

PDR

71-6698

Nuclear Assurance Corporation
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September 19, 1979
JRD/79/06/ETS

RECEIVED

SEP 24 PM 2 20

U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76012

Attention: Mr. Uldis Potapovs, Chief
Vendor Inspection Branch

Reference: Docket 99900331/79-01

Gentlemen:

POOR ORIGINAL

QA Program Inspection Conducted July 31 - August 3, 1979
At the Facility of Excelco Developments Inc.
in Silver Creek, New York

Excelco Developments, Inc. (EDI) has furnished us a copy of the inspection report prepared by your office and transmitted to them under your letter of September 6, 1979. The subject inspection involved a review of fabrication records pertaining to spent fuel shipping casks manufactured by EDI for Nuclear Assurance Corporation (NAC). We are desirous that the issues raised in the report be resolved expeditiously and take this opportunity to respond directly to the Nuclear Regulatory Commission (NRC) in this matter.

The inspection focused primarily on the fabrication records of four casks, NAC-1A through NAC-1D, which were manufactured in 1973/1974. Also included in the inspection were the records on the NAC-1E cask, manufactured in 1978/1979; however, the fabrication of this fifth cask has been more thoroughly treated in three separate NRC inspections conducted during 1978. All deviations identified in those inspections have been satisfactorily addressed or resolved (Reference: Docket #99900331/78-01, 02, and 03).

With respect to casks NAC-1A through NAC-1D, the findings in the present inspection, conducted five years after the fact, must be addressed with appreciation for the quality assurance requirements in effect at the time of manufacture and the establishment of those requirements through the contractual relationship between NAC and EDI.

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1176 314 14201

POOR ORIGINAL

In 1973 NAC contracted with EDI for fabrication of four spent fuel shipping casks to the requirements of NAC specification NAC0001 (Revision 1) and NFS Drawing E10080 (Revision 12). In accordance with the NAC0001 specification, EDI submitted a Quality Assurance Program Plan for NAC-1 Spent Fuel Shipping Casks. Included by reference in the plan were EDI's Quality Control Procedures QC-0202 through QC-0213 and detailed procedures for welding, NDT, and acceptance tests for implementation of the program. NAC approved the plan and retained the United States Testing Company, Inc. as its Quality Assurance Administrator.

To provide guidance for the Quality Assurance Administrator, an NAC Quality Assurance Implementation Manual was issued in February 1974 with specific procedures for a program that would satisfy the requirements of 10CFR50, Appendix B and the then proposed 10CFR71, Appendix E.

The NAC0001 specification incorporates by reference certain sections of the ASME Code, e.g., ". . . all welds shall be performed by qualified welders who meet the requirements of (have passed the test as required by) the ASME Boiler and Pressure Vessel Code, Section IX." However, since the casks were not required to be "N" stamped vessels, Excelco was not required to meet all Code requirements. The quality assurance requirements imposed upon EDI by NAC and NAC's control of EDI during fabrication of the casks were based on the plan and procedures outlined above.

Contractually, the procurement of the fifth cask, NAC-1E, was to the same requirements as those of the first four. As a result of the NRC inspection at Excelco in March 1978, the NAC0001 specification was revised to incorporate a later revision of the ASME Code, where it is referenced in the specification.

With the foregoing as background, we offer the following specific responses to each of the individual items (A through C) in the NOTICE OF DEVIATION:

A. (Non-Destructive Test Evaluation)

1. (Radiographs)

The manufacturing drawings for the NAC-1 Spent Fuel Shipping Cask require five X-rays on each

1176 315

cask - one by the supplier of the inner shell and four by EDI. During 1974 each of the films was evaluated by a Level III inspector at EDI and accepted. Each weld film was also evaluated by another Level III inspector, NAC's Quality Administrator, C. H. McDonnell of U.S. Testing, and accepted. Finally, the films were reviewed by the Atomic Energy Commission's (AEC's) inspector, Mr. A. R. Herdt, Metallurgical Engineer, in October 1974. His report states: "No deficiencies or violations were noted." (See Attachment A).

As background on the X-ray of the C-2 weld, Attachment A provides excerpts from inspection reports by both U.S. Testing and the AFC dated at various times in 1974. The reports document the difficulties encountered in radiographing the weld, the radiographic technique developed to solve the problem, and final closure of the item. In the more recent 1978 NRC inspections of the NAC-1E cask fabrication, no issue was raised concerning the radiographic procedure for the C-2 weld.

On December 23, 1974, the AEC acknowledged "without further questions" NAC's response to the Report of Inspection forwarded to NAC in November 1974. A copy of the AEC acknowledgment is provided as Attachment B.

Given the above documentation, the radiographic techniques and the interpretation of the results must be considered acceptable under the conditions and requirements of 1974. Current interpretation of the films may be questioned, since the film quality may have suffered some degradation in the intervening five years due to the conditions of storage, e.g., temperature, humidity, air pollutants, etc.

