

OCT 25 1973

W. Vetter, Chief
Reactor Construction Branch, RO:III

COMMONWEALTH EDISON COMPANY - DRESDEN UNITS 1, 2 AND 3, ZION UNITS 1 AND 2
DOCKET NOS. 50-10, 237, 249, 295 AND 304

The attached report of the inspection of the Commonwealth Edison Company's (CE) QA program for nuclear fuel procurement is forwarded for issuance by your office. The inspection was conducted on September 25-27, 1973 by Messrs. Pomeroy and Tripp of RO Headquarters and generally followed the proposed inspection plan.¹ This plan was based on the CE Fuel QA program which has been found acceptable by DL.² The inspection plan was applied to fuel contracts as outlined below:

Dresden 1 - GUNFC - two reload cores. Each core consists of five reload batches. The fourth reload batch is to be supplied by GUNFC for the fall of 1973 D-1 refueling. (Four reload fuel assemblies were fabricated in Japan by Sumitomo Electric Industries, Ltd., a licensee of GUNFC.)

Dresden 2 and 3, Quad Cities 1 and 2 - General Electric initial core and one reload core for each of these units.

Zion 1 and 2 - Westinghouse - first three cores of each of these units.

LaSalle 1 and 2 - General Electric - initial core plus 1 reload batch for each core. GUNFC - four reload batches for each unit.

Bryon 1 and 2, Braidwood 1 and 2 - Westinghouse - initial cores plus eight reload batches for each of these plants.

We are referencing only the Dresden and Zion Dockets rather than all of the above, since most of the material reviewed applied to these units.

Our overall reaction to the CE program was that they appear to be conducting some QC checks on their fuel suppliers but that they were not conducting a QA program for fuel procurement. Considering their corporate commitment to nuclear power and the poor fuel performance they have experienced to date, we would expect a much higher degree of management interest and

¹Memo to Grier from Reinmuth, dated September 7, 1973, "Planned Inspection of Commonwealth Edison's Fuel QA program."

OFFICE ▶	² Letter D. J. Skovholt, L to J. S. Abel, CE dated September 17, 1973,			
SURNAMF ▶	"CE Fuel QA Program."			
DATE ▶				

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OCT 25 1973

involvement in fuel procurement than we found. Although the CE policy³ of using "strong economic incentives" in fuel contracts to assure production of "sound, long life fuel" has proved largely ineffective, there appears to be no plan to strengthen their own capabilities to provide an independent assessment of the adequacy of fuel. Enclosure number 2 is a draft enforcement letter requesting a 20 day response to the apparent violations and program weaknesses.

Based on the results of this inspection, we recommend a RO:III directed reinspection in about six months. A likely subject, based on current CE refueling plans,⁴ would be Quad Cities 1 and 2 reloads of GE 8x8 fuel. We would like to be kept informed of any action you plan in this area, and would like to assist in a reinspection if it can be arranged to our mutual benefit.

Not discussed in this report are the inspection findings relative to the analysis of the Dresden 3 spring 1973 refueling. These findings are documented in enclosure 3.

Original Signed by
G. W. Reinmuth

G. W. Reinmuth, Chief
Technical Assistance Branch, RO

Enclosure:

1. RO Inspection Report
2. Draft Enforcement Letter
3. Memo, Tripp to Reinmuth, dated 10/9/73

cc w/encls:

D. F. Knuth
J. G. Davis
B. H. Grier
J. B. Henderson
RO Regional Directors

bcc w/encls:

A. Herdt, RO:II
J. Tillou, RO:I
W. Hayward, RO:I
U. Potapovs
L. Tripp
D. Pomeroy
G. Bidinger

³CE QA Program for Nuclear Fuel submitted to DL dated May 16, 1973.

⁴Letter, J. S. Abel, CE to D. L. Ziemann, DL. Dated September 25, 1973, "Dresden 2-3 and Quad Cities 1-2 Refueling Plans."

OFFICE	RO:TAB	RO:TAB.			
SURNAME	<i>D. Pomeroy</i> D. Pomeroy:arj	<i>G. W. Reinmuth</i> GWReinmuth			
DATE	10/23/73	10/25/73			

ENCLOSURE 1 - INSPECTION REPORT

(COVER SHEET TO BE ADDED BY RO:III)

A. Background

The Directorate of Regulatory Operations conducted a special inspection of the quality assurance (Q/A) system employed by Commonwealth Edison Company (CE) in the procurement of nuclear fuel. The primary objective of this inspection was to obtain information which would permit an appraisal of the implementation and effectiveness of the Q/A controls employed by CE in the procurement of nuclear fuel to assure compliance with the 18 Q/A criteria for Nuclear Power Plants (Appendix B, 10 CFR Part 50). The inspection findings are based on review of pertinent documents such as the CE Q/A Manual, Q/A procedures, supplier evaluation reports, purchase orders and reports of inspections of fuel fabricators as supplemented by interviews with CE personnel.

