FLUID CONTROL SPECIALISTS

HOKE

HOKE INCORPORATED

ONE TENAKILL PARK • CRESSKILL, N.J. 07626
PHONE (201) 568-9100 TELEX 135428

February 2, 1991

Mr. Alan Herdt
Acting Chief
Vendor Inspection Branch
Division of Reactor Inspection
Office of Nuclear Reactor Regulations
Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: NRC Findings - Appendix B - Notice of Non-Conformance

Dear Sir:

We were very sorry to hear that your audit team had found some non-conformance during their audit of our Spartanburg, SC Plant. We would like to assure you that in our commitment to a Total Quality Management Program we are very unhappy when some audit team reports a non-conforming finding. It is our goal to be the very best in our field, therefore, we have taken a very serious look at the non-conformities reported and have attempted to answer them with the related corrective action to the best of our abilities.

A. Criteria II: Hoke Inc. failed to establish and implement a quality program compromising all those planned and systematic actions necessary to provide adequate confidence that non-pressure boundary, non-ASME Code components or assemblies will perform their safety related function.

1. A description of steps that have been or will be taken to correct these items :
Hoke Internal procedure HQI-147 has been revised to indicate that any individual, upon discovery of any defect or deviation that affects a component intended for use in a nuclear facility shall notify in writing the Hoke Plant Quality Manager of the non-conformance.

2. A description of steps that have been or will be taken to prevent recurrence :
Internal procedures have been established where audits will be performed on all Hoke facilities to assure that Hoke procedure HQI-147 is being followed.

3. The dates your corrective actions and preventive measures were or will be completed :
The above mentioned corrective action implementation is immediate.

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B. Criteria II: Hoke Inc. failed to indoctrinate and train the MQC, Lead Quality Control Inspector (LQCI), and two other Level II QCI's that performed activities affecting quality in the requirements of 10 CFR Part 21 and Hoke Inc. procedure HQI-147, "Reporting of Defects and Noncompliance", and the annual performance review necessary for each individual to maintain their qualification had expired in July 1990 and had not been performed as of September 20, 1990.

1. A description of steps that have been or will be taken to correct these items :
All Hoke employees who are involved in our Nuclear Programs have been trained in the use of 10 CFR Part 21 and Hoke procedure HQI-147, and the subsequent reporting of non-conformities. A Corporate Audit program has been established to insure that this is done annually and that all related individuals are knowledgable in the use of these procedures.

   Copies of our training program attendance sheets are submitted for your review.

   All Hoke Inspection/Test Personnel had their annual performance review completed in accordance with internal Hoke procedures. We have submitted copies of 3 examples for your review.

2. A description of steps that have been or will be taken to prevent recurrence :
Corporate program has been established where both plant quality managers and personnel departments are responsible for assuring that our annual performance reviews are maintained, and that all employees who perform activities which affect quality are instructed in the use of 10 CFR Part 21 and HQI-147.

   Internal procedures have been established where audits will be performed on all Hoke facilities to assure that Hoke procedure HQI-147 is being followed.

3. The dates your corrective actions and preventive measures were or will be completed :
The implementation plan for this corrective action is immediate. The related department audits will be performed in accordance with Hoke's internal audit schedule.

C. Criteria III: Hoke Inc. failed to comply with the minimum ASME Code requirements of 0.125 inch fillet weld leg length on Hoke Inc. Part No. N930308Y37 for Beaver Valley Unit 1, Purchase Order (PO) No. D03012 due to the undersized machined dimension, as specified by engineering, of the valve body weld-prep land length on the socket welded joint attaching the valve body and tube nipples.

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1. A description of steps that have been or will be taken to correct these items :

It is Hoke's policy that all issuance of and revisions to Engineering Drawings are reviewed, certified and approved by a Registered Professional Engineer, to assure compliance with the code and design specification. Hoke's Registered Professional Engineer is Robert Reilly, who is our Director of Engineering. All drawings are reviewed and approved by R. Reilly before issuance.

Hoke Corporate Quality has reviewed and reinspected the part which was measured by the NRC examiner and we take exception to the finding. Our measurements indicate that the fillet weld length far exceeds the minimum ASME Code requirements.

Hoke's procedures are handled in accordance with our internal procedures which stipulate that appropriate signatures are required before any procedural issuance or revision to the related procedures are finalized. We have submitted as part of this report copies of Hoke's Internal Procedures HPS-85, HPT-N145, and HWS-N1 with their related supporting revision issuance form to validate this statement.

It appears that this non-conformity may have occurred due to a misunderstanding of the request for supporting data between the NRC representatives and Hoke, Spartanburg's Quality Group. Therefore, based on the supplied data, it is Hoke's feeling that no corrective action is required for this non-conformity.

D1. Criteria IV: Hoke failed to include the quality requirement for the acetone, procured on Hoke Inc. PO No. 41987, to be free of halogens as required by Hoke Inc. procedure HPS-85, "Cleaning for Nuclear Service (or Oxygen Applications)," Revision H, dated June 27, 1988. Acetone was the cleaning media prescribed in Hoke Inc. procedure HPS-85, used to clean the valve body and tube nipple subassemblies.

1. A description of steps that have been or will be taken to correct these items :

Hoke's purchase order requirements for acetone have been revised to require a statement indicating that acetone is to be free of halogens. We are supplying copies of a letter from Hoke Spartanburg Quality Manager to our purchasing department indicating this requirement and a copy of the revised purchase order.

Hoke internal procedure HPS-85 has been revised under Paragraph 1.1 to specify degreasing agents used in acordance with HPS-85 are not to contain halogens. This procedure has also been revised to include testing to verify the Quality standards for chloride, electrical conductivity and pH of the final rinse water.

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2. A description of steps that have been or will be taken to prevent recurrence :
All related purchase orders have been revised to prevent recurrence of this non-conformity. An attachment of our revised purchase order is included.

3. The dates your corrective actions and preventive measures were or will be completed :
The corrective action date is immediate and our purchase orders have been revised accordingly in support of this action.

D2. Criteria IV: Hoke failed to include the requirements for lost classification and level of testing required by ASME Code Section II, Specification SFA-5.01 on Hoke Inc. PO No. 38255 for the procurment of ASME Code Section III, Class 1 weld filler material used to weld the tube nipples to valve body assemblies.

1. A description of steps that have been or will be taken to correct these items :
It was Hoke's interpretation after reviewing SFA 5.01 for schedule F under table 1 footnote that if we did not specify the required schedule that we would automatically receive schedule F. To satisy the recent requirements brought to our attention by your audit we have revised our purchase orders to now meet the ordering requirements as specified in SFA 5.01.

2. A description of steps that have been or will be taken to prevent recurrence :
To satisy the recent requirements brought to our attention by your audit we have revised our purchase orders to now meet the ordering requirements as specified in SFA 5.01.

3. The dates your corrective actions and preventive measures were or will be completed :
Corrective action is immediate and our purchase orders have been revised accordingly in support of this action.

E1. Criteria Va: Hoke Inc. failed to prescribe the fillet weld leg length on Hoke Inc. assembly drawings No. N81575-1, Revision A, dated May 17, 1983 and No. N930308Y37, Revision G, dated February 12, 1986 for socket welded valve body and tube nipple subassemblies.

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1. A description of steps that have been or will be taken to correct these items :
It is Hoke's policy that we reference a weld procedure on our drawing which stipulates the weld criteria including leg length of the weld. To support this we have submitted a copy of our procedure HWS-N1 for your review. Since our supporting procedure stipulates the welding criteria we do not consider this a non-conformity and therefore no corrective action is required.

E1. Criteria Vb: Hoke Inc. failed to prescribe the visual and dimensional inspection requirements of Hoke Inc. procedure HQI-132, "Weld Inspection Procedure (ASME Section III)," Revision C, dated April 17, 1989 on Nuclear Traveler No NA0020 for the assembly and welding of the valve body and tube nipples.

1. A description of steps that have been or will be taken to correct these items :
Hoke welding procedure HWS-N1 has been revised on page 5 of 8 to indicate that visual examination is to be performed in accordance with HQI-132. A copy of this procedure is submitted to validate this corrective action.

2. A description of steps that have been or will be taken to prevent recurrence :
All related welding procedures have been revised as part of our contract review program.

3. The dates your corrective actions and preventive measures were or will be completed :
Our implementation plan is immediate and all procedures have been revised to support this action.

E1. Criteria Vc: Hoke Inc. failed to prescribe proof-flushing requirements of Hoke Inc. procedure HPS-85, "Cleaning for Nuclear Service (or Oxygen Applications)," Revision H, dated June 27, 1988 on Nuclear Traveler No. NA0020 to comply with the requirement that item surfaces after cleaning shall be free of cleaning media.

1. A description of steps that have been or will be taken to correct these items :
Hoke does not consider this a discrepancy and therefore no corrective action is required since proof-flushing is not required by Hoke's Cleaning Procedure. HPS-85, Rev. H, Paragraph 6.1 states " when proof flushing is specified on the nuclear traveler".

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In addition, neither ANSI N45.2.2 nor the licensees PO (Duquesne Light Company PO D038012) establishes the requirement of "proof-flushing". Paragraph 3.2.21.b, states " if flushing is the only practical means....". Section P1.1 of PO D038012 only requires that surfaces are free of cleaning media, etc. Also, Addendum 1 to Stone & Webster Engineering Corporation Spec. No. 2BVS-679, dated February 14, 1985, (the applicable specification) does not establish the requirement for "proof-flushing". In fact, page 3 of 3 of Addendum 1 states that the reason for change of the specification is "to agree with Seller's approved method which is more restrictive".

Hoke notes that valve components are cleaned after detail parts machining, prior to and after sub-assembly welding and prior to and after valve final assembly and testing (prior to packaging for shipment). This method of repetitve cleaning, as illustrated in the Inspection Plan portion of the Project Plan 1388 has been approved by the customer. Water rinsing and/or acetone cleaning assures surfaces are free of cleaning media.

Supporting documentation is forwarded as part of this documentation package to support Hoke's response.

F2. Criteria Va: Hoke Inc. failed to document revisions of procedure HPT-N145, "Liquid Penetrant (PT) Examination Procedure (Visible Dye, Solvent Removable Method) in accordance with ASME Code Sections III and V", Revision U, dated February 21, 1989 in accordance with established procedures by not providing evidence of a documented review and approval by the NOA, Conformance Engineer, Corporate Director of Quality, Manufacturing Engineer, and the qualified Level III Examiner for Revisions A through U.

1. A description of steps that have been or will be taken to correct these items :

This non-conformity may have been caused by a misunderstanding when the question was asked by the NRC Auditor of our Spartanburg Quality Group. It is Hoke's policy when any revisions are made to a Hoke NDE procedure that our company procedural revision document (Specification/ Pevision Authorization)(SRA) is signed by all responsible individuals including our Level III NDE Inspector prior to issuance. We are forwarding a copy of our revision documentation for HPT-N145 which which clearly establishes that all responsible individuals have reviewed and approved the latest revision of this document. Refer to the attachment identifed as SRA 1705. Due to the fact that all responsible signatures are on the supplied documentation it is Hoke's position that no corrective action is required.

F2. Criteria Vb: Hoke Inc. failed to document revisions of procedure HWS-N1, "Procedure Specification for Gas Tungsten Arc Welding (GTAW) in accordance with ASME Sction III and IX, Single Butt and Fillet Joints, .062" to .308" thickness P8 to P8," Revision L, dated August 9, 1988 in accordance with established procedures by not providing evidence of a documented review and approval by the NOA, Conformance Engineer, Corporate Director of Quality, and the Manufacturing Engineer for Revision A through L.

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1. A description of steps that have been or will be taken to correct these items :
This non-conformity appears to be caused by a misunderstanding between the NRC auditor and Hoke Spartanburg Personel. Since it is Hoke's policy that all revisions to procedures are reviewed and approved by responsible individuals under our SRA Program, we are supplying to you a copy of the latest revision to HWS-N1 with the supporting revision documentation (SRA 2020) to validate that all related signatures have been obtained.

Therefore, Hoke does not consider this a non-conformity and no corrective action is required.

F. Criteria VIII: Hoke Inc. failed to implement established measures to prevent the use of potentionally defective "O" rings, that may have exceeded their shelf life, in safety related components. A combined total of 280 "O" rings from seven part numbers were stored in the nuclear material storage area and had not been inspected every three months or recorded in the "O" ring Log book. The quality characteristics of these "O" rings and the ability of the "O" rings, and all components supplied with "O" rings from this inventory, to perform their safety related function is indeterminate.

1. A description of steps that have been or will be taken to correct these items :
Hoke's internal procedure HQI-115 is being revised to indicate that the expected shelf life of our rubber components will be in accordance with Military Handbook 695C.

When the NRC auditors were in Spartanburg no "O" rings were under formal cure date control, since all of these "O" ring material compositions are to MIL-R-83248, Type 1, Class 1, fluoro elastomer, which has an expected shelf life of 20 years. Although the controls were not formally documented we have every confidence that no "O" rings shipped on Nuclear products have exceeded the 20 year shelf life.

Even though we do not consider the related "O" rings to have exceeded their shelf lives, we have audited our nuclear stock and are supplying as objective evidence of this audit our "O" ring control documentation.

2. A description of steps that have been or will be taken to prevent recurrence :
As indicated in the previous paragraph our internal procedure HQI-115 is being revised and the corporate audit criteria has been revised to indicate that as part of the audit, shelf life criteria on all products are to be validated.

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3. The dates your corrective actions and preventive measures were or will be completed:
Our revision to HQI-115 should be completed by April 1, 1991.

G1. Criteria IX: Hoke Inc. failed to evaluate Hoke Inc. procedure HPT-N145, "Liquid Penetrant Examination Procedure, (Visible Dye, Solvent-Removable Method) in accordance with ASME Code Section III and V," Revision U, dated February 21, 1989 and HQI-183, "Written Practice for the Qualification and Certification of Nondestructive Examination(NDE) Personnel," Revision A, dated August 3, 1990 and failed to reconcile the differences between the 1984 Edition and the 1975 Edition of SNT-TC-1A to assure compliance with the Beaver Valley Unit 1, PO No. D038012.

1. A description of steps that have been or will be taken to correct these items :
Hoke has not been able to locate a 1975 copy of SNT-TC-1A, therefore we will need an extention to answer this finding. It is Hoke's opinion that evaluation was performed previously, although we are unable to find objective evidence to validate this.

G2. Hoke Inc. accepted and certified the qualifications of an NDE Level III Examiner for PT examinations that contained the following deficiencies: (a) The certification did not reference the written practice/procedure to which the Level III was qualified; (b) The certification did not reference the applicable edition of SNT-TC-1A to which the Level III was qualified; and (c) the Hoke Inc. certification letter was not signed by the Senior Vice President as required by Subsection 9.4.1, "Qualification and Testing of Personnel," of the Hoke Inc. NQAM.

1. A description of steps that have been or will be taken to correct these items :
A corrected copy of the qualification records of all NDE Level III examiners has been obtained which reference the written practice/ procedure to which the Level III was qualified and which applicable additions of SNT-TC-1A to which the Level III was qualified. We are submitting as evidence on this corrective action, a copy of our Level Level III examiners qualification records for PT examinations.

Due to company restructuring the position of Senior Vice President is no longer a part of Hoke's Management. We are submitting a copy of the letter which was sent to ASME dated 10/30/90 notifying them of this change. We do not consider this a non-conformity and therefore no corrective action is required.