2. ("Missing" Records in QC Work Package)

Immediately following the exit interview of the subject inspection, the following action was taken:

- a) NAC and EDI undertook a review of the manufacturing/inspection records. Each document identified in the exit interview as "missing" was found and reviewed. In all cases the "found" documents verified compliance with the manufacturing specifications. The difficulty in locating certain records was due largely to misfiling. Copies of the specific "missing" documents cited in the NOTICE OF DEVIATION are attached as follows:

Attachment C - Radiographic records of weld C-51 for casks C and D.

Attachment D - Results of the penetrant tests on weld C-16 on casks A through D.

Attachment E - Results of the penetrant tests on the lead hole plug, weld C-5, on the cask base assembly for casks A through D.

- b) An independent review was made by NAC covering all weld parameter sheets and the inspection called out (PT or RT) for each assembly (assembly nos. 200 through 239). In every case documentation was found to verify that the required inspection was performed, either at the time called out or at a later assembly point.
- c) As a part of the review in (b) above, the drawing revision referenced on each weld parameter sheet was compared with the documented history of drawing revisions. All fabrication was verified to be in accordance with the final revision of the applicable drawing. Drawing revisions subsequent to fabrication were for error correction or changing "NFS" to "NAC".

POOR ORIGINAL

B. (Test Procedures)

As described earlier, the quality assurance requirements, including acceptance tests, were to be in accordance with EDI procedures approved by NAC. These procedures require that gage calibration be verified prior to testing, but do not include a specific requirement for documentation of the gage used in each test. Conformance to the test procedures, including verification of gage calibration, was documented in two AEC inspections conducted during 1974 and in five inspections by U. S. Testing. For the NAC-1E fabrication and test program, the same acceptance test procedures are applicable. For these tests the U.S. Testing check list for selected hold points has been reviewed to verify that it contains items sufficient to document conformance to the test procedures, including gage selection and calibration. Selected documents relative to the calibration of acceptance test instruments are given in Attachment F.

The NAC0001 specification provides that the fabricator is to perform the thermal test and submit the test data to NAC for review and evaluation. In the formal letters of acceptance from NAC to EDI covering casks NAC-1A through NAC-1D, NAC verified the acceptability of its evaluations with the following language:
". . . acceptance is . . . based upon inspections performed, surveillance of tests, and review of quality assurance documentation."

NAC has reverified the acceptability of the thermal test data for both the original acceptance test and the retest performed after three years' service. The analysis reconfirmed in both instances that the test data were within the acceptance limits specified in the Safety Analysis Report. Moreover, the results of the three year thermal test, as required by the Certificate of Compliance, confirmed that there has been no deterioration in the capacity of the cask wall to transfer heat to the environment.

1176 318

C. (Documentation of Material Specification)

The cited document covering the balsa wood used for impact limiters is provided as Attachment G.

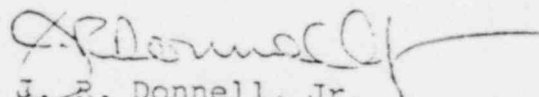
In response to Item 4.b., Unresolved Items in the DETAILS SECTION of the subject inspection report, the qualification records of the welders used in fabrication of the casks have been furnished to your office under our letter dated August 17, 1979.

We have reviewed each of the comments under Item 4.c., Comments, in the DETAILS SECTION of the inspection report. Several of these comments have been addressed above in our responses to the NOTICE OF DEVIATION. Most of the remaining items have been resolved as a result of the review of fabrication records conducted by NAC subsequent to the inspection, e.g., drawing status and the lead pour certificate of compliance. Other items will be addressed through Revision 19 to NFS Drawing E10080 which will be submitted to NRC, Transportation Branch, for approval as an amendment to the Certificate of Compliance.

We request your consideration of this response as soon as possible and stand ready to answer any additional questions you may have.

Sincerely,

NUCLEAR ASSURANCE CORPORATION


J. R. Donnell, Jr.
Vice President

JRD:cnr

cc: Mr. L. A. Brooks
Excelco Developments, Inc.

Mr. C. E. MacDonald, Chief
Transportation Branch
U. S. Nuclear Regulatory Commission

1176 319

U. S. Testing Audit Reports of Inspection at Excelco Developments, Incorporated on 10 May 1974 (Report #1018-6, pages 3 and 4) and on 28 May 1974 (Report #1018-8, pages 2 and 3).

RADIOGRAPHIC PROCEDURE

During the audit at Nuclear Assurance by the representative of the Atomic Energy Commission, it was requested that the tables noted in paragraphs 4.1.1, 4.1.2, 4.2, and 4.5 of Procedure SR-WD-25 be clarified. This was brought to the attention of the Excelco Quality Assurance Manager who will make this revision and submit it to Excelco.

RADIOGRAPHIC REPORTING PROCEDURE

It was also requested during the AEC audit at Nuclear Assurance that the U.S. Testing Representative confirm that Excelco notes on the radiographic report sheets all indications found on radiographs even if they are well within code requirements. During this visit to Excelco radiographic report sheets for this and other work were reviewed. It can be confirmed that all indications found on radiographs are reported by Excelco.