B. Enforcement Actions

The following items of noncompliance were identified during the inspection.

1. 10 CFR 50, Appendix B, Criterion V states in part: "Activities affecting quality shall be prescribed by documented . . . procedures, . . . appropriate to the circumstances and shall be accomplished in accordance with these . . . , procedures, . . . "

Contrary to the above:

- a. A procedure (Q.P. No. 10-2) has been prepared for use in inspection at the fuel contractor. However, the procedure does not include requirements to i) provide for the assignments of qualified inspectors; ii) prepare documented results of the inspections; iii) provide for management review of inspection results; iv) reinspect deficient areas; and v) prepare inspection plans or check-lists for each inspection or inspection type. (See Details, Section 3)
- b. Procedure Q.P. No. 10-2 requires that during the pre-manufacturing phase a schedule of audits will be established. However, a schedule of audits of fuel contractors has not been prepared. (See Details, Section 8.1)
- c. Procedure Q.P. No. 10-2 requires that the Quality Assurance Administrator verify completion of corrective action (taken by the fuel manufacturer on areas found deficient by the Nuclear Fuel Inspector). However, no systematic method has been developed for following up on deficiencies and thereby allow the Quality Assurance Administrator to verify completion of corrective actions. (See Details, Section 8.4).

2. 10 CFR 50, Appendix B, Criterion VII states in part: "Measures shall be established to assure that purchased material, . . . conform to the procurement documents. These measures shall include evidence of quality furnished by the contractor, inspection at the contractor source, and examination of products upon delivery. The effectiveness of the control of quality by contractors shall be assessed by the applicant or designee at intervals consistent with the importance, complexity; and quantity of the product or services." Also, Criterion IV requires that contractors provide a quality assurance program consistent with the Appendix B criteria.

Contrary to the above, inspections of fuel contractors were incomplete in that these inspections were not conducted against each of the Appendix B Criteria. For example:

- a. Criterion I-Organization. Inspections of fuel contractors do not include a determination that the fuel contractors' organization provides that: i) the authority and duties of persons performing quality assurance function are clearly established and delineated in writing; and ii) such persons have sufficient authority, organizational freedom and independence to identify quality problems; to initiate, recommend, or provide solutions; and to verify implementation of solutions. (See Details, Section 8.2)
- b. Criterion III-Design Control. Although the responsibility for fuel design and design review is delegated to the nuclear fuel contractor,^{1/} the inspections did not determine the establishment or effectiveness of the design control measures applied by the fuel contractor. (See Details, Section 8.2)
- c. Criterion IV and VII-Control of Procurement Documents and Purchased Material. Inspections of fuel contractors did not include a determination that the fuel contractor is assuring that adequate requirements are included in his procurement documents. These inspections did not include a determination that material purchased by the fuel contractor conforms to the procurement documents. (See Details, Section 8.2)
- d. Criterion IX-Control of Special Processes. Inspections of fuel contractors did not include a determination that the special processes used in the manufacturer of nuclear fuel are accomplished by qualified personnel using qualified procedures. (See Details, Section 8.2)
- e. Criterion XVI-Corrective Action. Inspections of fuel contractors did not include a finding that i) the fuel contractor determines the causes of conditions adverse to quality; ii) takes corrective action to preclude repetition; iii) documents causes and corrective actions; and iv) reports these to appropriate levels of his management. (See Details, Section 8.2)

^{1/} "Responses to AEC Inquiry Concerning Commonwealth Edison's Quality Assurance Program for Nuclear Fuel," dated March 22, 1973, submitted to Licensing on May 16, 1973, Docket No. 50-10.

3. 10 CFR 50, Appendix B, Criterion XVI states in part: "Measures shall be established to assure that conditions adverse to quality, such as deficiencies, deviations, defective material, and non-conformances are promptly identified and corrected. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management."

Contrary to the above, a) identification of significant conditions adverse to quality from the fuel inspector's inspections were not reported to appropriate levels of management and b) corrective actions were not documented and reported to appropriate levels of management. (See Details, Section 8.2)

4. 10 CFR 50, Appendix B, Criterion XVIII states: "A comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program. The audits shall be performed in accordance with the written procedures or checklists by appropriately trained personnel not having direct responsibilities in the areas being audited. Audit results shall be documented and reviewed by management having responsibility in the area audited. Follow-up action, including reaudit of deficient areas, shall be taken where indicated."