2. A description of steps that have been or will be taken to prevent recurrence :
The steps referenced in sub-paragraph 1 of this criteria spells out what action we are taking and our internal procedures are in the process of being revised to assure that this does not recurr.

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3. The dates your corrective actions and preventive measures were or will be completed :

The corrective action will be implemented immediately and Corporate Internal Audits will be performed to determine compliance to these related requirements.

G3. Hoke Inc. failed to comply with the pH and conductivity requirements for demineralized rinse water as specified in ANSI N45.2.1, "Cleaning of Fluid Systems and Associated Components During Construction of Nuclear Power Plants," and NRC Regulatory Guide 1.37, Section C paragraph 3, "Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water Cooled Nuclear Power Plants," which were specified in Addendum 1, dated February 14, 1985 of Design Specification 2BVS-679, "Specification for Hermetically Sealed Instrument Valves," required in Beaver Valley Unit 1, PO No. D038012. Also, Hoke Inc. failed to measure the values of and prescribe the quality standards for chloride, floride, sulfide, silica, and turbidity of the demineralized rinse water in Hoke Inc. procedure HPS-85, "Cleaning for Nuclear Service," Revision H, dated June 27, 1988.

1. A description of steps that have been or will be taken to correct these items :

Hoke's procedure HPS-85 is supplied to our customer for approval. Once approval is obtained all related product is cleaned in accordance with our contract requirements. It is our opinion that this practice meets the requirements of ANSI N45.2.1 paragraph 3.4 and NRC Regulatory Guide 1.37, Section C paragraph 3.

Hoke has established a program where our demineralized water will be sent out for testing. We are submitting a copy of a blanket purchase order where this will be performed and a copy of our related analysis report form.

Hoke internal procedure HPS-85 has been revised under Paragraph 1.1 to specify degreasing agents used in accordance with HPS-85 are not to contain halogens. This procedure has also been revised to indicate the Quality standards for chloride, electric conductivity and pH of the final rinse water.

2. A description of steps that have been or will be taken to prevent recurrence :

It is Hoke's position that since this analysis will be performed as part of a blanket order and will be controlled by Spartanburg Quality and audited for conformance by Hoke Corporate Quality, that there will be no recurrence of this non-conformity.

3. The dates your corrective actions and preventive measures were or will be completed :

Our corrective action plan is immediate.

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G4. Hoke Inc. failed to measure the values of and prescribe the quality standards for halogen contamination of the acetone cleaning media as required by Hoke Inc. procedure HPS-85 described above.

1. A description of steps that have been or will be taken to correct these items :
Hoke internal procedure HPS-85 has been revised to specify degreasing agents used in accordance with HPS-85 are not to contain halogens.

2. A description of steps that have been or will be taken to prevent recurrence :
It is Hoke's position that since this requirement is part of a blanket order and will be controlled by Spartanburg Quality and audited for conformance by Hoke Corporate Quality, that there will be no recurrence of this non-conformity.

3. The dates your corrective actions and preventive measures were or will be completed :
Our corrective action plan is immediate.

G5. Criteria IX: Hoke Inc. failed to establish measures to perform proof-flushing of nuclear valve internal cavities to ensure that surfaces were free of cleaning media as prescribed by ANSI N45.2.1 and required by the licensees PO.

1. A description of steps that have been or will be taken to correct these items :
Hoke does not consider this a discrepancy and therefore no corrective action is required since proof-flushing is not required by Hoke's Cleaning Procedure. HPS-85, Rev. H, Paragraph 6.1 states " when proof flushing is specified on the nuclear traveler".

In addition, neither ANSI N45.2.2 nor the licensees PO (Duquesne Light Company PO D038012) establishes the requirement of "proof-flushing". Paragraph 3.2.21.b, states " if flushing is the only practical means....". Section P1.1 of PO D038012 only requires that surfaces are free of cleaning media, etc. Also, Addendum 1 to Stone & Webster Engineering Corporation Spec. No. 2BVS-679, dated February 14, 1985, (the applicable specification) does not establish the requirement for "proof-flushing". In fact, page 3 of 3 of Addendum 1 states that the reason for change of the specification is "to agree with Seller's approved method which is more restrictive".

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Hoke notes that valve components are cleaned after detail parts machining, prior to and after sub-assembly welding and prior to and after valve final assembly and testing (prior to packaging for shipment). This method of repetitive cleaning, as illustrated in the Inspection Plan portion of the Project Plan 1388, has been approved by the customer. Water rinsing and/or acetone cleaning assures surfaces are free of cleaning media.

Supporting documentation is forwarded as part of this documentation package to support Hoke's response.

Please advise if I can be of any further assistance.

Very truly yours,

Ronald J. Williams
Director of Quality

RJW/clb

cc: J. Doblosky
W. Woodlock
R. Johnson
B. Taylor
D. Richardson
R. Lewis
E. Davis

CHANGE ORDER #1

HOKE INCORPORATED

1 TENAKILL PARK
CRESSKILL, NEW JERSEY 07626 (201) 568 - 9100

SUBMIT INVOICES IN TRIPLICATE TO ABOVE ADDRESS
ATTN: ACCTS. PAYABLE

PURCHASE ORDER 38235

Order Date	Page	Vendor Code	Suffix "X" indicate No Overshipments permitted.
2/5/91	1 or 2		☐

Certificate of compliance ☐ with req. specifications & drawings req. in dup.	Account Class	Job No.
	510037	

Requisitioned By	Notify on Receipt
E. Davis	

TO
Arcos Corporation
1 Arcos Drive
Mt. Carmel, Pa. 17851

SHIP TO
HOKE INC.

Terms	F.O.B.	Ship Via	Date Promised	☐ NOT FOR RESALE	☐ FOR RESALE ☐ FOR MFG. ☐ FOR R&D } EXEMPT REG. NO.
Net	Shipping Pt.	Best Way			

Delivery Not Sooner Than	Not Later Than	☐ CONFIRMING ORDER OF ____ Date	PER YOUR QUOTATION OF ____

ITEM NO.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT
			CHANGE THE DESCRIPTION ON P.O. 38235 FROM:		
1	2	Spls	STAINLESS STEEL WIRE, 316L ALLOY .045 DIA., ON 12" SPOOL, 25 Lbs., per spool *Certification required for Actual Wire Chemical Analysis (each Heat) in accordance with ASME SECTION II CLASS I, SFA 5.9 NB 2400, Including Delta Ferrite Determination and 1986 Edition, Thru 1988 Addenda. *Manufacturer Certified Material Test report must indicate Material Manufacturers Quality System Certificate Number and Expiration Date. TO: STAINLESS STEEL BARE WIRE, 316L ALLOY .045 Diameter on 12 inch Spools, 25 pounds per spool. 1. Filler Metal to be supplied, Certified in accordance with ASME Section II Class I, SFA 5.9, NB 2400 1986 Edition through 1988 Addenda. Including Delta Ferrite Determination. Certification required for Actual Wire Chemical Analysis (each heat) supplied.	$6.38 Tst Chg	$319.00 75.00 $394.00

EXPEDITING REGISTER

Purchase Order No. Must Appear On All Invoices, Delivery Slips, Cases, Packages, Certification, etc.

INFORMATION RECEIVED

CONDITIONS

1) All orders to be effective must bear authorized signature.
2) No higher prices than indicated herein can be invoiced without our written authorization.
3) Invoices rendered must certify that you are complying with all applicable provisions of Government price and labor regulations.
4) Additional terms and conditions are listed on the back of this order.
5) Acknowledgement must be returned by _____

VENDOR'S SIGNATURE: _____ REFER INQUIRIES TO: _____

DATE: _____ AUTHORIZED SIGNATURE: _____

HOKE INCORPORATED

1 TENAKILL PARK
CRESSKILL, NEW JERSEY 07626 (201) 568 - 9100

CHANGE ORDER #1

PURCHASE ORDER 38235

Order Date	Page	Vendor Code	Suffix "X" indicate No Overshipments permitted. ☐
2/5/91	2 of 2		

Certificate of compliance ☐ with req. specifications & drawings req. in dup.	Account Class	Job No.
	510037	

Requisitioned By	Notify on Receipt

SUBMIT INVOICES IN TRIPLICATE TO ABOVE ADDRESS
ATTN: ACCTS. PAYABLE

TO
ARCOS CORPORATION
1 ARCOS DRIVE
MT. CARMEL, PA. 17851

SHIP TO
HOKE INC.

Terms	F.O.B.	Ship Via	Date Promised	☐ NOT FOR RESALE	☐ FOR RESALE ☐ FOR MFG. ☐ FOR R&D — EXEMPT REG. NO
Net	Shipping Pt.	Best Way			

Delivery: Not Sooner Than ____ Not Later Than ____ ☐ CONFIRMING ORDER OF ____ Date ____ PER YOUR QUOTATION OF ____

ITEM NO.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT
			2. Lot Classification Per Schedule F, of Talbe 1, Section 6 of SFA-5.01. 3. The level of testing per section 6.2, from Table, Section 6 of SFA-5.01. *Manufacturer's Certified Material Test report must indicate Material Manufacturers' Quality System Certificate Number and Expiration Date. APPROVED BY QUALITY CONTROL DEPT. DATE 2/6/91		

EXPEDITING REGISTER

Purchase Order No. Must Appear On All Invoices, Delivery Slips, Cases, Packages, Certification, etc.

CONDITIONS

1) All orders to be effective must bear authorized signature.
2) No higher prices than indicated herein can be invoiced without our written authorization.
3) Invoices rendered must certify that you are complying with all applicable provisions of Government price and labor regulations.
4) Additional terms and conditions are listed on the back of this order.
5) Acknowledgement must be returned by ____

INFORMATION RECEIVED

VENDOR'S SIGNATURE: ____ REFER INQUIRIES TO: Frank Johnson

DATE: ____ AUTHORIZED SIGNATURE: ____

STONE & WEBSTER ENGINEERING CORPORATION
P. O. BOX 2325, BOSTON, MASSACHUSETTS 02107

DATE March 20, 1986
J O NO 12241
P O NO 2BV- 679
LTR NO
REF

VIA

TO HOKE INC.
ATTN: MR. R. F. JOHNSON
ONE TENAKILL PARK
CRESSKILL, NJ 07626

DEAR SIRS:

THE FOLLOWING ARE [X] ATTACHED [ ] SENT SEPARATELY

— COPIES 1 PRINTS — REPRODUCIBLES — MICROFILM APERTURE CARDS EACH OF
[X] DRAWINGS [ ] SPECIFICATIONS
[ ] DOCUMENTS [ ] NOTES OF CONFERENCE

STATUS			PLEASE NOTE		SENT FOR YOUR	
[ ] FINAL	[X] APPROVED		[ ] REVISIONS	[ ] OMISSIONS	[ ] APPROVAL	[ ] COMMENT
[ ] PRELIMINARY	[ ] APPROVED AS REVISED	AS DEFINED IN SPECIFICATION	[ ] ADDITIONS	[ ] CORRECTIONS	[X] USE	[X] INFORMATION
[ ] NO COMMENT	[ ] UNACCEPTABLE		[ ] COMMENTS	[ ]	[X] FILES	[ ] CONCURRENCE
[ ] SUGGESTIONS AS NOTED	[ ]				[ ]	

YOUR ATTENTION IS DIRECTED TO THE FOLLOWING:

RELEASED FOR [ ] FABRICATION [ ] PURCHASE OF NECESSARY MATERIALS

[ ] PLEASE REVISE AND SUBMIT _____ PRINTS _____ REPRODUCIBLES _____ MICROFILM APERTURE CARDS
[ ] PLEASE SUBMIT _____ PRINTS _____ REPRODUCIBLES _____ MICROFILM APERTURE CARDS OF [ ] DOCUMENTS [ ] DRAWINGS [ ] SHOP DETAIL
[ ] PLEASE RETURN ONE COPY EACH OF THIS MATERIAL BEARING YOUR APPROVAL OR COMMENTS
[ ] PLEASE ACKNOWLEDGE RECEIPT OF THIS MATERIAL BY SIGNING AND RETURNING THE ENCLOSED COPY OF THIS FORM
[ ] WE TRUST THAT THESE NOTES ARE IN ACCORDANCE WITH YOUR UNDERSTANDING. IF NOT, PLEASE ADVISE US

IMPORTANT SHOULD ANY REVISION TO DOCUMENTS OR DRAWINGS RETURNED HEREWITH INVOLVE A PRICE INCREASE, THE SUPPLIER MUST NOTIFY STONE & WEBSTER PURCHASING DEPARTMENT WITHIN TEN (10) DAYS EVEN THOUGH A DEFINITE ESTIMATE CANNOT BE GIVEN AT THE TIME, OTHERWISE THE PURCHASER WILL CONSIDER THE REVISIONS MADE WITHOUT COST

BEAVER VALLEY POWER STATION - UNIT NO. 2
J.O. NO. 12241 - O.F.E. NO. 10080 - C.O. NO. 6289
MANUFACTURER'S DRAWINGS

MFG. DWG. NO.	MFG. TITLE	SWEC FILE NO.	STATUS
N9303Q8Y37 REV. C	Bellows Sealed Instrument Valves	2007.650-679-181G	APP

G O Bellows for T.M.J.

T. M. Jacob
Lead Control Engineer

RECEIVED
MAR 31 1986
NUCLEAR

Copies to:
JAKline(dup)
JJBaumler-3
AMMoody-2 (enc & dup) APP ONLY
RFJohnson-2 (enc)

STONE & WEBSTER ENGINEERING CORPORATI
P. O. BOX 2325, BOSTON, MASSACHUSETTS 02107

DATE June 19, 1984
J. O. NO. 12241
P. O. NO. 2BV-679
LTR. NO.
REF.

VIA

TO Hoke Incorporated
Attn: RFJohnson
One Tenakill Park Rd.
Cresskill, NJ 07626

DEAR SIRS:

THE FOLLOWING ARE ☒ ATTACHED ☐ SENT SEPARATELY

2 COPIES ___ PRINTS ___ REPRODUCIBLES ___ MICROFILM APERTURE CA
EACH OF
☐ DRAWINGS ☐ SPECIFICATIONS
☒ DOCUMENTS ☐ NOTES OF CONFERENCE

STATUS			PLEASE NOTE		SENT FOR YOUR	
☐ FINAL	☒ APPROVED		☐ REVISIONS	☐ OMISSIONS	☐ APPROVAL	☐ COMMENT
☐ PRELIMINARY	☐ APPROVED AS REVISED	AS DEFINED IN SPECIFICATION	☐ ADDITIONS	☐ CORRECTIONS	☐ USE	☐ IN. RMATION
☐ NO COMMENT	☐ UNACCEPTABLE		☐ COMMENTS	☐	☐ FILES	☐ CON RRENC
☐ SUGGESTIONS AS NOTED	☐				☐	

YOUR ATTENTION IS DIRECTED TO THE FOLLOWING:

RELEASED FOR ☐ FABRICATION ☐ PURCHASE OF NECESSARY MATERIALS

☐ PLEASE REVISE AND SUBMIT

☐ PLEASE SUBMIT _____ PRINTS _____ REPRODUCIBLES _____ MICROFILM APERTURE CARDS OF ☐ DOCUMENTS ☐ DRAWINGS ☐ SHOP DET

☐ PLEASE RETURN ONE COPY EACH OF THIS MATERIAL BEARING YOUR APPROVAL OR COMMENTS

☐ PLEASE ACKNOWLEDGE RECEIPT OF THIS MATERIAL BY SIGNING AND RETURNING THE ENCLOSED COPY OF THIS FORM

☐ WE TRUST THAT THESE NOTES ARE IN ACCORDANCE WITH YOUR UNDERSTANDING. IF NOT, PLEASE ADVISE US

IMPORTANT SHOULD ANY REVISION TO DOCUMENTS OR DRAWINGS RETURNED HEREWITH INVOLVE A PRICE INCREASE, THE SUPPLIER MUST NOTIFY STO WEBSTER PURCHASING DEPARTMENT WITHIN TEN (10) DAYS EVEN THOUGH A DEFINITE ESTIMATE CANNOT BE GIVEN AT THE TIME. OTHERWISE PURCHASER WILL CONSIDER THE REVISIONS MADE WITHOUT COST.