RADIOGRAPHS OF WELD C-2

Difficulty was encountered in radiographing the circumferential weld of the inner cylinder to the top flange, Weld C-2, Drawing E-3769-3. This is the last weld in the assembly of the inner-outer cylinders to the base section and top flange prior to the lead pour.

Because of the configuration of the assembly it is necessary to have the radiographic source positioned outside the outer cylinder with the film on the inside weld surface of the inner cylinder. The penetrameter is on the film side. The radiation passes through the outer shell (1.25"), the copper fins attached to the inside surface of the outer shell, the air gap between the outer and inner shell, the inner shell weld back up strip, (.125"), and the inner shell weld (.3125").

For welds meeting the fabrication requirements of ASME Section III, Class 2 equipment, a number 5 penetrameter is required per Table IX - 3325 - 1, Appendix IX of Section III. To interpret the radiography to a 2T level of quality, the 2T hole for a number 10 penetrameter is 0.020 inches in diameter per Paragraph IX-3325 of Section III and ASTM E-142. Radiographs taken with the penetrameter were difficult to interpret since the 2 T hole could not be clearly seen, but could be seen with difficulty.

Nuclear Assurance Corporation

1018-6

One radiograph, a technique shot, was taken using a penetrometer on the weld with a slot 1/4 inch long and 0.010 inch wide. This was allowable by Section III Paragraphs IX-3325 and IX-3334.5 of the ASME Code. Paragraph IX-3334.5 further requires that a 2T hole or smaller shall appear. As previously stated the 2T hole could be interpreted with difficulty.

Based on the acceptance by Excelco of this technique shot, the circumferential weld was radiographed without penetrameters. All radiographic exposure parameters remained the same for each exposure.

These radiographs were reviewed by the U.S. Testing Representative and the results presented on the enclosed report forms. The measured density ranged from 2.7 to 3.1. Acceptance density limits are from 2.0 to 3.8.

In general the radiographs are difficult to read because of the outer shell and the copper fins. However, they can be interpreted.

The U.S. Testing Representative accepted the radiographs as being within the ASME Code for allowable indications.

It is required, since the radiographic technique is not within that of the approved radiographic procedures, that Excelco write and submit a radiographic procedure, which includes the use of the technique exposure, for this weld.

This procedure will require approval by Nuclear Assurance.

This is an "OPEN ITEM".

REMAINING RADIOGRAPHS

Radiographs of the following were reviewed.

- Inner cylinder to base Weld C-1.
- Top flange weld neck.
- Base casting weld neck.

The results are presented on the enclosed report sheets. All radiographs were acceptable.

DYE PENETRANT EXAMINATIONS

Dye penetrant examinations records were reviewed for the following areas. Reference is made to Report No. 1018-4 pages 7 and 8 where a check list was presented.

1176 321

SYNOPSIS OF VISIT

Radiographs of the inner cylinder weld to the base casting, and the weld neck areas of the top lid flange and the base casting of cask number 2 were reviewed and were acceptable.

The radiographs of the top lid flange weld to the inner cylinder were not in strict accordance with the requirements of the Excelco radiographic procedure, or Section III of the ASME Code. Either a new procedure, or an ammendment to the original procedure is required for this weld. This is an "OPEN ITEM".

The inside diameter of cask number 2 was within tolerance. The BWR Fuel can fitted into the inner cylinder without difficulty.

Cask number 1 was inspected after the lead pour. The BWR fuel can did not make full insertion into the inner cylinder (Later lead was found in the inner cylinder and this fuel can did make full insertion.) Stiffeners in the can was found to be out of drawing requirements.

REPORT OF VISIT

General

POOR ORIGINAL

This visit was made to Excelco to review radiographs, documentation and to inspect cask number 2 prior to its shipment to Edwards Lead for the lead pour.

Cask number one had been returned and was subjected to a test whether the BWR Failed Fuel can could be inserted freely into the inner cylinder.

Following are the results of this visit.

Radiographs

Radiographs of the top lid flange to the inner cylinder, the bottom base to the inner cylinder, and the weld neck areas of the top lid flange and the bottom cask were reviewed.

The radiographs of the top lid flange to inner cylinder weld, Weld C-2, do not meet the requirements of either the Excelco Procedure SR-ND-25 or Section III of the ASME Code. The technique used involves a technique shot where the penetrameter is placed on the weld. In this case a Number 7 penetrameter, which is acceptable, with a 0.010 slit 1/4 inch long is used on the film side.

1176 322

POOR ORIGINAL

Interpretation is the ability to see the slit. If this technique shot is accepted all weld areas will then be radiographed, without penetrameters, using the same exposure parameters.

The Section III, Appendix IX of the Code, allows the use of the slit with this size penetrameter. However, for film side penetrameters both the slit and at least the 2T hole must be seen. The use of a technique shot is not strictly allowed by the Code but depends upon an agreement between the customer and the fabricator.

For radiography Weld C-2, the Excelco radiographic procedure must be ammended to include this technique, or a separate procedure must be written for this one weld. In either case the procedure must be submitted to Nuclear Assurance for approval. This is an "OPEN ITEM".