Contrary to the above, no internal audits had been performed to verify compliance with, nor determine the effectiveness of the quality assurance program for the purchase of nuclear fuel. (See Details, Section 4)

C. Significant Findings

1. A review of the records of CE inspections conducted at three fuel fabricators indicated that some 40 inspections had been made, lasting 2-3 days each. The inspection reports indicated that substantive deficiencies with the fabricators Q/A program were often found, however, follow-up actions were found to be inconsistent. (See Details, Section 8)
2. CE is reorganizing their Q/A functions and has recently established a "Manager of Q/A" position reporting to an Executive Vice President. (See Details, Section 2)
3. A review of nuclear fuel purchasing documents indicated that Q/A requirements were being included. (See Details, Section 6)
4. CE has utilized outside laboratories for independent analyses of production fuel quality. (See Details, Section 9)

5. CE fuel failure experience is being analyzed and there is feedback from this experience into the fuel QA program. (See Details, Section 10)

D. Management Interview

At the conclusion of the inspection Messrs. Pomeroy and Tripp met with the following CE personnel:

<u>Name</u>	<u>Title</u>
J. H. Ellis	Section Engineer - M&S Engr.-CECO
W. M. Kiefer	Director, Nuclear Fuel Services
R. J. Squires	QA Coordinator (Production)
W. J. Shewski	Manager of QA
G. F. Marcus	Fuel Agent
E. J. Hemzy	QA Administrator (Engrg. & Constr.)
L. W. Duchek	Nuclear Fuel Inspector

The meeting was opened with comments from Mr. Pomeroy regarding the purpose of the inspection and its relationship to the direct inspections by Regulatory Operations at fuel fabricator facilities.

It was explained that the presentation of findings would include, in addition to deficiencies identified, the personal observations and conclusion made by the inspectors for whatever benefit the licensee might derive. The introductory remarks were concluded with an explanation of the method by which the inspection findings would be documented and the subsequent release of these documents to the Public Document Room. Following these comments, the detailed results of the inspection were discussed, as described in Paragraph B and C above. Comments by the licensee are outlined below:

1) Internal Audits

The licensee questioned the inspectors regarding the need to conduct audits of their fuel Q/A program. Were they to "audit" the "auditor"? The inspectors replied that the type of program that CE had outlined in their Quality Procedures No. 18-1, General Office Audit of Total Quality Assurance Program, was what they had in mind.

The inspectors also stated that the implementation of this type of procedure to the fuel Q/A program would appear necessary to meet the requirements of the CE Q/A policy manual which states in part (Q.R. 18.0 Internal Audits): "Audits will be performed by CE Co. . . to verify the adequacy and effectiveness of quality programs under their cognizance. These audits are to be conducted to assist the organization being audited and assure that required corrective action or improvements are accomplished."

2) Qualification of Fuel Contractors

The inspectors discussed the commitments made in the CE submittal to Regulatory Licensing on their fuel Q/A program regarding the evaluation of contractors. The inspectors stated that these commitments did not appear to have been implemented. CE personnel stated that a procedure had been prepared to implement this commitment, that it would be used in the future and that it was now being used as an aid in their contractor inspection program.

3) Contractor Inspections

The inspectors stated that based on the experience of RO inspectors with inspections of this type, many of the CE fuel QA inspections should have been conducted by a team (2 or 3) of inspectors rather than by one person due to the complexity of typical nuclear fuel fabrication operations. This would permit the utilization of inspection personnel with different (but complimentary) backgrounds and technical expertise and would avoid the situation in which one inspector confronts several vendor personnel by himself. CE responded that they believed "man days" of inspection time was a better criteria for gaging the scope of an inspection program.

DETAILS

1. Persons Contacted

J. A. Abel, Nuclear Licensing
J. Dolter, Nuclear Fuel Services
L. W. Duchek, Nuclear Fuel Inspector
E. J. Hemzy, QA Administrator (Engineering and Construction)
W. M. Kiefer, Director, Nuclear Fuel Services
G. F. Marcus, Fuel Agent, Purchasing
W. Shewski, Manager of Quality Assurance
R. J. Squires, QA Coordinator (Production)
A. Veras, Nuclear Fuel Services

2. Fuel QA Organization

The Commonwealth Edison Company (CE) responsibility for nuclear fuel quality assurance is as follows:

President - Overall responsibility for CE Nuclear fuel quality assurance program.

Manager of Quality Assurance - Responsible for development, implementation, and execution of nuclear fuel quality assurance program. Mr. Shewski has just recently been appointed to this position as a part of the reorganization currently in progress at CE. Until his appointment, these responsibilities were shared by the V. P., Engineering and Construction and the Manager of Production.

Fuel Agent - Responsible for coordinating design control and procurement document control as well as controlling the distribution of documents.