BEAVER VALLEY POWER STATION - UNIT NO. 2
J.O.NO. 12241 - O.F.E.NO. 10080 - C.O.NO. 6289
PROCEDURES, TEST REPORTS, AND CERTIFICATIONS

DOCUMENT NO.	TITLE	SWEC FILE NO.
HWS-N1, Rev H, w/Apdx B, Rev A, and Hoke Ltr dtd 5/16/84	Weld Procedure	2607.650-679-259E

Hoke's above listed procedure is approved for use on Spec 2BVS-679.

GP Bellomo for JFH
JFHarkins
Lead Controls Engineer

Copies to:
RFJohnson-2(2enc)
FACavalier-1
DWDenning-3
RJWashabaugh-1

RECEIVED
JUN 21 1984
NUCLEAR

▲029.50

PRECISION VALVES & TUBE FITTINGS

HOKE

HOKE INCORPORATED

899 SIMUEL ROAD • POST OFFICE BOX 4866
SPARTANBURG, SOUTH CAROLINA 29305
TELEPHONE: (803) 574-7966

TO: Carolyn Dorton

DATE: January 11, 1991

FROM: Ron Lewis

SUBJ: Special Requirement for the Purchase of Acetone

All Purchase Orders generated for Acetone or reclaimation of Acetone must specify that material supplied/reclaimed does not contain Halogens. A signed certificate of conformance must be supplied by the vendor for each lot of new or reclaimed Acetone. This certification should be marked to the attention of the Spartanburg Q.A. Manager.

Please mark your Purchasing Records, making this a requirement on all future orders. This must be done in order to bring us into compliance with Nuclear requirements.

Ron Lewis
Ron Lewis

REL/rjo

cc: B. Taylor

HOKE INCORPORATED

1 TENAKILL PARK
CRESSKILL, NEW JERSEY 07626 (201) 568 - 9100

SUBMIT INVOICES IN TRIPLICATE TO ABOVE ADDRESS
ATTN: ACCTS. PAYABLE

PURCHASE ORDER

Order Date	Page	Vendor Code	Suffix "X" Indicates No Overshipments permitted.
1/14/91	Of		☐

Certificate of compliance ☐ with req. specifications & drawings req. in dup.	Account Class	Job No.
	022510034	

Requisitioned By	Notify on Receipt
Barry Gilmer	Barry Gilmer

TO SouthChem
297 Tucapau Rd.
Duncan, SC 29334

SHIP TO Hoke, Inc.
899 Simuel Road
Spartanburg, SC 29303

Terms	F.O.B.	Ship Via	Date Promised	☐ NOT FOR RESALE	☐ FOR RESALE ☐ FOR MFG. ☐ FOR R&D } EXEMPT REG. NO.
Net 30		Their Trk			

Delivery Not Sooner Than ____ Not Later Than ____

☐ CONFIRMING ORDER OF 1/11/91 Date

PER YOUR QUOTATION OF ____

ITEM NO.	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT
1	2	dr.	55-gal Acetone (363#)	.38/#	275.88

Please furnish MSDA Sheets also statement - Free of Halogen

Confirming

Complete

Please include packing slip with order.

EXPEDITING REGISTER

Purchase Order No. Must Appear On All Invoices, Delivery Slips, Cases, Packages, Certification, etc.

CONDITIONS

1. All orders to be effective must bear authorized signature.
2. No higher prices than indicated herein can be invoiced without our written authorization.
3. Invoices rendered must certify that you are complying with all applicable provisions of Government price and labor regulations.

Additional terms and conditions are listed on the back of this order.

Acknowledgement must be returned by ____

INFORMATION RECEIVED

VENDOR'S SIGNATURE: ____

DATE ____

REFER INQUIRIES TO: Carolyn Dorton

AUTHORIZED SIGNATURE Bryan Hinton

PURCHASING

COMPANY CONFIDENTIAL

Individual Performance Record

Name: Shirley M. Lewis Employ. No.: 10764

Dept.: Assembly - Test Stamp No.

Assigned Qualification: TESTING Level II

	Date Review	Date Review 4/90	Date Review	Date Review	Date Review	Date Review
	Rating	Rating	Rating	Rating	Rating	Rating
1. Work Habits	5	5				
2. Quality of Work	5	5				
3. Work Interest	5	5				
4. Relationship with People	4	4				
5. Compliance with Procedures	5	5				
6. Acceptance Std. Knowledge	5	5				
7. Records maintenance	5	5				
8. Maintenance & use of Gages & Instruments	5	5				
9. Use of Inspection Stamps/Signature & Dates	4	5				
10. Resourcefullness	4	5				
11. Results of Annual Vision Test	5	5				
12. Training attendance	5	5				
13. Maint. of Qual. Status	5	5				
14. Promptability	4	4				
Total	66	66				
Level Certified To/By	I Pdm	Qw				

Rating	Points	Total
Excellent	5	57-70
Good (Req'd for Qual. Status)	3-4	43-56
Fair (Training Req'd/Downgrade)	1-3	14-42
Unsatisfactory (Subject to release)	0	0-13

Individual Performance Record

Name: Joel Bolton

Employ. No.: 565-740

Dept.: Q.C. Dept.

Stamp No. #34

Assigned Qualification:

	Date Review 7-19-89 Rating	Date Review 9/92 Rating	Date Review Rating	Date Review Rating	Date Review Rating	Date Review Rating
1. Work Habits	5	5				
2. Quality of Work	5	5				
3. Work Interest	5	5				
4. Relationship with People	5	5				
5. Compliance with Procedures	5	5				
6. Acceptance Std. Knowledge	5	5				
7. Records maintenance	5	5				
8. Maintenance & use of Gages & Instruments	5	5				
9. Use of Inspection Stamps/Signature & Dates	5	5				
10. Resourcefullness	5	5				
11. Results of Annual Vision Test	5	5				
12. Training attendance	5	5				
13. Maint. of Qual. Status	5	5				
14. Promotability	5	5				
Total	70	70				
Level Certified To/By	II /SC	II /SC				

Rating	Points	Total
Excellent	5	57-70
Good (Req'd for Qual. Status)	3-4	43-56
Fair (Training Req'd/Downgrade)	1-3	14-42
Unsatisfactory (Subject to removal)	0	0-13

Name: Steve Kniak Employ. No.: 10-515

Dept.: Assembly Lead/Test Stamp No.

Assigned Qualification: TESTING Level II

	Date Review 7/12/89 Rating	Date Review 9/90 Rating	Date Review Rating	Date Review Rating	Date Review Rating	Date Review Rating
1. Work Habits	5	5				
2. Quality of Work	5	5				
3. Work Interest	5	5				
4. Relationship with People	5	5				
5. Compliance with Procedures	5	5				
6. Acceptance Std. Knowledge	5	5				
7. Records maintenance	5	5				
8. Maintenance & use of Gages & Instruments	5	5				
9. Use of Inspection Stamps/Signature & Dates	5	5				
10. Resourcefullness	4	4				
11. Results of Annual Vision Test	5	5				
12. Training attendance	5	5				
13. Maint. of Qual. Status	5	5				
14. Promotability	4	4				
Total	68	68				
Level Certified To/By		BP GN				

Rating	Points	Total
Excellent	5	57-70
Good (Req'd for Qual. Status)	3-4	43-56
Fair (Training Req'd/Downgrade)	1-3	14-42
Unsatisfactory (Subject to release)	0	0-13

HOKE AUDIT CHECKLIST

SECTION: 6.0 Quality Control-Spart. Auditor: _____ Audit No. _____

6.2 Personnal Qualif. & Trng. Lead Auditor: _____ Date: _____

☐ Cresskill ☐ Spartanburg ☐ Other Contacts: _____ Page _____ of _____

C	G	F	V	QUALITY ELEMENT	YES	NO	N/A	OBJECTIVE EVIDENCE	REMARKS
				11.7 Verify that the individual who evaluates the helium leak test is a Level II or Level III inspector with a current certification					

HOKE AUDIT CHECKLIST

SECTION: 6.0 Quality Control-Spart. Auditor: _____ Audit No. _____

6.2 Personnal Qualif & Trng Lead Auditor: _____ Date: _____

☐ Cresskill ☐ Spartanburg ☐ Other Contacts: _____ Page _____ of _____

C	G	F	V	QUALITY ELEMENT	YES	NO	N/A	OBJECTIVE EVIDENCE	REMARKS
				10.2 Verify that the person responsible for product (piece part) inspection is qualified to perform that inspection. Check inspectors names from a recent (nuclear)order and verify that the inspection people involved were properly qualified					
				2.6 Is there a documented Qualification/Certification Program?					
				2.6.2 Verify that all personnel performing these functions are certified.					
				2.6.3 Select at random three employees performing three different functional skills such as welding, inspection, test, etc., and verify that their records are complete as to: -Name -Job title -Activities for which certified -Basis for certification -Results of re-eveluation -Signature of authorized certifier -Dates of certification and expiration					

HOKE AUDIT CHECKLIST

SECTION: 4.0 Quality Control-Cresskill
4.4 Other

☐ Cresskill ☐ Spartanburg ☐ Other

Auditor: _____ Audit No. _____
Lead Auditor: _____ Date: _____
Contacts: _____ Page _____ of _____

C	G	F	V	QUALITY ELEMENT	YES	NO	N/A	OBJECTIVE EVIDENCE	REMARKS
				5.5 That current copies of NQA-1, and sections II, III, V, XI plus addenda are available in QA Cresskill, QA Spartanburg, and Engineering					
				8.5 Verify that age controlled items are inspected every three months and that end-of-life material is removed for disposition					
				10.1 Verify that the person responsible for product inspections do not report to the department performing the work					
				12.5 Verify that personal gages are not used for acceptance					
				12.8 Review any NCRs written since the last audit and determine whether the corrective action was reasonable and timely					

HOKE AUDIT CHECKLIST

SECTION: 4.0 Quality Control-Cresskill
4.3 Personnal Qualif. & Trng.

☐ Cresskill ☐ Spartanburg ☐ Other

Auditor: _____ Audit No. _____

Lead Auditor: _____ Date: _____

Contacts: _____ Page _____ of _____

C	G	F	V	QUALITY ELEMENT	YES	NO	N/A	OBJECTIVE EVIDENCE	REMARKS
				10.2 Verify that the person responsible for product (piece part) inspection is qualified to perform that inspection. Check inspectors names from a recent (nuclear)order and verify that the inspection people involved were properly qualified					
				2.6 Is there a documented Qualification/Certification Program?					
				2.6.2 Verify that all personnel performing these functions are certified.					
				2.6.3 Select at random three employees performing three different functional skills such as welding, inspection, test, etc., and verify that their records are complete as to: -Name -Job title -Activities for which certified -Basis for certification -Results of re-eveluation -Signature of authorized certifier -Dates of certification and expiration					

MWO 2 19 4 3

TRAINING LOG

HOKE

SUBJECT: Reporting of Nonconformances

INSTRUCTOR: Ron Lewis

DATE: 10/4/90

TIME STARTED: 10:00 AM

TIME ENDED: 10:30 AM

NAME	SIGNATURE	TITLE
Jeanette Cantrell	Jeanette Cantrell	Q.C. Inspector
Nancy Hildebrand	Nancy C Hildebrand	Q.C. Inspector
Christeen Littlejohn	Christeen Littlejohn	Q.C. Inspector
Kathy Layton	Kathy D. Layton	1st Piece Inspector
Connie Burrell	Connie Burrell	Assembly Operator - Cleaning
Shirley Lewis	Shirley Lewis	Assembly Operator/P.C. Inspector
Josephine Lindsey	Josephine Lindsey	Assembly Operator/Tester
Peggy Crump	Peggy Crump	Assembly Operator
Barbara Rogers	Barbara Rogers	Assembly Operator
Joel Bolton	Joel E Bolton	Q.C. Lead Inspector
Michael Easton	Michael L Easton	Helium Leak Test Operator
Steve Kinch	Steve Kinch	Helium Leak Test Operator
David Howitt	David B Howitt	Welder
Kathy Shockley	Kathy Shockley	Weld Lead Person
Jesse Byrd	Jesse Byrd	Assembly Set Up
Gerald Moffatt	Gerald G Moffatt	Q.C. Inspector - Gauging
Patty Gentry	Patty Gentry	Assembly Set Up
Barry Gilmore	Barry D Gilmore	Assembly Manager
Richard Gardner	Richard Gardner	Q.C. Inspector

INSTRUCTOR COMMENTS: Classroom instruction in OSHA 21, 1989, Energy Reorganization Act of 1974 & HOI-147. Uncontrolled copies supplied to attendees

HOKE AUDIT CHECKLIST

SECTION:

Auditor: _____ Audit No. _____

Lead Auditor: _____ Date: _____

☐ Cresskill ☐ Spartanburg ☐ Other Contacts: _____ Page _____ of _____

C	G	F	V	QUALITY ELEMENT	YES	NO	N/A	OBJECTIVE EVIDENCE	REMARKS
				1. Is there evidence that HQI-147 has been used when "Use As Is" disposition has been made?					
				2. Are container's on "Use As Is" dispositioned items identified with MRB disposition marking?					

HOKE INCORPORATED CRESSKILL, NEW JERSEY

NUCLEAR SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE ☒ SPEC.CHANGE | SRA No. 1705 | SHEET 1 OF 2

REQUEST (INCLUDE REASON) Revise HPT-N145, Liquid Penetrant Examination Procedure, Rev. T, to comply with ASME audit recommendations and to update per latest (1986 Edition with Addenda through 1988) ASME Code requirements.

☐ ONLY PARTS CONFORMING TO THE NEW REVISION MAY BE USED
☐ REWORK ☐ SCRAP PRESENT STOCK AND IN PROCESS.
☒ MANUFACTURE TO THE NEW REVISION MAY BE DEFERRED TO NEXT MANUFACTURED LOT.
☐ REVISION DOES NOT EFFECT STOCK OR MANUFACTURING.
☐ RELEASED FOR PRODUCTION.

SPECIAL INSTRUCTIONS:

Revise HPT-N145, Rev. T, as follows:

1. Add Rev. U to document number at bottom of each page and add revision bars in margin where required. Eliminate page numbers 1A and 1B, 2A (info. now on pages 2,3 and 5)-renumber all pages accordingly.
2. Page 1- Change spec title from "Liquid Penetrant Examination Procedure to ASME Section III" to "Liquid Penetrant Examination Procedure (Visible Dye, Solvent-Removable Method) in Accordance with ASME Code Sections III and V);" eliminate rev. letter in top right corner and typist's initials "jk" in lower left hand corner.
3. Add SRA numbers to previous changes Rev. M, N and P. Rev. M change on Pg. 2 changed from pencil to type.
4. Para. 2.3- Change edition of SNT-TC-1A from "1980" to "1984."
5. Para. 3.1- Revise and expand material testing requirements per latest ASME Code Section V Article 6 (now Paras.3.1 and 3.1.1-3.1.3). Reword sentence concerning customer requirements.
6. Para. 3.2- Change "Uresco/Ardrox" to "Ardrox (formerly Uresco Ardrox)."
7. Para. 4.0- Add "dry and."
8. Para. 5.1- Add acetone "(per Spec. O-A-51)" and new note regarding acetone halogen and sulphur content.
9. Para. 6.2- Add "If bleed-out does not alter the inspection results, development periods of over 30 minutes are permitted."
10. Para. 7.0- Change "alconex or equivalent detergent" to "TritonX or Igepal (or equivalent detergent containing non-ionic wetting agents)."