Difficulty was encountered with the original radiography for this weld. This weld is the closure weld for the inner and outer portions of the cask. This requires that the film be placed on the inside weld surface of the inner cylinder with the source outside. The radiation must pass through the outer cylinder (about 1.25" thick), the copper cooling fins on the outer shell and the inner cylinder before penetrating the weld of the inner cylinder (0.375" thick). In addition there is a back up ring on the inner cylinder weld. There was scattering of the radiation due to the cask outer shell, and additional interference from the copper fins. For this reason the above technique was developed.

No indications were noted on these radiographs.

Radiographs of Weld C-1, the inner cylinder to the base casting were in accordance with the requirements of Section III of the ASME Code. These radiographs were acceptable.

Radiographs of the weld neck areas of the top flange lid and the bottom casting were taken for information purposes prior to welding. These radiographs were acceptable.

NOTE

Excelco Development Procedure SR-ND-25, "Radiographic Examination Procedure," revised June 14, 1974 was approved by U.S. Testing on 12 July 1974 and NAC approval was transmitted to Excelco on 15 July 1979. Item closed.

1176 323

Atomic Energy Commission (AEC) Report of Inspection at Excelco on 12-14 June 1974 (Report 70-1510/74-2, Page I-3) and on 15-17 October 1974 (Report 70-1510/74-3, Page I-3)

POOR ORIGINAL

/74-2 Report

b. Radiography

The inspector reviewed the radiographic procedure, SR-ND-26 and the radiographic acceptance standard. The inspector reviewed the radiographs and associated documentation for the C-1 and C-2 welds, the cask flange and base castings and the inner cylinder longitudinal weld seam manufactured by Trent Tube for the numbers 1 and 2 spent fuel shipping casks. The radiographs were reviewed for joint identification, date, parameter size, quality of radiograph density and apparent quality of weld.

The inspector noted that difficulty was encountered in radiographing the circumferential weld on the inner cylinder to the top flange, weld C-2. This is the last weld in the assembly of the outer-inner cylinder to the base section and top flange prior to the lead pour. Because of the configuration of the assembly the radiographic source was positioned outside the outer cylinder with the film on the inside weld surface of the inner cylinder with the penetrometer on the film side.

This radiographic technique is a code variance and not entirely within that of the approved radiographic procedure. The licensee agreed that Excelco should prepare and submit for approval of NAC details of the C-2 weld radiographic technique and qualification to be included in the radiographic procedure.

The inspector informed the licensee that this item is unresolved and would be examined during the next inspection. No other major discrepancies were noted.

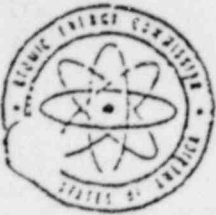
/74-3 Report

c. Radiography

Excelco has reissued and NAC has approved the radiographic examination procedure, SR-ND-25. The procedure now contains the details on the C-2 weld radiographic technique. The inspector reviewed the revised radiographic procedure, radiographs and associated documentation for the C-1 and C-2 welds, the cask flange and base castings and the inner cylindrical longitudinal weld seam manufactured by Trent Tube for the numbers 3 and 4 spent fuel shipping casks. The radiographs were reviewed for joint identification, date, penetrometer size, quality of radiograph density and apparent quality of welds. No deficiencies or violations were noted.

The inspector considers the unresolved item on radiographic procedure closed.

1176 324



UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION II - SUITE 818
230 PEACHTREE STREET, NORTHWEST
ATLANTA, GEORGIA 30303

TELEPHONE: (404) 526-4903

In Reply Refer To:
RO:II:ARE
70-1510/74-3

DEC 23 1974

Nuclear Assurance Corporation
ATTN: Mr. R. E. Keenan
24 Executive Park West
Atlanta, Georgia 30329

POOR ORIGINAL

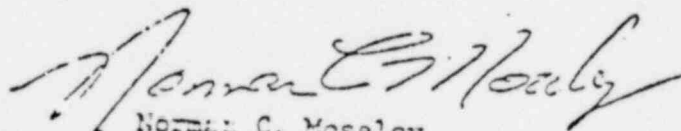
Gentlemen:

Thank you for your letter of December 2, 1974, informing us of steps you have taken to correct the violation concerning activities under AEC License No. SNM-1473 which was brought to your attention in our letter of November 11, 1974. We have examined your corrective actions and have no further questions.

Should you have any questions concerning this letter, you may communicate directly with this office.

We appreciate your cooperation with us.