Nuclear Fuel Inspector - Responsible for evaluation of contractor's fuel QA program; surveys of the fuel contractor for implementation of special process procedures, assurance that procedures are established and executed, assurance that test controls are established and executed, assurance that procedures and records for calibration of test equipment are established and executed, assurance that instructions for handling, preservation, storage, and shipping are established, and disposition of non-conforming items including identification and correction; determination that the contractor's QA program includes procedures for identification of items and traceability of documentation; and for audits of the fuel contractor's procedures.

Quality Assurance Administrator - Responsible for implementation of the fuel vendor's QA program surveillance inspections. This also includes verifying completion of corrective action. Audits are under his direction.

Technical Staff Engineers - Establishment and execution of procedures for inspection of the fuel at the station and for surveying the fuel contractor's procedures for disposition of non-conforming items.

Specialists in Engineering, Quality Control and Reactor Analysis - Review procurement documents as needed, audit fuel inspections and repair during refueling operations, maintain contact with other operating companies on fuel matters, and evaluation of fuel failure mechanisms and failure experience.

Other Departments - Prepare, review and approve quality procedures as applicable pertaining to nuclear fuel.

3. Fuel QA Program Procedures

Those portions of the CE quality assurance manual applicable to the fuel QA program were reviewed. Those Quality Procedures (Q.P.) which appeared to be applicable to nuclear fuel were as follows:

Q.P. No. 3-1 (Design Control) - This procedure establishes the method for the review, evaluation, approval, control and release of design documents.

Q.P. No. 4-2 (Evaluation of Contractor's Quality Assurance Program and Procedures) - The purpose of this procedure is to assure that contractor programmed activities provide the required quality requirements for delivered and installed material, equipment, and systems.

Q.P. No. 10-2 (Surveillance of Nuclear Fuel Fabrication) - The quality assurance programs of nuclear fuel fabricators are to be inspected by CE in accordance with this procedure.

Q.P. No. 10-52 (Station Operation and Fuel Handling) - The purpose of this procedure is to provide instructions and describe responsibilities for the inspection of nuclear generating station operational activities.

C.P. No. 10-52 (General Office Audit of Total Quality Assurance Program) - This procedure states that, "the quality assurance programs of Commonwealth Edison Company and its' contractors shall be audited by personnel from the Mechanical and Structural Engineering Department and the Station Electrical Engineering Department, in accordance with this procedure."

In this review, particular emphasis was placed on Q.P. 10-2 since this procedure was the most applicable to the fuel QA program. This procedure has no requirements for assignment of qualified inspectors to the fuel surveillance program. Although the general areas to be inspected during the fabrication surveillance program are outlined, this procedure cannot be used as an inspection plan or checklist. In the procedure, there are no requirements to prepare inspection reports or documented results of inspections, for management review of inspection results, for reinspection in area found deficient, or to conduct the inspections in accordance with written procedures or checklists for each inspection or inspection type.

4. Audits

The CE QA policy manual, in Section 18.0 on Internal Audits, states in part that, "Audits will be performed by CE Co. . . . to verify the adequacy and effectiveness of quality programs under their cognizance. These audits are to be conducted to assist the organization being audited and assure that corrective action or improvements are accomplished." Organizationally, these audits appear to be the responsibility of the Mechanical and Structural Engineering Department and the Station Electrical Engineering Department. The RO inspectors asked CE representatives if any internal audit of their fuel QA program had ever been done to determine its effectiveness and were told that no internal audits had ever been performed of the fuel QA function.

5. Qualification of Fuel Contractors

The CE submittal to Licensing dated March 22, 1973, states in part that, "Qualified contractors are selected on the basis of evaluated or demonstrated capability to provide a product, process, or service. An overall review of the contractor's quality assurance program is performed as necessary. Where valid records of contractor capability and quality performance are not available to Commonwealth Edison Company, a survey of the contractor's facilities, capabilities, and quality assurance systems has been made by Commonwealth Edison Company or its designated representatives. Such surveys include, as applicable, a review of facilities, organization, quality assurance experience, existing controls, knowledge of special processes, and an understanding of, and a willingness to meet, contract or purchase order requirements."

Since 1970, Jersey Nuclear (now Exxon Nuclear) has been considered as an approved potential supplier of reload fuel. The inspectors reviewed the qualification procedure for Jersey Nuclear. According to Mr. Marcus, Jersey Nuclear made one or more technical presentations to CE representatives, Mr. Veras made a visit to their fabrication facilities, and a detailed written proposal to another utility which included a description of Jersey Nuclear qualifications was made available for CE review. CE conducted a search of their records and was unable to find any documentation to indicate that an evaluation of Jersey Nuclear was made or that demonstrate capability had been evaluated.

