OCRWM.

⁸ Does a significant condition adverse to quality exist? Yes No X
If Yes, Circle One: A B C

¹⁰ Does a stop work condition exist? Yes No ; If Yes - Attach copy of SWO
If Yes, Circle One: A B C D

¹¹ Response Due Date: 11/13/92

¹² Required Actions: Remedial Extent of Deficiency Preclude Recurrence Root Cause Determination

¹³ Recommended Actions:

Establish and implement a regular system for reporting on QA program issues.

⁷ Initiator R. Dennis Brown Date 10/5/92 ¹⁴ Issuance Approved by: [Signature] Date 10/13/92
QADD Date

¹⁵ Response Accepted QAR Date ¹⁶ Response Accepted QADD Date

¹⁷ Amended Response Accepted QAR Date ¹⁸ Amended Response Accepted QADD Date

¹⁹ Corrective Actions Verified QAR Date ²⁰ Closure Approved by: QADD Date