Very truly yours,


Norman C. Moseley
Director

1176 325

110 NAC
EXCELCO DEVELOPMENTS, INC.
 SILVER CREEK, N. Y.

ATTACHMENT C

X-RAY SERIAL NO. CB4

JOB or S/O 3769

MATERIAL S.S. Casting

SPECIFICATION ASTM E71-64

X-RAY STATUS Final

Inspector W.P. Lynch III Date 4/3/74

X-RAY WELDMENT REPORT—

Cast Base #4

SEAM NO.	FILM NO.	LOCATION OF DEFECT	TYPE	LEGEND
<u>CB4</u>	<u>1-2</u>			
	<u>2-3</u>			
	<u>3-4</u>			
<u>(2)</u>	<u>4-5</u>	<u>(1) (9)</u>	POOR ORIGINAL	
	<u>5-6</u>			
	<u>6-7</u>			
<u>(2)</u>	<u>7-1</u>	<u>(1) (8)</u>		
<u>(2)</u>	<u>Welded plug areas —</u>			
<p>Note: Radiographed in final machined surface — Films on (5) 1st flange — Single upset film from (5) —</p> <p>190 KV 4-MA 36" — Distance 2:15 — Dev. w/ screen "AA" — Kodak film .005" — lead screen</p>				

- OK— Accepted
- TT— Top edge of
- T— Top of weld
- C— Center of weld
- B— Bottom of weld
- ES— End edge of weld
- OS— Outside
- IS— Inside
- 1— Porosity
- 2— Scattered porosity
- 3— Linear porosity
- 4— Crack (s)
- 5— Incomplete penetration
- 6— Incomplete fusion
- 7— Slag inclusion
- 8— Tungsten
- 9— Undercut
- 10— Base metal thinning
- 11— Burn thru
- 12— Grind marks
- 13— Surface defects
- 14— Polish
- 15— Film/screen defect
- 16— Re-X-Ray

1176 326

P. H. M. Farrell
 W.S.T.C./NAC
 10/14/74

PENETRANT INSPECTION REPORT

EXCELLO DEVELOPMENTS, INC.
Silvercreek, New York

Page _____ of _____

DWG. NO. E-3769-6 P/O _____
 PART NAME UPPER IMPACT HEAD S/O 3769
 S/N 3769-210 TO 3769-211 INSP. STATUS FINAL
 DATE 5/13/74 INSPECTOR OCA
3 LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT _____

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS.
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U
UNIT #1

3769-210 (IMPACT HEAD SUB ASSEMBLY) TO 3769-211 (COVER ASSEMBLY)
(C14 & C15)

(C-16 - P.T. INSPECTED - REF. DWG. E 3769-55 REV. 1) OCA
3

REMARKS:

POOR ORIGINAL

N.D.T. - PROCEDURE - No. - SR-ND-23 U.
 SPOTCHECK PENETRANT (SKL-S) BATCH No. - 3C015
 SPOTCHECK CLEANER (SKC-S) BATCH No. - 3A137
 SPOTCHECK DEVELOPER (SKD-S) BATCH No. - 3B046

1176 328

ATTACHMENT D
PENETRANT INSPECTION REPORT

PIR # _____

EXCELCO DEVELOPMENTS, INC.
Silvercreek, New York

Page _____ of _____

DWG. NO. E-3769 -6 P/O _____
 PART NAME Upper Impact Head S/O 3769
 S/N 3769-210 to 3769-211 INSP. STATUS FINAL
 DATE 5/17/74 INSPECTOR QCA
3 LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT _____

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS,
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U.

UNIT - #2

3769-210 (IMPACT HEAD SUB-ASSEMBLY) TO 3769-211 (COVER ASSEMBLY)
(C.14 & C.15)

(C-16 - P.T. INSPECTED - REF. DWG. E-3769-55 REV. 1) QCA
3

REMARKS:

POOR ORIGINAL

N.D.T. - PROCEDURE - No. - SR-ND-23 U.
 SPOTCHECK PENETRANT (SKL-S) BATCH No. - 3C015.
 SPOTCHECK CLEANER (SKC-S) BATCH No. - 3A137
 SPOTCHECK DEVELOPER (SKD-S) BATCH No. - 3B046

1176 329

PENETRANT INSPECTION REPORT

EXCELDON WELDMENTS, INC.
Silvercreek, New York

Page _____ of _____

DWG NO E-3769 -6 R/O _____
 PART NAME UPPER IMPACT HEAD S/O 3769
 S/N 3769-210 TO 3769-211 INSP. STATUS FINAL
 DATE 5/23/74 INSPECTOR OCA
3 LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT _____

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS.
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U
UNIT-#3

3769-210 (IMPACT HEAD SUB ASSEMBLY) TO 3769-211 (COVER ASSEMBLY)
(C14 & C15)

(C-16-P.T. INSPECTED - REF. DWG-E3769-55 Rev.1) OCA
3

REMARKS:

POOR ORIGINAL

N.D.T. - PROCEDURE - No. SR-ND-23 U.
 SPOTCHECK PENETRANT (SKL-S) BATCH NO. - 3C015
 SPOTCHECK CLEANER (SKC-S) BATCH NO. - 3A137
 SPOTCHECK DEVELOPER (SKD-S) BATCH NO. - 3B046

1176 330

PENETRANT INSPECTION REPORT

EXCELLO DEVELOPMENTS, INC.
Silvercreek New York

DWG. NO. E-3769-6 S/O _____

PART NAME UPPER IMPACT HEAD S/O 3769

S/N 3769-210 TO 3769-211 INSP. STATUS FINAL

DATE 5/28/74 INSPECTOR 3 LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT _____

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS.
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U.
(UNIT #4)

3769-210 (IMPACT HEAD SUB ASSEMBLY) TO 3769-211 (COVER ASSEMBLY)
(C14 & C15)