*Uncontrolled copy

DISTRIBUTION

TO	QTY ECN	QTY ASSY	QTY DET.	SIGN	DATE
MFG. ENGR.	1			TPP	4/7/89
INV. CONTROL					
QUALITY CONTROL	1	1+		RVP	4/13/89
PURCHASING					
ASSEMBLY	1			JK	4/24/89
MILITARY SALES					
COST DEPT.					
DRAFTING Orig.		1+		MBP	4/10/89
PROJ. ENGR.	1			WSJ	4/12/89
CHIEF ENGR.					
MARKETING					
SAFETY FILE					
PROD. CONTROL					
ECN COORDINATOR					
MASTER SCHEDULER					
C.C. Spart					
F. Tucker	1			FT	4/28/89
R. Johnson	1			RDJ	4/27/89
TOTAL	6	5			

DWG RELEASE DATE	EST.	ACT.

PREPARED BY W. S. Jack DATE 2/22/89
REQUESTED BY W. S. Jack DATE 7/21/88
CHANGED BY W. S. Jack DATE 2/21/89
CHECKED BY RDJ DATE 2/28/89

See Sheet 2 of 2 for Level III N.D.E. Inspector review and approval.

AUTHORIZATION

PROJ. ENG. W. S. Jack DATE 2/23/89
CONF. ENG. [signature] DATE 2/1/89
QUAL. CONT. [signature] DATE 3/7/89
N.O.A. R. Johnson DATE 2/28/89
A.N.I. [signature] Date 4/5/89
MFG. ENGR. [signature] DATE 4/07/89

HOKE INCORPORATED CRESSKILL, NEW JERSEY

NUCLEAR

SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE ☒ SPEC. CHANGE

SRA No. 1705 SHEET 2 OF 2

REQUEST (INCLUDE REASON)

Revise HPT-N145, Liquid Penetrant Examination Procedure, Rev. T.

Continued:

11. Para. 8.3- Change "unacceptable mechanical discontinuities" to "imperfections." Also see item #17.
12. Para. 9.1- Change wording, add "appendices", add note to refer to the Nuclear Traveler for inspection requirements.
13. Para. 10.1 and Form- include latest Liquid Penetrant Test Report form (Form LPTR).
14. Made minor punctuation, spelling, grammatical corrections to Paras. 2.2, 2.3, 3.2, 4.0, 4.1.1, 5.1, 5.2, 5.3, 5.3.1, 5.3.2, 5.4, 6.1, 7.0, 8.1, 9.1.1, 9.1.1c and d, 9.1.2c and d1, 9.1.3a, 9.1.4 and 9.1.4a, 10.1, 1.0, 2.1.
15. Para. 6.1-at beginning of third sentence, add "Since the true size and type of discontinuities are difficult to evaluate if the penetrant diffuses excessively into the developer,"
16. Para. 8.1-change "localized surface imperfections" to "localized surface discontinuities,"
17. Para. 8.3-in last sentence, add "equal to or."

To be Rev. U

☐ ONLY PARTS CONFORMING TO THE NEW REVISION MAY BE USED
☐ REWORK ☐ SCRAP PRESENT STOCK AND IN PROCESS.
☒ MANUFACTURE TO THE NEW REVISION MAY BE DEFERRED TO NEXT MANUFACTURED LOT.
☐ REVISION DOES NOT EFFECT STOCK OR MANUFACTURING
☐ RELEASED FOR PRODUCTION

SPECIAL INSTRUCTIONS:

DISTRIBUTION

TO	QTY ECN	QTY ASSY	QTY DET.	SIGN	DATE
MFG. ENGR.	1				
INV. CONTROL					
QUALITY CONTROL	1	1+			
PURCHASING					
ASSEMBLY	1				
MILITARY SALES					
COST DEPT.					
DRAFTING Orig.		4+			
PROJ. ENGR.					
CHIEF ENGR.					
MARKETING					
SAFETY FILE					
PROD. CONTROL					
ECN COORDINATOR					
MASTER SCHEDULER					
D.C. Spart-					
F. Tucker	1				
R. Johnson	1				
TOTAL	6	5			
DWG RELEASE DATE	EST.			ACT.	

+Uncontrolled copy

PREPARED BY W. S. Tucker DATE 2/22/89
REQUESTED BY W. S. Tucker DATE 2/22/89
CHANGED BY W. S. Tucker DATE 2/22/89
CHECKED BY [illegible] DATE 2/28/89

Revision has been reviewed and approved by Level III N.D.E. Inspector.

Level III Inspector — Date 2-28-89

AUTHORIZATION

PROJ. ENG W. S. Tucker DATE 2/23/89
CONF. ENG [illegible] DATE 3/1/89
QUAL. CONT. [illegible] DATE 3/7/89
N.O.A. R. Johnson DATE 2/28/89
A.N.I. [illegible] DATE 3/5/89
MFG. ENG. [illegible] DATE 3/2/89

SPARTANBURG, S.C.
CRESSKILL, NEW JERSEY
OKE INCORPORATED

SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE | ☒ SPEC. CHANGE | SRA No. 2021 | SHEET 1 OF 1

REQUEST (INCLUDE REASON):

HPS-85 (to be Rev. J)

Add rinse water test requirements per NRC audit finding and recommendation.

ACTION TAKEN (ADD ADDITIONAL SHEETS AS NEEDED):

PAGE 3:

Para 2.1: Certron, add "X100". For Igepal, add "CO-630".

Para 2.2: Delete "Potable Water meeting reqts of Public Health Service Drinking water stds" & insert "Tap water" Delete "max chloride content-25ppm max. electrical conductivity-400 micromhos/cc, pH 6.0 to 8.0"

PAGE 4:

Para 2.3: Under 1st column, add "or demineralized water"

Under 2nd column, change "pH 6.0 to pH 5.5". Add "(See para 7.4 for test reqts)"

Para 2.4: Under 2nd column, add "(Must be certified halogen free)"

Para 3.1: Delete all after middle of 1st line, and insert "in accordance with HPS-58 or HPS-138, depending upon the material"

PAGE 5: Delete subparagraphs 3.1.2 & 3.1.5

PAGE 6:

Add para 7.4- and 7.4.1 requiring testing of Grade 'B' water & referencing methods

PAGE 7:

At end, add "At Spartanburg, the ultrasonic cleaner may be used"

PAGE 7: PARA 7.1

Rewrite. Add alternate method of cleaning in acetone in containers and agitating and/or sonicating.

PAGE 8:

Para 7.3: Delete last 2 lines & insert "shall be replaced with distilled or ionized water and the parts shall be recleaned"

☐ ONLY PARTS CONFORMING TO THE NEW REVISION MAY BE USED.
☐ REWORK ☐ SCRAP PRESENT STOCK AND IN PROCESS.
☐ MANUFACTURE TO THE NEW REVISION MAY BE DEFERRED TO THE NEXT MANUFACTURED LOT.
☒ REVISION DOES NOT AFFECT STOCK OR MANUFACTURING.
☐ RELEASED FOR PRODUCTION

SPECIAL INSTRUCTIONS:

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DISTRIBUTION

TO	QTY SRA	QTY SPEC.	SIGN	DATE
MFG. ENGR.	1	1*		10/19
QC-CRESSKILL				
QC-SPARTANBURG	1	1*		10/24
ASSY. DEPT.	1	4*		10/20
GOVT. SALES				
PURCHASING				
DRAFTING	ORIG	5	DMAP	10/19/90
PROJ. ENGR.	1			10/19/90
DIR. OF ENGR.	1			10/19
MARKETING				
P&IC-CRESSKILL				
P&IC-SPART.				
N.O.A.	1			10/19/90
PROD. SUPT.				
WELDING ENGR.				
WELDING DEPT.				
LAB	1	1*		10/19/90
TOTAL	7	13		

PREPARED BY ... DATE 10-16-90
REQUESTED BY ... DATE 10-15-90
CHANGED BY ... DATE 10-17-90
CHECKED BY ... DATE 10-17-90

AUTHORIZATION

PROJ. ENG. ... DATE 10-17-90
DIR. OF ENGR. ... DATE 10-17-90
QC (CRESSKILL) ... DATE 10/19/90
MFG. ENGR. ... DATE 10/19/90

Form E 109.4.5/83 (Ref. Procedure HQS 158)

CLEANING FOR NUCLEAR SERVICE

(OF OXYGEN APPLICATIONS)

HOKE INCORPORATED

CRESSKILL, NEW JERSEY

DATE January 9, 1974

PREPARED - Kevin T. Olsen
PROJECT ENGINEER

APPROVED - [illegible]
Q. C. Manager

APPROVED - James Carlson
Nuclear Order Administrator

APPROVED - George Hewitt
Assembly Foreman

APPROVED - M. T. Hoke
DIRECTOR OF ENGINEERING

CHANGE LETTER	DATE	APP'D	PAGES AFFECTED	REMARKS
A	6/10/74	[illegible]	6	Revised drying Procedure
				Ref HEDL DTRF V0012 (SRA103)
B	7/6/77	[illegible]	3	Par. 3.1 "Machining"
				changed to "Welding" (SRA3[illegible])
C	8/9/77	[illegible]	3	Para. 3.1 (SRA371)
D	8/26/77	[illegible]	3,4	Added Para 2.6 Revised
				para 3.1 and 3.3 Ref.
				A.I. Par HO-015 (SPA384)
E	10-12-77	[illegible]	5,6&9	Customer Request SRA 395
F	10-16-78	[illegible]	6, 7, & 8	See SRA-573

(See Page 2)

Change Letter	Date	App'd	Pages Affected	Remarks
G	9/4/79	[illegible]	6,8,9	Para. 6.2.3, 7.3, 8.1 revised to clarify (SRA702)
H	6/27/88	[illegible]	All	Update (See SRA 1683)
J	10/17/90	[illegible]	3,4,5,6, 7,9	See SRA# 2021

CLEANING FOR NUCLEAR SERVICE

(OR OXYGEN APPLICATIONS)

1.0 APPLICATIONS

1.1 General

This specification covers the removal of oil and grease and other soil from parts during fabrication and assembly for use in nuclear applications or oxygen service. Degreasing agents used in accordance with this specification will not contain HALOGENS (F, Cl, Br, I, At).

1.2 Specific

1.2.1 Any metal part may be cleaned in this manner. (See CAUTION note following para. 4.2)

1.2.2 Assemblies with non-metallic portions and non-metallic parts should be cleaned with detergent solution only after original cleaning to HPS-2.

1.2.3 This cleaning procedure may also be used for products which will be mass spectrometer leak tested.

2.0 MATERIALS

2.1 Detergent (Containing non-ionic wetting agents) Triton X100, Igepa CO-630, or equivalent.

2.2 Grade 'C' Water

Tap Water.

2.3	Grade 'B' Water (Wonder Water, by Allied Distilled Water Co., or equivalent) or demineralized water.	Max. chloride content - 1.0 ppm, max. electrical conductivity - 20 micromhos/cc. pH 5.5 to 8.0. See paragraph 7.4 for test requirements).
2.4	Acetone (CH_3COCH_3)	Federal Spec. O-A-51 Technical Grade (Must be certified halogen free)
2.5	Denatured Alcohol (CH_3CH_2OH)	Federal Spec. O-E-760, TypeIII
2.6	Machining Lubricants	Max sulfur & chloride content, 5000ppm

3.0 PRECAUTIONS

The following precautions shall be taken during machining, fabrication, and assembly operations.

3.1 Stainless Steels

All austenitic (300 Series) stainless steel bar and forgings shall be purchased in the solution annealed condition. If passivation is specified for a forging, it shall be done after machining. Passivation shall not be done on components that have been stellited, welded or weld repaired.

When specified on the detail drawing, passivation shall be performed in accordance with HPS-58 or HPS-138 depending upon the material.

2.3	Grade 'B' Water (Wonder Water, by Allied Distilled Water Co., or equivalent) or demineralized water.	Max. chloride content - 1.0 ppm, max. electrical conductivity - 20 micromhos/cc. pH 5.5 to 8.0. See paragraph 7.4 for test requirements).
2.4	Acetone (CH_3COCH_3)	Federal Spec. O-A-51 Technical Grade (Must be certified halogen free)
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When specified on the detail drawing, passivation shall be performed in accordance with HPS-58 or HPS-138 depending upon the material.

3.2 Exposure to Contaminated Atmospheres

Metals and components shall be protected from the general shop atmosphere, or other contaminated atmospheres, insofar as possible during fabrication and temporary storage. Bodies, bonnet assemblies, and other wetted components shall be boxed or covered during storage.

3.3 Use of Lubricants

A lubricant may be employed during machining operations provided that the lubricant is removed immediately after completion of each operation for which it is used by the methods of HPS-1.
Lubricants used shall not contain more than 5000ppm of sulfur or chloride.

3.4 Mercury Control

During the manufacturing processes, tests, and inspections, the components or assemblies shall not come in direct contact with mercury or any of its compounds.

3.5 Exclusion of Foreign Materials

Extreme care shall be taken during fabrication to prevent contamination by foreign materials. Temporary polyethylene plugs or seals shall be installed to keep contaminants out of a clean part during subsequent fabrication and storage.

3.6 Aluminum

Aluminum shall not be used, either as soft pads or hammers, to reduce marring during assembly and handling of nickel-base or stainless steel components.

3.7 Wire Brushing

If wire brushing of stainless steel parts is required, type 304 stainless steel brushes shall be used. These brushes shall not have previously been used on metals other than stainless steel.

4.0 DEGREASING PROCEDURE

4.1 CAUTION: Acetone is highly flammable. Take proper safety precautions when using and storing this material. Display "No-Smoking" signs adjacent to the operation.

4.2 Remove heavy dirt by scrubbing with a non-shedding bristle brush and a solution of up to one fluid ounce of non-ionic detergent per gallon of Grade 'C' water. Agitate and use brush as necessary.

CAUTION: Sub-assemblies that contain crevices or inaccessible areas, such as bodies containing socket welded tubing and bonnet assemblies, shall not be detergent cleaned, but shall be cleaned in acetone only per para. 4.3. At Spartanburg, the ultrasonic cleaner may be used.

4.3 Rinse components thoroughly in Grade 'C' water at a temperature of 120° to 160°F for five minutes. Parts shall be rinsed immediately to prevent drying of detergent.

4.3.1 Rinse components with Grade 'B' water.

4.4 Following water rinse, clean the parts in oil-free, unused or redistilled acetone (see para. 7.3). At Spartanburg, the ultrasonic cleaner may be used. Components containing crevices or inaccessible areas are to be cleaned in acetone only (ref. para. 4.2).

Alternatively, the parts may be immersed, in acetone, in a clean metal or glass container and agitated and/or scrubbed, as necessary, with a non-shedding bristle brush.