The CE Quality Assurance Manual now has a procedure (Q.P. 4-2) for evaluation of contractor's quality assurance program and another procedure now in preparation has requirements for evaluation of the vendor's quality program prior to award of contract. Such procedures, if implemented, would appear to be an adequate method to assure that only qualified suppliers were considered for nuclear fuel orders.

6. Procurement Document Control

The methods for assuring that procurement documents contain the necessary QA requirements were covered by the inspectors. The method for getting these requirements into contracts is an informal approach and no written procedure has been prepared. The fuel agent consults with the QA staff to get their input as to what was required to handle QA/QC audits, inspections, surveillance, etc. Portions of fuel contracts from the late 1950's thru 1972 were examined with one of the most recent examined in detail. This recent contract requires the fuel supplier to establish a program such that CE can satisfy applicable USAEC requirements as to fuel quality. It requires the fuel vendor to submit his quality assurance program in writing to CE for review and comment prior to fuel manufacture. It also applies to the fabricator's subvendors. Finally, it requires the fabricator to make applicable records, procedures and data available to CE for inspection and it establishes the right of access of CE representatives to vendor and subvendors shops for necessary inspections.

7. CE Review of Fuel Design and Fabrication Changes

The CE March 22, 1973, submittal states that, "in areas of special concern the contractor requests review and comment before modification started." As a result of PWR fuel experience, changes were made to the Zion 1 and Zion 2 initial cores after fabrication had started. To observe the CE implementation of the above commitment, the RO inspectors asked to review the CE actions relative to these changes.

CE representatives followed applicable PWR experience closely including direct contacts with the station staff. After review and discussions with Westinghouse of their recommendations, it was agreed on October 25, 1972, to use the original Zion 2 fuel (Regions 2 and 3) in Zion 1 after increasing the fuel density and the internal pressurization pressure. The original Region 3 fuel of Zion Unit 1 was refabricated (the contained uranium was reconverted to UF_6 and subsequently reconverted to UO_2) to be used in Region 3 of Zion Unit 2. The original Region 2 fuel of Unit 1 was repressurized at a higher pressure for utilization in Region 2 of Unit 2. The CE documentation of the above modifications indicated that CE personnel had reviewed other utility experience with Westinghouse fuel, reviewed the proposed modifications, commented as appropriate, and concurred with the actual modifications.

8. Inspections of Fuel Vendors

The CE fuel fabricator inspection program is described below.

8.1 General

The CE Nuclear Fuel Inspector (NFI) was hired upon graduation from college approximately three years ago. According to Mr. Henzy, he conducts surveillance inspections, not audits. In his early inspections, he was accompanied by Mr. Squires and/or by representatives of a CE consultant, NATCO. NATCO also assisted CE in the fuel QA program by making an evaluation of the Westinghouse fuel QA program during late 1971 - early 1972. Since the initial inspections, the Nuclear Fuel Inspector has been conducting vendor inspections by himself. The NFI writes a report describing these inspections to the QA Administrator. The NFI attempts to get deficiencies noted in his inspections corrected at the time of the inspection, at the exit meeting at the vendor, or thru the participation of appropriate CE management.

The NFI has no pre-planned schedule for inspections. His inspection trips to the vendor are based on when CE fuel is to be manufactured. According to the NFI, he regularly talks by phone to the fabricator's representatives to determine when CE fuel will be in manufacture and schedules his trips accordingly. This is not in agreement with Q.P. No. 10-2 which requires that a schedule of audits will be established during the pre-manufacturing phase. Inspections are not conducted in accordance with written procedures. The NFI may submit a list of items or areas to be looked at to the QA Administrator for his concurrence prior to visiting the vendor. From the RO inspectors conversations with the NFI, it was apparent that inspections are not conducted on a planned or systematic basis and little use is made of written procedures of checklists.

8.2 Reports of Inspections

The CE surveillance trips to Westinghouse, GUNFC and General Electric are summarized in Table 1. Most of the reports covering these inspections were reviewed in this inspection.

TABLE I

NUCLEAR FUEL FABRICATION INSPECTIONS

<u>Year</u>	<u>Company</u>	<u>No. of Inspections and Location</u>	<u>No. of Days of Inspections</u>
1971	G. E.	Wilmington (5)	14
	GUNFC	Hematite (1)	1
		New Haven (1)	2
	W	Cheswick (2)	9
		Columbia (2)	5
		Pittsburgh (1)	1
1972	GE	(0)	0
	GUNFC	Hematite (3)	7
		New Haven (2)	5
		Elmsford (1)	2
	W	Cheswick (4)	8
		Monroeville (1)	1
Columbia (7)		20	
1973	GE	Wilmington (2)	6
	GUNFC	New Haven (1)	2
		Elmsford (1)	2
	W	Columbia (4)	8

The NFI's reports showed a lack of organization and cover the details of these surveillance inspections in a rambling manner. Significant findings were not highlighted or summarized in these reports. Outstanding or unresolved items were not listed or highlighted for management attention and followup in subsequent inspection for resolution. Except for the NFI's memory, there was no method for maintaining a current list of problems identified during the inspection and no procedure for assuring closeout or resolution of outstanding items.