(C-16 - P.T. INSPECTED - REF. DWG. E3769-55 REV. 1) EDY
OCL
3

REMARKS:

POOR ORIGINAL

N.D.T. - PROCEDURE - No. -SR-ND-23U.
 SPOTCHECK PENETRANT (SKL-S) BATCH No. - 3C015.
 SPOTCHECK CLEANER (SKC-S) BATCH No. - 3A137
 SPOTCHECK DEVELOPER (SKD-S) BATCH No. - 3B046

1176 331

FEDERAL BUREAU OF INVESTIGATION
U.S. DEPARTMENT OF JUSTICE
WASHINGTON, D.C. 20535
New York

Page 01

NO. E-3769-5
PART NAME (CAPS TO LID FLANGE) S/O 3769
S/N 3769-20 TO 3769-18 TEST STATUS FINAL
DATE 6/10/74 INSPECTOR

QCA 6

LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS.
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U
(Cask #1)

5) 3769-20 (CAPS) TO 3769-18 (LID FLANGE)

POOR ORIGINAL

REMARKS:

N.D.T. - PROCEDURE - No. -SR-ND-23 U.
SPOTCHECK PENETRANT (SKL-S) BATCH No. -3C015
SPOTCHECK CLEANER (SKC-S) BATCH No. -3A137
SPOTCHECK DEVELOPER (SKD-S) BATCH No. -3B046

1176 332

Form 70-0004

PAGE # _____

DELEGATE INSPECTOR REPORT

FACECO DEVELOPMENTS, INC.
Silverbrook, New York

Page _____ of _____

DWG. NO. E-3769-5 P/O _____
 PART NAME CAPS TO LID FLANGE S/O 3769
 S/N 3769-20 TO 3769-18 INSP. STATUS FINAL
 DATE 6/19/74 (ROOT) 7/2/74 (FALL) INSPECTOR EJL
QCA
2 LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT _____

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS.
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U
(Cask #2)

(C5) 3769-20 (CAPS) TO 3769-18 (LID FLANGE)

REMARKS:

POOR ORIGINAL

N.D.T. - PROCEDURE - No. - SR-ND-23 U.
 SPOTCHECK PENETRANT (SKL-5) BATCH No. - 30015
 SPOTCHECK CLEANER (SKC-5) BATCH No. - 3A137
 SPOTCHECK DEVELOPER (SKD-5) BATCH No. - 3B046

1176 333

INDUSTRIAL INSPECTION SERVICE
1000 WEST 170TH STREET
NEW YORK, NEW YORK

NO. E-3769-5
ITEM CAPS TO LID FLANGE NO. 3769
S/N 3769-20 TO 3769-18 Insp. STATUS FINAL
DATE 9/11/74 INSPECTOR

EDH
QCA
3

LEVEL II

AREA/WELD TIME: 100% ACCEPT REJECT

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U
(CASK #3)

(C5) 3769-20 (CAPS) TO 3769-18 (LID FLANGE)

POOR ORIGINAL

REMARKS:

N.D.T. - PROCEDURE - No. - SR-ND-23 U.
SPOTCHECK PENETRANT (SKL-5) BATCH No. - 3C015.
SPOTCHECK CLEANER (SKC-5) BATCH No. - 3A137
SPOTCHECK DEVELOPER (SKD-5) BATCH No. - 3B046

1176 334

PERMANENT INSPECTION PART

EXCELLENCE DEVELOPMENT, INC.
Silvercreek, New York

Page _____ of _____

DWG. NO E-3769-5 S/O _____

PART NAME CAPS TO LID FLANGE S/O 3769

S/N 3769-20 TO 3769-18 INSP. STATUS FINAL

DATE 10/12/74 INSPECTOR CCA
6 LEVEL II

AREA/WELD INSP. 100% ACCEPT REJECT _____

TEST RESULTS: INSPECTED 100% OF COMPLETE AREA OF WELDS.
ACCEPTABLE TO REQUIREMENTS AS LISTED IN SR-ND-23 & U
(Cask #4)

(C5) 3769-20 (CAPS) TO 3769-18 (LID FLANGE)

POOR ORIGINAL

REMARKS:

N.D.T. - PROCEDURE - No. - SR-ND-23 U.

SPOTCHECK PENETRANT (SKL-S) BATCH No. - 3C015

SPOTCHECK CLEANER (SKC-S) BATCH No. - 3A137

SPOTCHECK DEVELOPER (SKD-S) BATCH No. - 3B046

1176 335

COPIES OF SELECTED DOCUMENTS RELATING TO THE CALIBRATION
OF ACCEPTANCE TEST INSTRUMENTS

Copies of selected pages of Excelco acceptance test procedures and U.S. Testing Witness Check Lists are attached. Documents include:

1. Hydrostatic Test Specifications - Page 1 and Data Sheet.
2. Pressurization Test Specification for Double O-Ring Seal - Page 1 and Data Sheet.
3. U. S. Testing Check List for NAC-1E, Witness Point 4. Note items 5, 6, and 7.
4. U. S. Testing Check List for NAC-1E, Witness Point 8. Note item 4.
5. U. S. Testing Check List for NAC-1E, Witness Point 7, with documentation of the verification to each item.
6. Thermal Test Procedure - Page 2 and a copy of a thermal test certification provided by Excelco. This particular certification was for NAC-1A.