5.0 DRYING

5.1 The units shall be dried in a clean, dry, oil-free, ventilated area. The drying shall be accomplished with the use of heat lamps to heat the components to drive off the residual acetone. Drying is to be performed within 30 minutes after rinsing.

6.0 FLUSHING

6.1 Applicability

These provisions apply to flushing components when proof flushing is specified on the nuclear traveler. The requirements and cleanliness criteria for the use of filter cloths specified herein apply only to the final flushes to demonstrate that the component is free of particulates.

6.2 Flushing Media Purity

6.2.1 Acetone or alcohol to be used for flushing shall be oil-free, redistilled, or unused and shall be checked for cleanliness in the manner described in para. 6.2.3.

6.2.2 Water to be used for flushing shall be Grade "B" and shall be checked for cleanliness in the manner described in para. 6.2.3.

6.2.3 Filter approximately 20 gallons of the applicable flushing media through a filter of a minimum of 2 unused KIMWIPES (stock no. 34255) supported by a stainless steel grid. The grid shall be ultrasonically cleaned in acetone per para. 4.4, before flushing.

The resulting filter shall be completely free of foreign material. This check shall be performed immediately prior to starting the flush. If packaged, distilled water (Wonder Water or equivalent) is to be used for component flush test, the cleanliness check may be waived.

6.3 Flushing Procedure

5 gallons of the flushing media shall be passed through the component by gravity feed and a filter as described in para 6.2.3 (supported by a strainer or other appropriate means) shall be used to filter the exit fluid. The filtering area of the Kimwipe shall be no larger than 1 square foot. The flushing media may be recirculated and used in other valves of the same lot provided that it is filtered through a 100 micron stainless steel filter prior to re-use.

6.3.1 Flow Rate of Flush

The flush shall be gravity flow.

6.3.2 Duration of Flush

Flushes shall be repeated until the filter meets the acceptance criteria specified in para. 6.4.

6.4 Flushing Acceptance Criteria

The acceptance criteria for flushing of components shall be as follows:

1. The general appearance of the filter shall be that of a clean, white, wet cloth showing no more than slight speckling and no more than slight soiling or staining of any kind from rust or dirt.

2. There shall be no particles on the filter larger than 1/32 in. in any dimension.

3. Readily apparent quantities of unusual impurities in the exit flush or on the filter, such as resin particles, abrasive grit, or other foreign matter, shall be reason for non-acceptance of the flush.

6.5 Drying

Following proof flushing, components shall be dried in accordance with para. 5.0.

7.0 CONTROL

7.1 Dry surfaces shall be examined for freedom from oil, insoluble dirt, and smut by wiping the part with a clean Kimwipe (stock no. 34255) or equivalent. Deposit on the wiper indicates a dirty metal surface which must be recleaned.

7.2 For oxygen cleaning only, an ultraviolet light with a minimum wave length of 3600 angstroms at a distance of 1 foot maximum shall be used to determine the freedom of surfaces from oil, grease and other hydrocarbons. Residue of hydrocarbons will fluoresce when exposed to ultraviolet light in a dark area.

7.3 Only oil-free, unused or redistilled acetone will be used for this cleaning process. The ultrasonic cleaning tanks, at Spartanburg, shall be drained and filled with unused or redistilled acetone for each batch of valve components to be cleaned or when the specified control test, para. 7.1, indicates parts are not clean. As a control for the cleanliness of the acetone for oxygen cleaning, para. 7.2, the ultraviolet examination shall be performed on 100% of the parts. Any reject by the ultraviolet light test will be cause for rejection of the entire batch. If a reject is discovered (para. 7.1 or 7.2), the acetone shall be replaced with redistilled or unused acetone and the parts shall be recleaned.

7.4 Tests shall be conducted on Grade 'B' water to ascertain acceptability of chloride content, electrical conductivity and pH. These tests shall be conducted on each lot of distilled water received, and at least monthly for demineralized water.

7.4.1 Reference Test Methods;

ASTM D512 Test Methods for Chloride Ion in Water
ASTM D1293 Test Methods for pH of Water
ASTM D1125 Test Methods for Electrical Conductivity and Resistivity of Water

8.0 PACKAGING

8.1 After inspection and test, all acceptable products shall be packaged in a double-polyethylene bag with a cleaning certification tag placed between the bags. Cleaned in-process parts shall be singly bagged. The bag shall be heat sealed.

8.2 Cleaning Certification Tag.

8.2.1 Alternate #1 (Nuclear Applications)

CLEANED IN HALOGEN FREE SOLUTIONS
FOR NUCLEAR APPLICATIONS
PER HPS-85
HOKE INC., CRESSKILL, N. J. 07626

8.2.2 Alternate #2 (Oxygen Service)

CLEANED IN HALOGEN FREE SOLUTIONS
FOR OXYGEN SERVICE
PER HPS-85
HOKE INC., CRESSKILL, N. J. 07626

SPARTANBURG, S.C. — CRESSKILL, NEW JERSEY — HOKE INCORPORATED

NUCLEAR SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE | ☒ SPEC. CHANGE | SRA No. 2020 | SHEET 1 OF 1

REQUEST (INCLUDE REASON):
HWS-N1 (to be Rev. M)
Update to 1989 Code & 1989 Addenda including comments of Ontario Hydro & NRC audits

☐ ONLY PARTS CONFORMING TO THE NEW REVISION MAY BE USED.
☐ REWORK ☐ SCRAP PRESENT STOCK AND IN PROCESS.
☐ MANUFACTURE TO THE NEW REVISION MAY BE DEFERRED TO THE NEXT MANUFACTURED LOT.
☒ REVISION DOES NOT AFFECT STOCK OR MANUFACTURING.
☐ RELEASED FOR PRODUCTION.

ACTION TAKEN (ADD ADDITIONAL SHEETS AS NEEDED):
PAGE 3:
Under JOINTS, for Backing Mat'l add "Base metal: Fillet"
Under BASE METALS, Spec Type, add "or 304 sst".
For thickness Range, Base metal, Fillet; delete ".062-.308" & insert "All thicknesses".
For Deposited weld metal Groove, insert ".062-.308", for Fillet, insert "1/8 min".
For Pipe Dia Range, Groove, insert "1/2 & larger", for Fillet, insert "All diameters"
PAGE 4:
Under POSITIONS, Welding Progression, Up, add "X"
For Position of Fillet, delete "Forward" and insert "2FR"
Under ELECTRICAL CHARACTERISTICS, Amps, delete "70", & insert "45-120".
For Volts, delete "10" & insert "9-10".
For Tungsten Electrode Size, add ".040"
Under TECHNIQUE, "String or Weave Bead, add "& Weave"
For Gas Cup Size, add "1/4".
For other, insert "INSPECTION per HQI-132 unless otherwise specified on traveler or order. PT per HPT-N105."
PAGE 5:
Under EXAMINATION, Visual, delete "for proper bead configuration" & insert "per HQI-132, unless otherwise specified"
Under PERFORMANCE, add para. C "As allowed by QW-304, one full section tensile specimen shall be welded and radiographed and examined per QW-191 to qualify an additional welding operator"
PAGE 6: Title the 2 figures as Fig 1 (FT) & 2
~~Under fig. ... at top add "(1971 Code)"~~ JTS
Add Weld Ring numbers to the 2 figures.

SPECIAL INSTRUCTIONS:
*STAMP COPIES FOR N.O.A. WITH "FOR CUSTOMER USE ONLY". (ATTACH COPY OF P.O.).

DISTRIBUTION				
TO	QTY SRA	QTY SPEC.	SIGN	DATE
MFG. ENGR.				
QC-CRESSKILL				
✓ QC-SPARTANBURG	1		[illegible]	11/7
ASSY DEPT				
PURCHASING				
DRAFTING	orig	4	MAP	11/2/90
N.O.A.	1	4*	MAP	11/2/90
CONF. ENGR.				
MARKETING				
P&IC-CRESSKILL				
P&IC-SPART.				
✓ WELDING ENGR.	1	1	MP	11-2-90
✓ WELDING DEPT.	1	1	K.S.	11-7-90
RON Williams	1	1	[illegible]	11-29
TOTAL	4	10		

PREPARED BY JTS DATE 10-16-90
REQUESTED BY RW DATE 10-15-90
CHANGED BY JTS DATE 10-18-90
CHECKED BY [illegible] DATE 10-17-90

AUTHORIZATION
N.O.A. R. D. Johnson DATE 11/1/90
CONF. ENG. [illegible] DATE 10/17/90
QC (CRESSKILL) JW DATE 11/2/90
WLDG ENGR. JTS DATE 11-2-90

Form E109 6-5-93 (Ref. Procedure HQI-158)

SPARTANBURG, S.C. — CRESSKILL, NEW JERSEY — HOKE-INCORPORATED

NUCLEAR SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE	☒ SPEC. CHANGE	SRA No. 2020	SHEET 1 OF 1

REQUEST (INCLUDE REASON):
HWS-N1 (to be Rev. M)
Update to 1989 Code & 1989 Addenda including comments of Ontario Hydro & NRC audits

☐ ONLY PARTS CONFORMING TO THE NEW REVISION MAY BE USED.
☐ REWORK ☐ SCRAP PRESENT STOCK AND IN PROCESS.
☐ MANUFACTURE TO THE NEW REVISION MAY BE DEFERRED TO THE NEXT MANUFACTURED LOT.
☒ REVISION DOES NOT AFFECT STOCK OR MANUFACTURING.
☐ RELEASED FOR PRODUCTION

ACTION TAKEN (ADD ADDITIONAL SHEETS AS NEEDED):
PAGE 3:
Under JOINTS, for Backing Matl add "Base metal: Fillet"
Under BASE METALS, Spec Type, add "or 304 sst".
For thickness Range, Base metal, Fillet; delete ".062-.308" & insert "All thicknesses".
For Deposited weld metal, Groove, insert ".062-.308", for Fillet, insert "1/16 min".
For Pipe Dia Range, Groove ins "... larger", for Fillet, insert "... ...es"
PAGE 4:
Under POSITIONS, Welding Progression, Up, add "X"
For Position of Fillet, delete "Forward" and insert "2FR"
Under ELECTRICAL CHARACTERISTICS, Amps, delete "70", & insert "45-120".
For Volts, delete "10" & insert "9-10".
For Tungsten Electrode Size, add ".040"
Under TECHNIQUE, "String or Weave Bead, add "& Weave"
For Gas Cup Size, add "1/4".
For Other, insert "INSPECTION per HQI-132 unless otherwise specified on traveler or order. PT per HPI-N165."
PAGE 5:
Under EXAMINATION, Visual, delete "for proper bead configuration" & insert "per HQI-132, unless otherwise specified."
Under PERFORMANCE, add para. c "As allowed by QW-304, one full section tensile specimen shall be welded and radiographed and examined per QW-191 to qualify an additional welding operator."
PAGE 6: Title the 2 figures as Fig. 1 & Fig. 2
~~Under Fig. 1 ... at top ... "(9471 ...)"~~ JJS
Add weld Proc numbers to the 2 figures.

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* STAMP COPIES FOR N.O.A. WITH "FOR CUSTOMER USE ONLY". (ATTACH COPY OF P&R).

DISTRIBUTION

TO	QTY SRA	QTY SPEC	SIGN	DATE
MFG. ENGR				
QC-CRESSKILL				
QC-SPARTANBURG	1			
ASSY DEPT				
PURCHASING				
DRAFTING	orig	4	MAP	11/2/90
N.O.A.	1	4*		
CONF. ENGR				
MARKETING				
P&IC-CRESSKILL				
P&IC-SPART.				
WELDING ENGR.	1	1	MP	11-2-90
WELDING DEPT.	1	1		
Ron Williams	1	1		
TOTAL	4	10		

PREPARED BY JJS DATE 10-16-90
REQUESTED BY TW DATE 10-15-90
CHANGED BY JJS DATE 10-18-90
CHECKED BY R DATE 10-17-90

AUTHORIZATION
N.O.A. R.D. Johnson DATE 11/1/90
CONF. ENG [signature] DATE 10/17/90
QC(CRESSKILL) JW DATE 11/2/90
WLDG ENGR JJS DATE 11-2-90

Form E109 6/5/85 Ref. Procedure HQI-150

PROCEDURE SPECIFICATION
FOR GAS TUNGSTEN
ARC WELDING (GTAW)
IN ACCORDANCE WITH ASME SECTION III & IX
SINGLE-WELDED BUTT AND FILLET JOINTS
.062" TO .308" THICKNESS
P8 TO P8

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

DATE Oct. 13, 1972

PREPARED - John R. Smith
PROJECT ENGINEER

APPROVED - Joseph McGarvey

APPROVED - M. J. Webb
DIRECTOR OF ENGINEERING

CHANGE LETTER	DATE	APP'D	PAGES AFFECTED	REMARKS
A	9-1-73	JRS	1, 3, 6 and 7	Update-Table Q-13.3 Winter 71
B	6-6-75	JRS	2	SRA-157 Inter Pass Temp.
C	9-13-76	JRS	3 & 4	SRA 256
D	1-3-77	JRS	2	SRA 292
E	1-28-77	JRS	1,2,3,6&7 Q1.010	SRA 301
F	4-28-77	JRS	2, 4	SRA 333
G	11-4-77	JRS	1, Add 7A	SRA408
H	6-29-78	JRS	3,7A	SRA-510
J	7-13-84	JEP	FORM Q-1.7A Deleted	SRA-1200

(con't on page 2)

CHANGE LETTER	DAT	APPD	PAGES AFFECTED	REMARKS
K	9-7-84	RMC	1, 2 & 3	SRA 1230
L	8-9-88	[illegible]	All	Update per ASME
				recommendations (SRA 1729)
M	10/17/90	[illegible]	3,4,5,6	OK to 1989 Code & 1989
				Addenda - See SRA 2020

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name: Hoke Incorporated By: R. Cauda

Welding Procedure Specification No.: HWS-N1 Date: 10-13-72 Supporting PQR No.(s): N-1

Revision No.: M Date: 10/17/90

Welding Process(es): GTAW Type(s): Machine (Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402) Details

Joint Design: Butt & Fillet

Backing (Yes): X (No):

Backing Material (Type): Consumable Insert (P-8): Butt
Base Metal: Fillet

See Joint Design

Pages 7,8

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

P-No. 8 Group No. 1 to P-No. 8 Group No. 1

OR

Specification type and grade: SA 312 - 316 or 304 sst

to Specification type and grade: SA 312 316 or 304 sst

OR

Chem. Analysis and Mech. Prop.: N/A

to Chem. Analysis and Mech. Prop.: N/A

Thickness Range:

Base Metal: Groove .062" - .308" Fillet All thickness

Deposited Weld Metal: Groove .062" - .308" Fillet 1/8" min.

Pipe Dia. Range: Groove 1/2" and larger Fillet All diameters

Other:

*FILLER METALS (QW-404)

F-No. 6 Other:

A-No. 8 Other:

Spec. No. (SFA): 5.30 Insert 5.9 Filler

AWS No. (Class): IN-316L Insert, ER-316L Filler

Size of filler metals: 1/8" dia insert, .045 dia filler
root pass insert, additional passes filler wire
(Electrode, Cold Wire, Hot Wire, etc.)

Electrode-Flux (Class): N/A

Flux Trade Name: N/A

Consumable Insert: 1/8" dia type 316L

*Each base metal-filler metal combination should be recorded individually.

(6/82) This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

EXAMINATION Visual per HQI-132, unless otherwise specified.
Liquid Penetrant - per HPT-N145.