Correspondence to and from the vendors was reviewed which indicated that some problems were being resolved in this manner. In this correspondence, there was no evidence that these letters were being cross checked with the items and issues raised in the inspection reports so that all problems could be resolved.

The NFI's reports were reviewed to determine if they established that the fuel fabricator contractor's quality assurance program meets the requirements of the 18 Criteria of 10 CFR Appendix B. In several areas, it was found that the NFI had not established that the fuel contractors' programs were in compliance with these criteria. In general the surveillance inspections were QC, not QA inspections. Specific examples where the NFI had failed to establish contractor compliance included the following:

The NFI's reports did not include evidence of critical evaluation or inspection of the vendor's QA organization.

Design, design review, and design control responsibilities are assigned to the vendor. However, CE had the responsibility for auditing these areas to insure that they are being properly accomplished. No audits of design, design review, and design control activities at G.E., GUNFC or Westinghouse have been performed.

Inspections at the fuel contractors did not cover in sufficient detail procurement documents and incoming or receiving QC inspections.

Inspections at the fuel contractors did not establish that special manufacturing processes and procedures are qualified or that persons performing activities affecting quality are properly trained and qualified.

The NFI's verification of the fuel vendor's initiation of corrective actions is only accomplished to the point of verifying that deficiencies in CE fuel are corrected or repaired and not to assure that deficiencies will not be repeated.

In reviewing the NFI's inspection reports, the RO inspectors found indications that the NFI had encountered problems in obtaining access to necessary records, procedures, and data to assess the effectiveness of the vendor's fuel QA program. However, by the time of this inspection, most of the access problems had been resolved satisfactorily.

Another item of interest found in the NFI's reports was the fact that four Dresden I Batch 9 fuel assemblies were fabricated in Japan using AEC enriched UF₆ material by Sumitomo Electric Industries, Ltd. (SEI), a licensee of GUNFC. These assemblies were fabricated in accordance with GUNFC drawings and specifications and under GUNFC's supervision. SEI was not required to have a quality system manual for fuel fabrication. The QA manager at GUNFC identified, through discussions with SEI, that adequate plans for inspection, etc. existed. These discussions were documented in an internal GUNFC memo PM-667 dated July 10, 1972.

8.3 NATCO Assistance

CE together with Consolidated Edison and Vepco, hired an outside consultant (NATCO) to assist them in the fuel QA area with respect to the Zion 1 and 2 fuel manufacture by Westinghouse. Phase 1 of this effort was initiated on August 16, 1971, and covered a five-month period. Phase 1 was comprised of an overall detailed review, analysis, and evaluation for the participating utilities of specifications for purchased and Westinghouse-manufactured materials, the operations and processes, and the associated quality assurance and quality control programs used by Westinghouse to fabricate nuclear fuel assemblies. Phase 2 consisted of audit-inspections of Westinghouse operations during the fabrication of the Zion fuel for CE.

During this inspection, the RO inspectors reviewed some of the reports submitted by NATCO. These reports raised what would appear to be several valid concerns about Westinghouse QA/QC programs and procedures. However, many of these concerns were not resolved by CE, and were never pursued. In their last report of May 18, 1972, NATCO states that, "NATCO and Commonwealth Edison representatives requested that Westinghouse formally reply to the utility on each of the statements and suggestions listed in Section 2.0 of this report. --- NATCO suggests

that Commonwealth Edison follow up with Westinghouse on each issue and consider meeting with Westinghouse representatives at a higher management level to obtain their concurrence on some of the requests which the utility deems critical to the quality assurance program." However most of the unresolved items listed in this report were never resolved or closed out and no meeting of the type suggested by NATCO was ever held between CE and Westinghouse. The NFI did go through the issues raised by NATCO item-by-item and write down (in long hand) his thoughts and opinions which included some items which he considered satisfactorily resolved but there was no evidence that his comments were ever formally transmitted to management.