1176 336

EXCELCO DEVELOPMENTS, INC. OPERATING INSTRUCTION

OPERATING INSTRUCTION		DATE ISSUED 1/21/74	INSTRUCTION NO SR-PP-68
SUBJECT HYDROSTATIC TEST SPECIFICATIONS		DATE RE-ISSUED 4/26/74	
REF		ISSUED BY QUALITY CONTROL MANAGER	PAGE NO <u>1</u> of <u>4</u>

1.0 SCOPE

1.1 This specification covers the procedure to be followed to accomplish the hydrostatic test on assemblies and sub-assemblies to the requirements of the Nuclear Assurance Corporation.

2.0 REFERENCES

- 2.1 Excelco Dev., Inc. S.O. 3769
2.2 Nuclear Assurance Corporation, NAC0001 Rev. 1

3.0 EQUIPMENT

- 3.1 Water Pressure pump and demineralized water.
3.2 Relief valve set to relieve at test pressure at plus 5 per cent.
3.3 Indicating Pressure Gauge.
3.3.1 The indicating pressure gauges shall preferably have dials graduated over a range of double the intended maximum test pressure, but in no case shall the lower 20% of the pressure gauge be used to indicate the test pressure.

3.4 Pressure gauges shall be calibrated within the past 6 months prior to test.

3.5 Valve for isolating cask from pressure pump.

1176 337

4.0 PREPARATION PRIOR TO HYDROSTATIC TEST

4.1 The assembly or subassembly shall be made pressure tight. This may be accomplished by using blind flanges, screwed plugs, or by the welding of temporary covers on openings that cannot be closed by other means. The method shall be specified on the drawing, giving detailed instructions regarding weld procedures, location of vents to purge air pockets and other information necessary to achieve a pressure

EXCELCO DEVELOPMENTS, INC. OPERATING INSTRUCTION

OPERATING INSTRUCTION		DATE ISSUED 1/22/74	INSTRUCTION NO SR-PP-227
SUBJECT PRESSURIZATION TEST SPECIFICATION FOR DOUBLE O-RING SEAL		DATE REISSUED 4/26/74	
REF		ISSUED BY QUALITY CONTROL MANAGER	PAGE NO <u>1</u> of <u>3</u>

1.0 SCOPE

- 1.1 This specification covers the procedure to be followed to accomplish the pressurization test on the double O-ring seal of the cask to the requirements of the Nuclear Assurance Corporation, NAC-1 Spent Fuel Shipping Cask.

2.0 REFERENCES

- 2.1 Excelco Dev., Inc. S.O. 3941
- 2.2 Nuclear Assurance Corporation, NAC 0001 Rev. 3

POOR ORIGINAL

3.0 EQUIPMENT

- 3.1 Pressure Pump, or gas bottle with pressure regulator.

- 3.2 Indicating Pressure Gauges

- 3.2.1 The indication pressure gauges shall preferably have dials graduated over a range of double the intended maximum test pressure, but in no case shall the lower 20% of the pressure gauge be used to indicate the test pressure.

- 3.3 Pressure gauges shall be calibrated within the past 6 months prior to test.

- 3.4 Valve for isolating cask from pressure system.

4.0 PREPARATION PRIOR TO PRESSURIZATION TEST

- 4.1 The assembly shall be made pressure tight. This may be accomplished by using blind flanges, screwed plugs, or by the welding of temporary covers on openings that cannot be closed by other means.

- 4.2 Pressurization will then be effected with the aid of the gasket leak valve to include the inner and outer O-ring seals.

1176 339

CHECK LIST

Fabrication of Nuclear Assurance Spent Fuel Shipping Cask.

Witness Point No. 4

Hydrostatic Test

1. Verify that the test procedure is in the test area.
2. Verify that all operations of the work traveller preceding this test have been signed-off.
3. Verify that the test and the procedure are identified on the work traveller.
4. Verify that demineralized water is used for the test.
- ~~5.~~ 5. Verify that the pressure gauge has the correct pressure range.
- ~~6.~~ 6. Verify that the pressure gauges calibrations are current.
- ~~7.~~ 7. Verify that the test is conducted in accordance with the requirements of the test procedure.
8. Inspect the cask.
9. Verify that Excelco has accepted the test and has completed the test report.
10. Verify that the test report and work traveller are properly signed.

1176 341

CHECK LIST

Fabrication of Nuclear Assurance Spent Fuel Shipping Cask

Witness Point 8

Thermal Test

A. Test Preparation.

1. Verify Thermal Test Procedure is noted on traveller.
2. Verify that all operations prior to the Thermal Test on the traveller are signed-off.
3. Verify that Thermal Test procedure is available in the test area.
- 4. Verify that all test instrumentation used to control Thermal systems and to obtain data have been calibrated and that the calibrations are current.
5. Verify that thermo-couples are installed as required.
6. Verify that all instrument and electrical systems have been checked for continuity.
7. Verify test set-up is complete and ready for testing.