PROCEDURE AND PERFORMANCE QUALIFICATION

1. PROCEDURE

a. Full section tensile specimen Fig. 1 (Refer to pg. 6 of 8).
b. Four samples were welded on automatic welding equipment.
c. One welding operator made four full section tensile specimens. (Fig. 1).
d. Two full section tensile specimens were tensile tested and two other full section tensile specimens were sectioned into four guided bend specimens (2 root and 2 face bends sub. size per para. Q-6D of 1971 Code).

2. PERFORMANCE

a. The welding operator that produces satisfactory procedure qualification samples has automatically satisfied his performance qualification requirements.
b. One full section tensile specimen (Fig. 2) shall be welded and sectioned into 2 guided bend specimens (1 root and 1 face bend) to qualify an additional welding operator, or
c. As allowed by QW-304, one full section tensile specimen (Fig. 2) shall be welded, and radiographed and examined per QW-191 to qualify an additional welding operator.

DELTA FERRITE A determination of Delta Ferrite shall be performed on weld material in accordance with NB 2433.

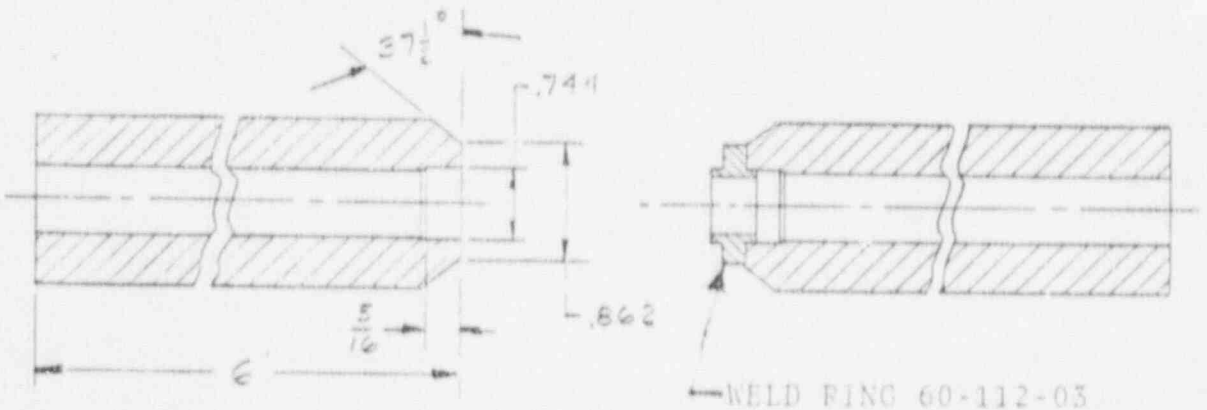
PROCEDURE AND PERFORMANCE QUALIFICATION TEST SAMPLES

BASE MATERIAL:

304 SST ASTM-A-312 ASME P-8 SA-312
316 SST ASTM-A-312 ASME P-8 SA-312

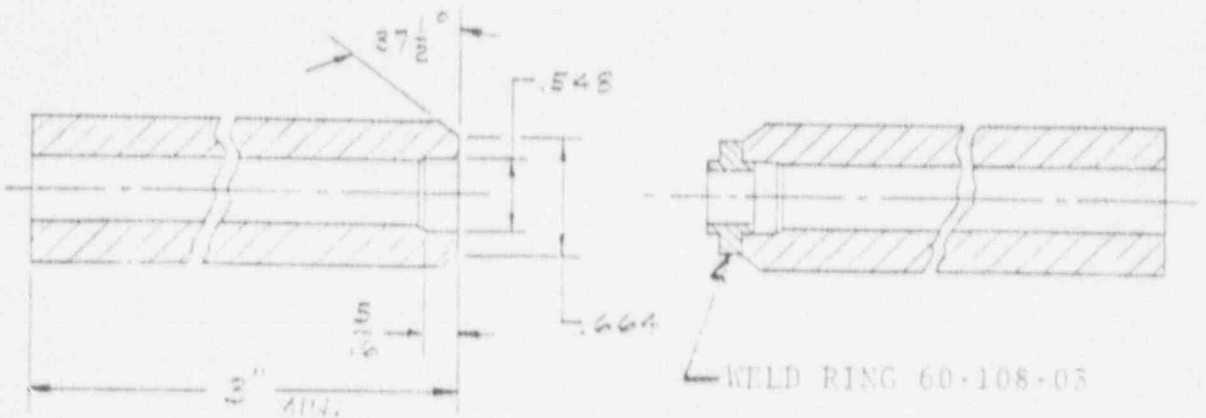
PROCEDURE TEST SAMPLE FIG. 1

SIZE: 3/4 IPS SCHEDULE 80



PERFORMANCE TEST SAMPLE FIG. 2

SIZE: ½ IPS SCHEDULE 80

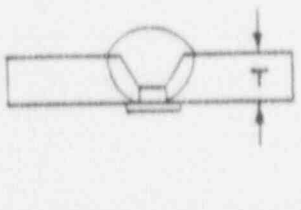
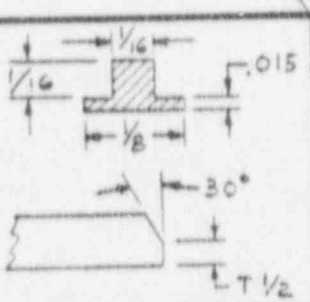
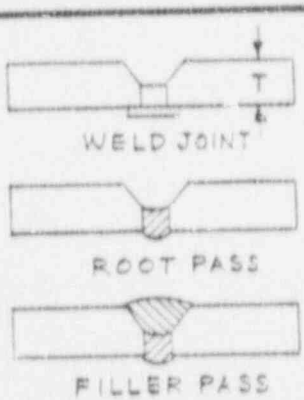
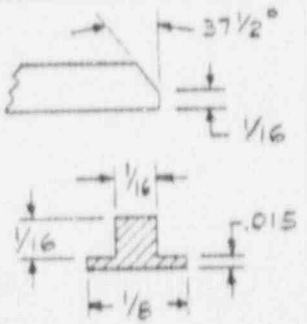
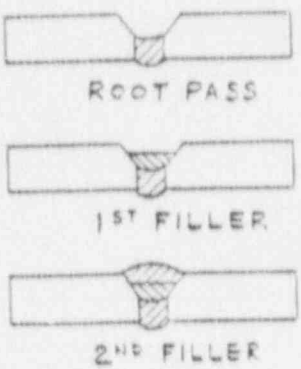
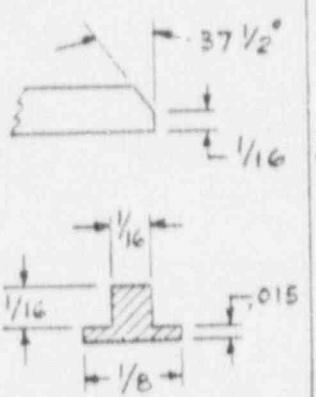


DOC. NO. HWS-N1 REV. M

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 101-2

BUTT WELD JOINT DESIGN AND BEAD DEPOSITION

		TUNGSTEN	VOLTAGE	AMP	ROTATION	SEC
SINGLE PASS CONSUMABLE INSERT "V" BUTT T=.062 TO .125	 	1/16	10	45/50		30
		1/16	10	50/55		55
DOUBLE PASS CONSUMABLE INSERT BUTT T=.125 TO .175	 	—	—	—		
		1/16	9	60/75		83
		1/16	10	65		60
TRIPLE PASS CONSUMABLE INSERT BUTT T=.175 TO .308"	 	—	—	—		
		1/16	9	95/90		133
		1/16	10	85/90		80
		1/16	10	85/90		80

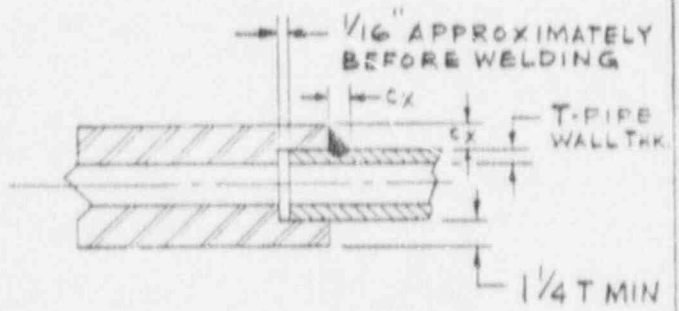
DOC. NO. HWS-N1
Rev. M

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

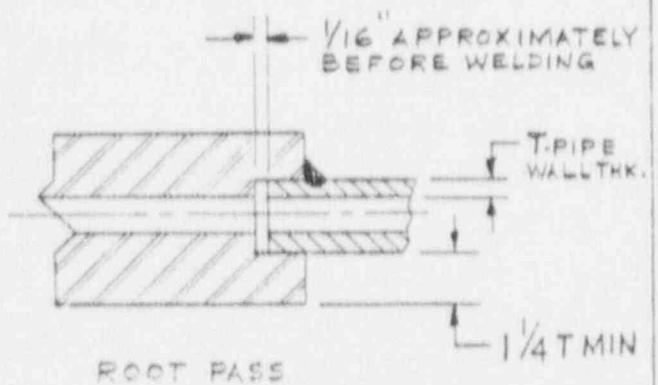
E 101-2

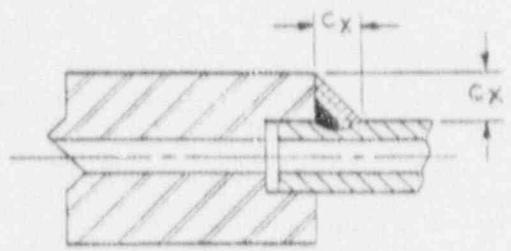
FILLET AND SOCKET WELD JOINT DESIGN AND BEAD DEPOSITION

	TUNGSTEN	VOLTAGE	AMP	ROTATION SEC
SINGLE PASS FILLET T=.060 TO .187	1/16	10	60/65	40
	1/16	10	75/80	55
	1/16	10	105/110	60
DOUBLE PASS FILLET T=.187 TO .308" ROOT PASS	1/16	10	105/110	60
FILLER PASS	1/16	10	110/120	60



Cx MIN. = 1 1/4 T BUT NOT LESS THAN 1/8"





Cx MIN. = 1 1/4 T

DOC. NO. HWS-N1 Rev. M

PAGE 8 OF 8

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 101-2

PROCEDURE SPECIFICATION

FOR GAS TUNGSTEN

ARC WELDING (GTAW)

IN ACCORDANCE WITH ASME SECTION III & IX

SINGLE-WELDED BUTT AND FILLET JOINTS

.062" TO .308" THICKNESS

P8 TO P8

HOKE INCORPORATED

CRESSKILL, NEW JERSEY

DATE Oct. 13, 1972

PREPARED - John R Smith
PROJECT ENGINEER

APPROVED - Joseph McGarvey

APPROVED - M. J. Webb
DIRECTOR OF ENGINEERING

CHANGE LETTER	DATE	APP'D	PAGES AFFECTED	REMARKS
A	9-20-73		1, 3, 6 and 7	Update-Table Q-15.3 Winter 71
B	6-6-75		2	SRA-155 Inter Pass Temp.
C	9-13-76		3 & 4	SRA 256
D	1-3-77	JRS	2	SRA 292
E	1-28-77	JRS	1, 2, 3, 6 & 7 Q1.016	SRA 301
F	4-28-77	JRS	2, 4	SRA 333
G	11-4-77	JRS	1, Add 7A	SRA408
H	6-29-78		3, 7A	SRA-510
J	7-13-84	JEP	FORM Q-1.7A Deleted	SRA-1200

(con't on page 2)

CHANGE LETTER	DATE	APP'D	PAGES AFFECTED	REMARKS
K	9-7-88	RMC	1,2,4,3	SRA 1230
L	8-9-89	[illegible]	ALL	Update per ASME recommendations (SRA 1729)
M	10/12/90	[illegible]	3,4,5,6	OK to 1988 Code & 1989 Addenda-See SRA 2020

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 101-2

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)

(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name: Hoke Incorporated By: R. Cauda

Welding Procedure Specification No.: HWS-N1 Date: 10-13-72 Supporting PQR No.(s): N-1

Revision No.: M Date: 10/17/90

Welding Process(es): GTAW Type(s): Machine (Automatic, Manual, Machine, or Semi-Auto.)

JOINTS (QW-402) Details

Joint Design: Butt & Fillet

Backing (Yes): X (No):

Backing Material (Type): Consumable Insert (P-8): Butt
Base Metal: Fillet

See Joint Design

Pages 7,8

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

*BASE METALS (QW-403)

P-No. 8 Group No. 1 to P-No. 8 Group No. 1

OR

Specification type and grade: SA 312 - 316 or 304 sst

to Specification type and grade: SA 312 316 or 304 sst

OR

Chem. Analysis and Mech. Prop.: N/A

to Chem. Analysis and Mech. Prop.: N/A

Thickness Range:

Base Metal: Groove .062" - .308" Fillet All thickness

Deposited Weld Metal: Groove .062" - .308" Fillet 1/8" min.

Pipe Dia. Range: Groove 1/2" and larger Fillet All diameters

Other:

*FILLER METALS (QW-404)

F-No. 6 Other:

A-No. 8 Other:

Spec. No. (SFA): 5.30 Insert 5.9 Filler

AWS No. (Class): IN-316L Insert, ER-316L Filler

Size of filler metals: 1/8" dia insert, .045 dia filler
root pass insert, additional passes filler wire
(Electrode, Cold Wire, Hot Wire, etc.)

Electrode-Flux (Class): N/A

Flux Trade Name: N/A

Consumable Insert: 1/8" dia type 316L

*Each base metal-filler metal combination should be recorded individually.

(6/82) This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

EXAMINATION Visual per HQI-132, unless otherwise specified. Liquid Penetrant - per HPT-N145.

PROCEDURE AND PERFORMANCE QUALIFICATION

1. PROCEDURE

a. Full section tensile specimen Fig. 1 (Refer to pg. 6 of 8).
b. Four samples were welded on automatic welding equipment.
c. One welding operator made four full section tensile specimens. (Fig. 1).
d. Two full section tensile specimens were tensile tested and two other full section tensile specimens were sectioned into four guided bend specimens (2 root and 2 face bends sub. size per para. Q-6D of 1971 Code).

2. PERFORMANCE

a. The welding operator that produces satisfactory procedure qualification samples has automatically satisfied his performance qualification requirements.
b. One full section tensile specimen (Fig. 2) shall be welded and sectioned into 4 guided bend specimens (1 root and 1 face bend) to qualify an additional welding operator, or
c. As allowed by QW-304, one full section tensile specimen (Fig. 2) shall be welded, and radiographed and examined per QW-191 to qualify an additional welding operator.

DELTA FERRITE A determination of Delta Ferrite shall be performed on weld material in accordance with NB 2433.