8.4 Management Participation

Management participation in the surveillance inspection program appeared to be minimal. CE management did not participate directly in inspections and had little participation in followup actions to resolve problems identified in the NFI's reports. For example, at the conclusion of the NATCO assistance program, a meeting was held in Monroeville, Pa., on May 1-2, 1972, to discuss all remaining unresolved concerns of NATCO and the CE NFI regarding the Westinghouse fuel QA program. There was no management participation by CE in this meeting (only the NFI represented CE).

The NFI writes his inspection reports to the QA Administrator for Engineering and Construction with copies to other departments within CE that have an interest in his inspections. The QA Administrator does not comply with the requirements of Q.P. No. 10-2 which require him to verify the completion of corrective actions. There is no documented listing to the QA Administrator of unresolved deficiencies in the fuel vendors' QA/QC programs in the NFI's reports. The QA Administrator's participation in followup on outstanding items with the fuel fabrication vendors appears unorganized and undocumented. Closeout actions on deficiencies are generally transmitted verbally or in the text of the inspection reports to the QA Administrator. In one case, after the fuel fabrication was nearly completed, the NFI went back through the inspection reports for that vendor and indicated in a written manner on a report-by-report basis to the QA Administrator what had happened with respect to the deficiencies in the vendor's program discussed in those reports.

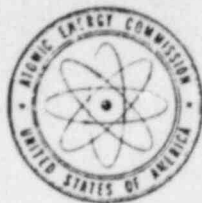
CE management has not directed the NFI to develop inspection plans and schedules, to highlight deficiencies found at the vendors, or write his reports in a more systematic or organized manner, however, he has been instructed to make his reports more brief and to the point. Although CE management was responsible for hiring an outside consultant to assist in their fuel QA program, this consultant's work appeared ineffective due to inadequate CE management participation and followup.

9. Independent Analyses of Production Fuel Quality

CE has utilized outside assistance in specialized areas. On occasion, they have utilized two outside laboratories for checks on pellet moisture and chemical impurity content. Some weld samples have been taken for metallographic examination. This is not done on a routine basis but rather as a spot check. When one vendor proposed to utilize a special type of cladding material in some test rods in one of their reactors, CE hired an outside consultant to evaluate the proposal before acceptance.

10. Fuel Performance Feedback into the Fuel QA Program

CE fuel failure experience was reviewed to determine how this experience was factored into measures to prevent further or future fuel failures. The Nuclear Fuel Services department analyzes fuel failure mechanisms and failure experience in detail working jointly with the vendors. (They are currently attempting to hire a fuel technologist with expertise in fuel design and fabrication.) These fuel failures are discussed informally with the fuel QA people (NFI and QA Administrator) and the Nuclear Fuel Services department receives copies of all of the NFI's reports. The Nuclear Fuel Services department utilizes the NFI to get the necessary records for attempts to correlate fuel failures with specific fuel manufacturing activities. CE has not looked into detailed specifications related to items such as moisture or hydrogenous material content of the fuel. They leave such matters to the vendor but utilize fuel contracts which provide strong economic incentives to the vendors to produce sound, long life fuel. In several cases CE has required the vendor to replace failed or defective fuel including a complete core replacement for Dresden 2.



UNITED STATES
ATOMIC ENERGY COMMISSION
~~XXXXXXXXXXXXXXXXXXXX~~
DRAFT
TO BE RETYPED ON RO:III LETTERHEAD

Docket No. 50-10
50-237
50-249
50-295
50-304

Commonwealth Edison Company
ATTN: W. Beneke, Executive Vice President
P. O. Box 767
Chicago, Illinois 60690

Gentlemen:

This refers to the AEC inspection conducted on September 25-27, 1973 at Commonwealth Edison Company offices in Chicago, Illinois and to discussions of our findings held with Mr. Skewski and others of your staff at the conclusion of the inspection. This inspection was an examination of activities related to the procurement of fuel for several of your nuclear power plants and a comparison of these activities with the Commission's Quality Assurance Criteria. The inspection was conducted by Mr. Pomeroy and Mr. Tripp of our Regulatory Operations Headquarters office and it consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspectors.

Based on the results of this inspection, it appears that certain of your activities are in violation of AEC requirements. These items are listed in attachment A to this letter and in the enclosed report.

This notice is sent to you pursuant to the provisions of Section 2.201 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office with twenty (20) days of your receipt of this notice a written statement or explanation in reply including: (1) corrective steps which have been taken by you and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved.

In addition to the need for corrective action regarding these specific deficiencies, we are concerned about the implementation of your quality assurance program that permitted these deficiencies to occur. Consequently, in your reply, you should describe in particular, those actions taken or planned to improve the effectiveness of your quality assurance program for procurement of nuclear fuel.