B. First Thermal Test (Neutron Shield Tank Empty)

1. Verify demineralized water is used to fill inner cavity.
2. Verify that the cask is heated in accordance with the procedure requirements.

1176 342



UNITED STATES TESTING COMPANY, INC.

CHECK LIST

July 17, 1974

Fabrication of Nuclear Assurance Spent Shipping Cask

Witness Point No. 7 - INNER CAVITY PHASE

Helium Leak Test

1. Verify that the test procedure is identified on the work traveller.
VERIFIED
2. Verify that the test procedure is available at the test area.
VERIFIED
3. Verify that test data recording sheets are available at the test area.
VERIFIED
4. Verify that all traveller operations prior to the helium leak tests have been signed-off.
VERIFIED
5. Verify that test pressure gauges were calibrated.
VERIFIED
6. Verify that the helium leak test equipment was calibrated against a known standard leak.
VERIFIED
7. Verify that the helium leak test is being conducted in accordance with the procedure requirements.
VERIFIED
8. Verify that test results are recorded and accepted by Excelco QA.
VERIFIED
9. Verify that the traveller is properly signed-off for this operation.
VERIFIED

1176 343

EXCELCO DEVELOPMENTS, INC. OPERATING INSTRUCTION

SUBJECT THERMAL TEST PROCEDURE	INSTRUCTION NO SR-PP-173	DATE ISSUED 1-22-74 DATE REISSUED 4-10-74	PAGE NO. 2 OF 4
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- 3.1.5 A set of three thermocouples mounted circumferentially on the neutron shield tank surface adjacent to the thermocouples on the internal surface. They shall be silver solder brazed to a stainless steel plate and the plate welded to the surface.
- 3.1.6 A set of three thermocouples mounted on the 39 1/4 O.D. neutron shield tank at it's midpoint and in line with the other external thermocouples. The thermocouples shall be silver solder brazed to a stainless steel plate and the plate welded to the surface.
- 3.1.7 One thermocouple is to be located in the 1.25 inch thick outer shell penetrating the neutron shield tank through a drain plug opening that is located 135° from twelve o'clock. Near the drain plug, there shall be a thermocouple located on the neutron shield tank.
- 3.1.8 One thermocouple which records the test area ambient temperature.
- 3.1.9 A pressure gage shall be installed in one of the upper neutror shield tanks.
- 3.1.10 A pressure gage and a 240 PSIG relief valve shall be installed in the test head.
- 3.1.11 Pressure gages shall be monitored and recorded by testing personnel.

4.0 TEST PREPARATION

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- 4.1 Wattmeter, thermocouples, potentiometer, pressure gages and other test equipment shall be calibrated prior to test.
- 4.2 Cask shall be positioned above ground in the horizontal position and shall be configured as shown on test schematic drawing 13367/2-35. The test head shall be insulated after the cask is set-up for testing.
- 4.3 Thermocouples shall be located and installed per 3.1.4, 3.1.5, 3.1.6 and 3.1.7.
- 4.4 The heater units shall be inserted in the test head and the test head secured in place.
- 4.5 All instrumentation and electrical systems shall be connected and checked for continuity, Dwg 13367/2-37.

EXCELCO DEVELOPMENTS, INC. OPERATING INSTRUCTION

SUBJECT	INSTRUCTION NO	DATE ISSUED	PAGE NO
THERMAL TEST CERTIFICATION	SR-PP-173	1/22/74 DATE REISSUED 4/26/74	---

THERMAL TEST CERTIFICATION

Date 10/7/74Fabricator Excelco Developments Inc.S.O.# 3769Customer Nuclear Assurance Corp.P.O.# NAC-1Item Tested Shipping Cask #1Dwg.No. 10080 Spec.NAC0001Rev. No. 1

The above listed item has been Thermal Tested in accordance with Excelco Thermal Test Procedure QC-SR-PP-173.

Date of FIRST THERMAL TEST 10/5/74 Operator A.AckselDate of SECOND THERMAL TEST 9/28/74 Operator A.Acksel

First thermal test originally conducted on August 22, 1974.
Second thermal test originally conducted on September 13, 1974.
However, this test required a re-run because interior position of thermocouples were not correct. This test was conducted on September 28, 1974.

After this test, the first thermal test was re-run on Oct. 5, 1974 to verify that data from the original test was valid. This repeat test verified the original test data.

POOR ORIGINAL

1176 345



P. O. BOX 332 POUGHKEEPSIE, NEW YORK 12502 | 514 471-0500 ESTABLISHED 1266

CERTIFICATE OF COMPLIANCE

It is hereby certified that all
of the articles called for in
your P. O. # A-4179
are in accordance with the re-
quirements, specifications and
drawings listed in the subject
order. Any exceptions are as
detailed in "Notes" below.

LUMB WOODWORKING COMPANY, INC.

By: H. A. Lulolph

Title: Quality Control

Date: May 21, 1974

NOTES: _____

1176 546