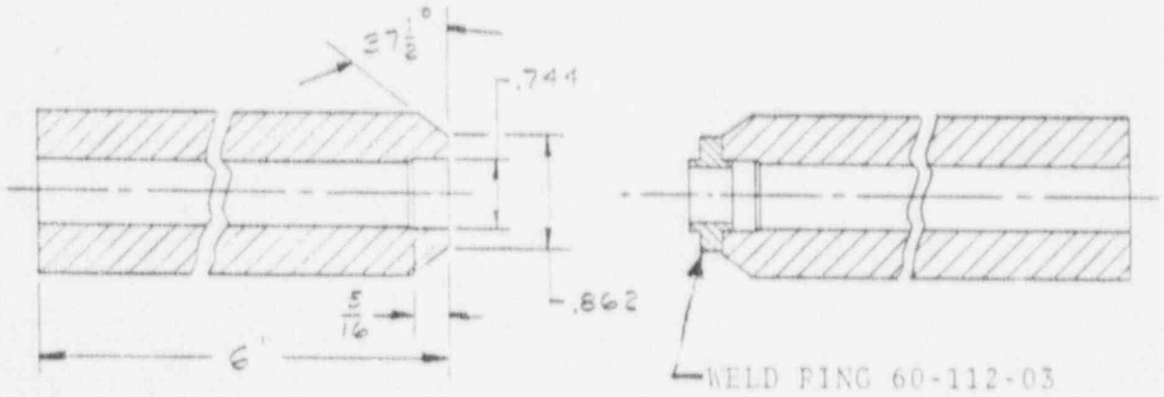
PROCEDURE AND PERFORMANCE QUALIFICATION TEST SAMPLES

BASE MATERIAL:

304 SST ASTM-A-312 ASME P-8 SA-312
316 SST ASTM-A-312 ASME P-8 SA-312

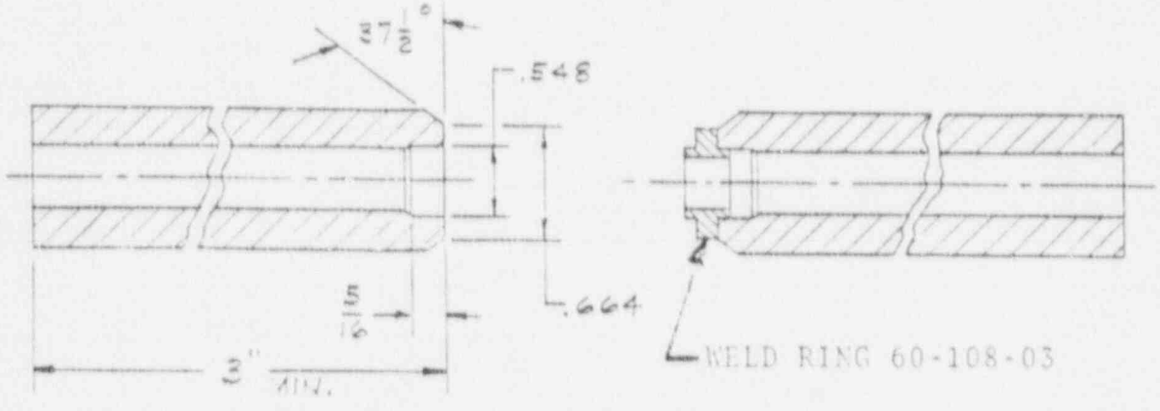
PROCEDURE TEST SAMPLE FIG. 1

SIZE: 3/4 IPS SCHEDULE 80



PERFORMANCE TEST SAMPLE FIG. 2

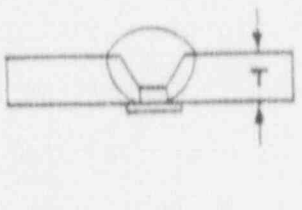
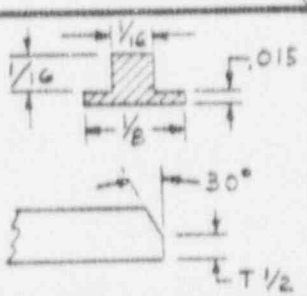
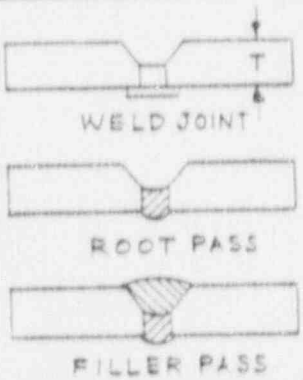
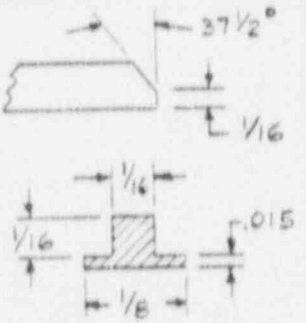
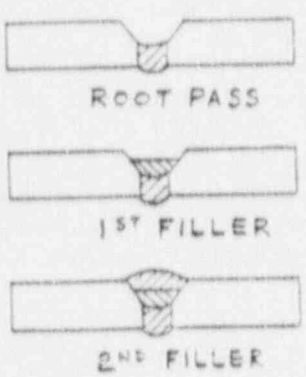
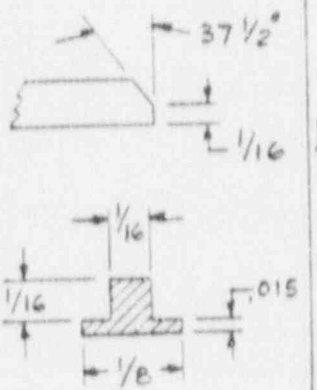
SIZE: 1/2 IPS SCHEDULE 80



HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 101-2

BUTT WELD JOINT DESIGN AND BEAD DEPOSITION

		TUNGSTEN	VOLTAGE	AMP	ROTATION
SINGLE PASS CONSUMABLE INSERT "V" BUTT T=.062 TO .125	 	1/16	10	45/50	30
		1/16	10	50/55	55
DOUBLE PASS CONSUMABLE INSERT BUTT T=.125 TO .175	 	—	—	—	
		1/16	9	80/75	83
		1/16	10	65	60
TRIPLE PASS CONSUMABLE INSERT BUTT T=.175 TO .308"	 	—	—	—	
		1/16	9	95/90	133
		1/16	10	85/90	80
		1/16	10	85/90	80

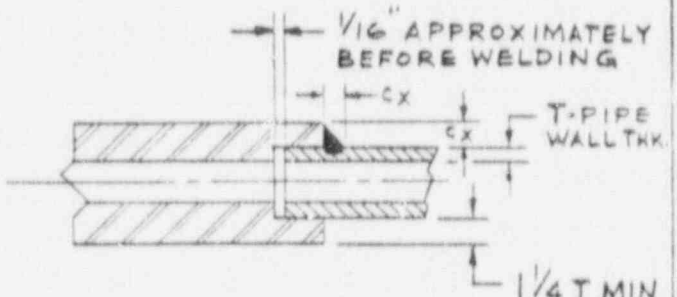
DOC. NO. HWS-N1
Rev. M

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

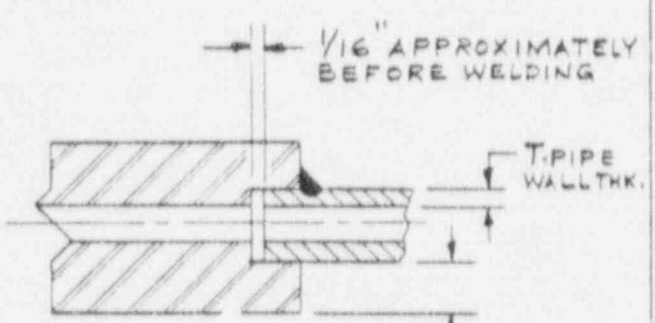
E 101-2

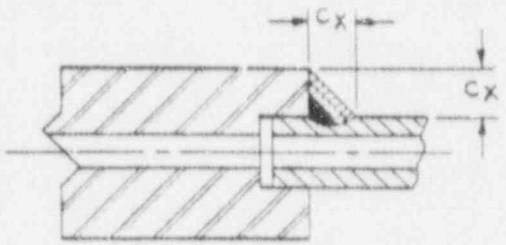
FILLET AND SOCKET WELD JOINT DESIGN AND BEAD DEPOSITION

	TUNGSTEN	VOLTAGE	AMPS.	ROTATION SEC.
SINGLE PASS FILLET T=.060 TO .187	1/16	10	60/65	40
	1/16	10	75/80	55
	1/16	10	105/110	60
DOUBLE PASS FILLET T=.187 TO .308" ROOT PASS	1/16	10	105/110	60
FILLER PASS	1/16	10	110/120	60



Cx MIN. = 1 1/4 T BUT NOT LESS THAN 1/8"





Cx MIN. = 1 1/4 T

DOC. NO. HWS-N1 Rev. M

PAGE 8 OF 8

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 101-2

UNCONTROLLED COPY
NOT FOR PRODUCTION

LIQUID PENETRANT EXAMINATION PROCEDURE

(Visible Dye, Solvent-Removable Method) in Accordance with ASME Code Sections III and V

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

DATE October 6, 1971

PREPARED - James F. McGeary
PROJECT ENGINEER

APPROVED - John K. Smith Jr.

APPROVED - Maurice A. Webb
DIRECTOR OF ENGINEERING

CHANGE LETTER	DATE	APP'D	PAGES AFFECTED	REMARKS
A	1-20-72	[illegible]	1, 5, 6, 2	Revised Section 8.1
B	2-22-72	[illegible]		
C	5-28-72	[illegible]	2, 5, 6	Revised para. 3.1, 3.2 Added "SNT-TC-1A" to para. 2.3 Added para. 8.1.6
D	[illegible]	6/1/72	para 5.4 & 7.1	
E	[illegible]	7/27/72	5, 6	Clarified par 8.1, 8.1.2, 8.1.6

DOC. NO. HPT-N145
Rev. U
Procedure was demonstrated to satisfaction of ANI.

PAGE 1 OF 57

POD 11/24/77 POD 8/13/87

Change Letter	Date	App'd	Pages Affected	Remarks
F	7-9-73		2	Clarified Para. 3.2
G	9-13-73		3, 5	60° was 50°
				added para. 8
				9 was 8; 10 was 9
H	4-24-74		1A,2,6,7,	Revised per HEDL
			E-154	V0016
I	6-11-74		2,3,4	Editorial Change
				Par. 1.0,2.3,4.1,
				5.2,5.4 Par. 3.0
				Revised to allow
				special customer
				requests. Par. 7.1
				revised to permit
				water wash
				Appendix A Added
J	10/8/75		ALL	Revised to comply to 1974 Code - Added Supplement No. 1 for special customer acceptance standards.
K	1/20/76		ALL	Wording changes, Supplement No. 1 included in App. A and amended for customer request. Added Para 4.1.2 Page 3.

E 10-2

Change Letter	Date	App'd	Pages Affected	Remarks
L	9/28/76	9/29	2	Added Para. 3.3
			1	Changes in Appendix A Para. A1 & A2
			2	Changes in Appendix A Para. A3.2
			3	Changes in Appendix A Addition to A3.4
M	3/11/77	3/11/77	2A 2	Delete Ardrox Matl. Added NOTE to Sec.3.1 (SRA 312)
N	10/10/77	VCO Lev III 10/10/77	3 & 4	Add 1" adjacent areas, profuse bleeding areas and adequate illumination (Sec. V) (SRA 393)
P	6/25/80	VCO Level III 6/25/80	2	Change halogen to chloride per Summer '79 Addenda.
			2A	Delete Turco materials & add Ardrox materials.
			2 App A	Delete aerosol containers (SRA 793)
Q	7/21/83	JL	2,2A, 5, & Suppl.1	See SRA-1061. BWB 8/25/83
R	2/13/87	CB	2A	Change Developer Part No. 9D8 to 9D1B See SRA-1527 BDB 8/13/87
S	7/27/87	CB	3.2, Appendix A Page 2	See SRA 1580
T	1/5/88		2A, 7, TR Form; Appendix A Page 2 & 4	See SRA 1610
U	2/21/89	2-27	All	Change SNT-TC-1A to 1984 edition and update (See SRA 1705). Demonstrated to ANI at MOS 7/13/89 HAO 9/9/89

E 101-2

1.0 SCOPE

This document specifies the method, materials and standards for solvent-removable, visible dye liquid penetrant examination in accordance with ASME Code Section III and Section V.

2.0 GENERAL REQUIREMENTS

2.1 This procedure provides the method of performing liquid penetrant examination to detect discontinuities open to the surface such as cracks, voids or porosity. The adjacent area, for a distance of one inch either side, shall be included in this test.

2.2 This procedure shall be used to examine ferrous and non-ferrous materials in the following forms: cast, forged, bar, sheet, including swaged and welded conditions, up to and including twelve inch diameter.

2.3 This procedure shall be performed only by personnel qualified to the standards of SNT-TC-1A (1984) as qualified by a Level III Examiner and supervised by the Hoke Quality Control Manager. Interpretation and evaluation of results of examination shall be performed only by Level II or Level III Examiners. Qualification documentation shall be recorded and filed in the Quality Control Office.

3.0 EXAMINATION MATERIALS

3.1 Each batch of the penetrant materials and cleaning solvents must be analyzed and certified by the manufacturer as to the actual sulphur and halogen content in accordance with ASME Section V Article 6.

3.1.1 Analyze for sulphur content as follows:

a) An individual sample of the penetrant materials shall be prepared for analysis by heating 50 grams (100 grams for cleaner/remover material) of the material in a 150mm nominal diameter glass Petri dish at a temperature of 194°F to 212°F for 60 minutes.

CAUTION: Provide adequate ventilation to dissipate the emitted vapor.

b) Analyze the residue as follows: If the residue is less than 0.0025 grams (0.005 grams for cleaner/remover material), the material is acceptable without further analysis. If the residue is 0.0025 grams or more (0.005 grams or more for cleaner/remover material), the procedure in 3.1.1(a) shall be repeated and the residue analyzed per ASTM D 129 or ASTM D 1552 or, alternately, the material may be decomposed in accordance with ASTM D 129 and analyzed per ASTM D 516 Method B.

NOTE: The alternate methods of residue analysis specified above can be used on both penetrant materials and cleaner/remover materials.

c) The sulphur content shall not exceed 1% of the residue by weight.

3.1.2 Analyze for chlorine and fluorine as follows:
a) Same as 3.1.1(a) above, including the CAUTION note.
b) Analyze the residue as follows: If the residue is less than 0.0025 grams (0.005 grams for cleaner/remover material), the material is acceptable without further analysis. If the residue is 0.0025 grams or more (0.005 grams or more for cleaner/remover material), the procedure in 3.1.1(a) shall be repeated and the residue analyzed per ASTM D808 or SE-165 Annex 2 for chlorine and SE-165 Annex 3 for fluorine.
c) The chlorine plus fluorine content shall not exceed 1% of the residue by weight.

3.1.3 Modifications to these requirements may be required by certain customers and are addressed in the appropriate appendix/supplement.

3.2 Penetrant materials used shall be Ardrox (formerly Uresco Ardrox) Co. visible dye penetrant 996 (aerosol or bulk), cleaner/remover 9PR50 (aerosol), and wet non-aqueous developer suspension 9D1B (aerosol or bulk).

Aerosol propellant must be verified that it is non-halogenated.

4.0 SURFACE PREPARATION

General Requirements - Surfaces to be examined and adjacent areas within 1 inch shall be dry and free from scale, slag, and adhering or embedded sand or other extraneous materials.

4.1.1 As-welded surfaces, following the removal of slag, shall be considered suitable for liquid penetrant examination without grinding, if this does not interfere with interpretation of the test results and if the weld contour blends into the base metal without undercutting. Shot, sand, grit and vapor blasting shall not be done on surfaces which are to be examined, unless the process has been approved in conjunction with the L.P. examination.