In accordance with Section 2.790 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulation, a copy of this letter, the enclosed inspection report and your response to this letter will be placed in the AEC's Public Document Room. If this report contains any information that you (or your suppliers) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must include a full statement on the base of which it is claimed that the information is proprietary, and should be prepared so the proprietary information identified in the application is contained in a separate part of the document. If we do not hear from you in this regard the report will be placed in the Public Document Room with your response.

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely,

J. G. Keppler, Director
Region III

Enclosure:
As Stated

DESCRIPTION OF VIOLATIONS

Commonwealth Edison Company

Certain activities under your license identified below appear to be in violation of Regulatory requirements. These are considered to be of Category II severity:

1. 10 CFR 50, Appendix B, Criterion V states in Part: "Activities affecting quality shall be prescribed by documented . . . procedures, . . . appropriate to the circumstances and shall be accomplished in accordance with these . . . , procedures,"

Contrary to the above:

- a. A procedure (Q.P. No. 10-2) has been prepared for use in inspection at the fuel contractor. However, the procedure does not include requirements to i) provide for the assignments of qualified inspectors; ii) prepare documented results of the inspections; iii) provide for management review of inspection results; iv) reinspect deficient areas; v) prepare inspection plans or check lists for each inspection or inspection type.
- b. Procedure Q.P. No. 10-2 requires that during the pre-manufacturing phase a schedule of audits will be established. However a schedule of audits of fuel contractors has not been prepared.
- c. Procedure Q.P. No. 10-2 requires that the Quality Assurance Administrator verify completion of corrective action (taken by the fuel manufacturer on areas found deficient by the Nuclear Fuel Inspector).

However no systematic methods has been developed for following up on deficiencies and thereby allow the Quality Assurance Administrator to verify completion of corrective actions.

2. 10 CFR 50, Appendix B, Criterion VII states in part: "Measures shall be established to assure that purchased material, . . . conform to the procurement documents. These measures shall include evidence of quality furnished by the contractor, inspection at the contractor source, and examination of products upon delivery. The effectiveness of the control of quality by contractors shall be assessed by the applicant or designee at intervals consistent with the importance, complexity, and quantity of the product or services." Also Criterion IV requires that contractors provide a quality assurance program consistent with the Appendix B criteria.

Contrary to the above, inspections of fuel contractors were incomplete in that these inspections were not conducted against each of the Appendix B Criteria. For example:

- a. Criterion I - Organization. Inspections of fuel contractors do not include a determination that the fuel contractors organization provides that: i) the authority and duties of persons performing quality assurance function are clearly established and delineated in writing; and ii) such persons have sufficient authority, organizational freedom and independence to identify quality problems; to initiate, recommend, or provide solutions; and to verify implementation of solutions.
- b. Criterion III - Design Control. Although the responsibility for fuel design and design review is delegated to the nuclear fuel contractor^{1/} the inspections did not determine the establishment or effectiveness of the design control measures applied by the fuel contractor.
- c. Criterion IV and VII - Control of Procurement Documents and Purchased Material. Inspections of fuel contractors did not include a determination that the fuel contractor is assuring that adequate requirements are included in his procurement documents. These inspections did not include a determination that material purchased by the fuel contractor conforms to the procurement documents.
- d. Criterion IX - Control of Special Processes. Inspections of fuel contractors did not include a determination that the special processes used in the manufacture of nuclear fuel are accomplished by qualified personnel using qualified procedures.
- e. Criterion XVI - Corrective Action. Inspections of the fuel contractors did not include a finding that i) the fuel contractor determines the causes of conditions adverse to quality; ii) takes corrective action to preclude repetition; iii) documents causes and corrective actions; and iv) reports these to appropriate levels of his management.

^{1/}"Reponses to AEC Inquiry Concerning Commonwealth Edison's Quality Assurance Program for Nuclear Fuel," dated March 22, 1973, submitted to Licensing on May 16, 1973, Docket No. 50-1-.

3. 10 CFR 50, Appendix B, Criterion XVI states in part: "Measures shall be established to assure that conditions adverse to quality, such as deficiencies, deviations, defective material, and non-conformances are promptly identified and corrected. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management."

Contrary to the above, a) identification of significant conditions adverse to quality from the fuel inspector's inspections were not reported to appropriate levels of management and b) corrective actions were not documented and reported to appropriate levels of management.

4. 10 CFR 50, Appendix B, Criterion XVIII states: "A comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program. The audits shall be performed in accordance with the written procedures or check lists by appropriately trained personnel not having direct responsibilities in the areas being audited. Audit results shall be documented and reviewed by management having responsibility in the area audited. Follow-up action, including reaudit of deficient areas, shall be taken where indicated."

Contrary to the above, no internal audits had been performed to verify compliance with, nor determine the effectiveness of the quality assurance program for the purchase of nuclear fuel.