4.1.2 Surfaces which are inaccessible or which would produce meaningless examination results, shall not be examined by this procedure. Examples of such surfaces are small inside diameters, drilled holes, threaded or knurled surfaces, or engraved areas.

4.2 Surfaces, for which a specific finish is required, shall be given this surface finish prior to the final liquid penetrant examination prescribed by the applicable specifications. Examination at intermediate stages of fabrication shall be permitted.

5.0 TEST PROCEDURE

NOTE: Acetone per Federal Spec. O-A-51 meets the halogen and sulphur requirements of Paragraph 3.1 (ref. ASME Code Section V Subarticle T-625).

5.1 Pretest cleaning shall be done with an acetone (per Fed.Spec. O-A-51) wash on the test area followed by complete air drying, allowing a minimum evaporation time of five (5) minutes.
ABRASIVE CLEANING SHALL NOT BE USED.

5.2 Penetrant application shall be brushed, dipped or sprayed on a clean, dry surface and shall be wetted for 15-20 minutes. The penetrant and test surface shall be maintained at a temperature recommended by the manufacturer but in no case less than 60°F nor greater than 100°F.

5.3 Penetrant shall be removed from all surfaces as follows:

5.3.1 As much excess penetrant as possible shall be removed by first wiping the surface thoroughly with a clean, dry, lint-free cloth or absorbent paper.

5.3.2 The remaining excess penetrant shall be removed by wiping the surface with a clean, lint-free cloth or absorbent paper dampened with penetrant remover. Acetone shall not be used to remove excess penetrant.

5.3.3 Flushing of the surface with any liquid following application of the penetrant and prior to developing shall be prohibited.

5.4 The drying of the test surfaces after the removal of the excess penetrant shall be accomplished only by normal evaporation, or by blotting with absorbent paper or clean, lint-free cloth. Forced air circulation in excess of normal ventilation on the inspection area shall not be used. The time for surface drying after removal of excess penetrant and prior to application of the developer shall be limited to a minimum of 5 minutes and a maximum of ten minutes.

6.0 DEVELOPING

6.1 After penetrant has been removed and parts are dried, a thin, uniform coating of developer shall be sprayed on the test area. The developer shall be thoroughly agitated both before using and periodically during application. Since the true size and type of discontinuities are difficult to evaluate if the penetrant diffuses excessively into the developer, observe the surface during application of the developer for indications which tend to bleed profusely.

6.2 Final examination shall be made a minimum of 7 minutes and no later than 30 minutes after the developer has dried. If bleed-out does not alter the inspection results, development periods of over 30 minutes are permitted. The examination shall be performed under adequate illumination to ensure no loss of sensitivity.

7.0 FINAL CLEANING

When the examination is concluded, the penetrant materials shall be removed as soon as possible. Absorbent paper or a clean, lint-free cloth may be used to remove the dry, white powder. The residual material shall be removed with an acetone dampened cloth, or by water washing using TritonX or Igepal (or equivalent detergent containing non-ionic wetting agents) followed by acetone cleaning.

8.0 EVALUATION OF INDICATIONS

8.1 Mechanical discontinuities at the surface will be indicated by bleeding out of the penetrant; however, localized surface discontinuities, such as may occur from machining marks or surface conditions, may produce similar indications which are not relevant to the detection of unacceptable discontinuities.

8.2 Any indication in excess of the acceptance standards, which is believed to be non-relevant, shall be regarded as a defect and shall be re-examined to verify whether or not actual defects are present. Surface conditioning may precede the re-examination. Non-relevant indications and broad areas of pigmentation which would mask indications of defects are un-acceptable, and the areas shall be cleaned and re-examined.

8.3 Relevant indications are those which result from imperfections. Linear indications are those indications in which the length is more than three times the width. Rounded indications are indications which are circular or elliptical with the length equal to or less than three times the width.

9.0 ACCEPTANCE STANDARDS

9.1 Acceptance standards shall be according to ASME Section III, as listed below, and in supplements/appendices to this procedure, addressing specific customers requirements.

NOTE: Refer to the Nuclear Traveler to determine inspection requirements.

9.1.1 Castings, forgings, bar, seamless and welded (without filler metal) tubular products and fittings and weld repair of same for bodies, bonnets, seats, stub extensions to bodies and plugs.

The following relevant indications are unacceptable:

a. Linear indications greater than 1/16" long for materials less than 5/8" thick, greater than 1/8" long for materials from 5/8" thick to under 2" thick and 3/16" long for materials 2" thick and greater.

b. Rounded indications with any dimension greater than 1/8" for thicknesses less than 5/8" and greater than 3/16" for thicknesses 5/8" and greater.

c. Four or more indications in a line separated by 1/16" or less, edge-to-edge.

d. Ten or more indications in any 6 square inches of area, whose major dimension is no more tha 6" with the dimensions taken in the most unfavorable location relative to the indications being evaluated.

9.1.2 Welds (other than bellows and repair welds to above). The following relevant indications are unacceptable:

a. Any cracks and linear indications.

b. Rounded indications with dimensions greater than 3/16".

c. Four or more rounded indications in a line separated by 1/16 inch or less, edge-to-edge.

d. 1) Ten or more rounded indications in any six square inches of surface, with the major dimension of this area not to exceed six inches with the area taken in the most unfavorable location relative to the indications being evaluated.

2) Indications whose major dimensions are greater than 1/16 inch shall be considered relevant.

9.1.3 Finished stems.

a. There shall be no defects, linear or otherwise.

9.1.4 Hardfaced surfaces of seats and plugs (after machining).

a. Any cracks or linear indications are unacceptable, as are rounded pores exceeding 2 pores for 6"

of circumference with the pore size not exceeding 1/64". Pore spacing must be greater than 1/16".

9.1.5 Bellows and bellows welds. Unacceptable indications are:

a. Any cracks, linear, or rounded indications. (Also there shall be no indications in the sheet or tube before forming bellows).

9.1.6 Bolts, studs and nuts (greater than 1" nominal bolt size).

The examination shall be performed on the material stock at approximately the finished diameter before threading and after heading (if involved). The following relevant indications are unacceptable:

a. Linear nonaxial indications.

b. Linear axial indications greater than 1" in length.

10.0 RECORDS

10.1 A record of all Liquid Penetrant Examinations shall be maintained for a minimum of seven years. Examination certificates, when necessary, shall be supplied to the customer. Results shall be recorded on Liquid Penetrant Test Report (sample of Form LPTR attached).

HOKE INCORPORATED
ONE TENAKILL PARK • CRESSKILL, N.J. 07626
899 SIMUEL ROAD • SPARTANBURG, S.C. 29303

LIQUID PENETRANT TEST REPORT

PART DESCRIPTION _____

PART NUMBER _____ REV. _____

QUANTITY (QTY) _____ HEAT CODE _____

ASSY. ORDER NO./
NUCLEAR TRAVELER NO. _____ CUSTOMER SPEC. NO. _____

CUSTOMER _____ SALES ORDER/PROJECT NO. _____

CUSTOMER P.O. NO. _____ CUSTOMER P/N _____

TEST DESCRIPTION

SPECIFICATION _____ REV. _____

DYE PENETRANT MATERIALS: ☐ ARDROX
☐ MAGNAFLUX SPOTCHECK
☐ OTHER (SPECIFY BELOW)
_____

	BATCH NO.
DYE	
REMOVER/ CLEANER	
DEVELOPER	

TYPE OF OBSERVATION Visual

INSPECTION RESULTS

QTY ACCEPTED _____ S/N _____

_____

QTY REJECTED _____ S/N _____

_____

QC NCR NO. _____

REMARKS:

OPERATOR _____ LEVEL _____ DATE _____

INSPECTOR _____ LEVEL _____ DATE _____

SPARTANBURG, S.C. CRESSKILL, NEW JERSEY HOKE INCORPORATED

SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE ☒ SPEC. CHANGE

SRA No. 207.1 SHEET 1 OF 1

REQUEST (INCLUDE REASON):

HPS-85 (to be Rev J)

Add rinse water test requirements per NRC audit finding and recommendation.

ACTION TAKEN (ADD ADDITIONAL SHEETS AS NEEDED):

PAGE 3:

Para 2.1: for Teflon, add "X100". For Inconel, add "CC-E30"

Para 2.2: Delete "Potable Water meeting reqts of Public Health Service drinking water stds" & insert "Tap Water". Delete "Max chloride content-25ppm max. electrical conductivity-400 micromhos/cc, pH 6.0 to 8.0"

PAGE 4

Para 2.3: Under 1st column, add "or demineralized water". Under 2nd column, change "pH 6.0" to "pH 5.5". Add "(See para 7.4 for test reqts)"

Para 2.3: Under 2nd column, add "(must be certified halogen free)"

Para 3.1: Delete all water mixing of etc line, and insert "in accordance with HPS-58 or HPS-138, depending upon the material"

PAGE 5: Delete subparagraphs 3.1.2 & 3.1.5

PAGE 7:

Add para 7.4 and 7.4.1 requiring testing of Grade 'B' water & [illegible] methods

PAGE [illegible]

At end, add "At Spartanburg the ultrasonic cleaner may be used"

PAGE 7: PARA 4

Rewrite. Add alternate method of cleaning [illegible] [illegible] and [illegible] [illegible]

PAGE [illegible]

Para 7.3: Delete last 2 lines & insert "shall be [illegible] [illegible] accordance with [illegible] shall be [illegible]"

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QC-SPARTANBURG	1	1*	[illegible]	10/24
ASSY. DEPT.	1	4*	[illegible]	[illegible]
GOVT. SALES				
PURCHASING				
DRAFTING	ORIG	5	MAP	10/19/90
PROJ. ENGR	1		[illegible]	10/19/[illegible]
DIR. OF ENGR	1		[illegible]	10/[illegible]
MARKETING				
P&IC-CRESSKILL				
P&IC-SPART				
N.O.A	1		[illegible]	10/19/90
PROD. SUPT.				
WELDING ENGR				
WELDING DEPT.				
LAB	1	1*	[illegible]	[illegible]
TOTAL	7	12		

PREPARED BY [illegible] DATE 10-16-90
REQUESTED BY [illegible] DATE 10-15-90
CHANGED BY [illegible] DATE 10-17-90
CHECKED BY [illegible] DATE 10-17-90

AUTHORIZATION

PROJ. ENG. [illegible] DATE 10-17-90
DIR. OF ENGR. [illegible] DATE 10-17-90
QC (CRESSKILL) [illegible] DATE 10/19/90
MFG ENGR [illegible] DATE 10/19/90

Form E109 4 5/89 (Ref. Procedure HQ1 156)

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CLEANING FOR NUCLEAR SERVICE

(OR OXYGEN APPLICATIONS)

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

DATE January 9, 1974

PREPARED - Kevin F. O'Brien
PROJECT ENGINEER

APPROVED - [signature]
Q. C. Manager

APPROVED - [signature]
Nuclear Order Administrator

APPROVED - [signature]
Assembly Foreman

APPROVED - [signature]
DIRECTOR OF ENGINEERING

CHANGE LETTER	DATE	APP'D.	PAGES AFFECTED	REMARKS
A	6/10/74	[illegible]	6	Revised drying Procedure
				Ref HEDL DTRF V0012(SRA103)
B	7/6/77	[illegible]	3	Par. 3.1 "Machining"
				changed to "Welding"(SRA358)
C	8/9/77	SR	3	Para. 3.1 (SRA371)
D	9/26/77	[illegible]	3,4	Added Para 2.6 Revised
				para 3.1 and 3.3 Ref.
				A.I. Par HO-015 (SRA384)
E	10-12-77	[illegible]	3,6&9	Customer Request SRA 395
F	10-16-78	[illegible]	6, 7, & 8	See SRA-573

(See Page 2)

Change Letter	Date	App'd	Pages Affected	Remarks
G	9/4/79	[illegible]	6,8,9	Para. 6.2.3, 7.3, 8.1 revised to clarify (SRA702)
H	6/27/88	[illegible]	All	Update (See SRA 1683)
J	10/17/90	[illegible]	3,4,5,6, 7,9	See SRA# 2021

CLEANING FOR NUCLEAR SERVICE

(OR OXYGEN APPLICATIONS)

1.0 APPLICATIONS

1.1 General

This specification covers the removal of oil and grease and other soil from parts during fabrication and assembly for use in nuclear applications or oxygen service. Degreasing agents used in accordance with this specification will not contain HALOGENS (F, Cl, Br, I At).

1.2 Specific

1.2.1 Any metal part may be cleaned in this manner. (See CAUTION note following para. 4.2)

1.2.2 Assemblies with non-metallic portions and non-metallic parts should be cleaned with detergent solution only after original cleaning to HPS-2.

1.2.3 This cleaning procedure may also be used for products which will be mass spectrometer leak tested.

2.0 MATERIALS

2.1 Detergent (Containing non-ionic wetting agents) Triton X100, Igepal, CO-630, or equivalent.

2.2 Grade 'C' Water

Tap Water.

2.3	Grade 'B' Water (Wonder Water, by Allied Distilled Water Co., or equivalent) or demineralized water.	Max. chloride content - 1.0 ppm, max. electrical conductivity - 20 micromhos/cc. pH 5.5 to 8.0. See paragraph 7.4 for test requirements).
2.4	Acetone (CH_3COCH_3)	Federal Spec. O-A-51 Technical Grade (Must be certified halogen free)
2.5	Denatured Alcohol (CH_3CH_2OH)	Federal Spec. O-E-760, TypeIII
2.6	Machining Lubricants	Max sulfur & chloride content, 5000ppm

3.0 PRECAUTIONS

The following precautions shall be taken during machining, fabrication, and assembly operations.

3.1 Stainless Steels

All austenitic (300 Series) stainless steel bar and forgings shall be purchased in the solution annealed condition. If passivation is specified for a forging, it shall be done after machining. Passivation shall not be done on components that have been stellited, welded or weld repaired.

When specified on the detail drawing, passivation shall be performed in accordance with HPS-58 or HPS-138 depending upon the material.

3.2 Exposure to Contaminated Atmospheres

Metals and components shall be protected from the general shop atmosphere, or other contaminated atmospheres, insofar as possible during fabrication and temporary storage. Bodies, bonnet assemblies, and other wetted components shall be boxed or covered during storage.

3.3 Use of Lubricants

A lubricant may be employed during machining operations provided that the lubricant is removed immediately after completion of each operation for which it is used by the methods of HPS-1.
Lubricants used shall not contain more than 5000ppm of sulfur or chloride.

3.4 Mercury Control

During the manufacturing processes, tests, and inspections, the components or assemblies shall not come in direct contact with mercury or any of its compounds.

3.5 Exclusion of Foreign Materials

Extreme care shall be taken during fabrication to prevent contamination by foreign materials. Temporary polyethylene plugs or seals shall be installed to keep contaminants out of a clean part during subsequent fabrication and storage.

3.6 Aluminum

Aluminum shall not be used, either as soft pads or hammers, to reduce marring during assembly and handling of nickel-base or stainless steel components.

3.7 Wire Brushing

If wire brushing of stainless steel parts is required, type 304 stainless steel brushes shall be used. These brushes shall not have previously been used on metals other than stainless steel.

4.0 DEGREASING PROCEDURE

4.1 CAUTION: Acetone is highly flammable. Take proper safety precautions when using and storing this material. Display "No-Smoking" signs adjacent to the operation.

4.2 Remove heavy dirt by scrubbing with a non-shedding bristle brush and a solution of up to one fluid ounce of non-ionic detergent per gallon of Grade 'C' water. Agitate and use brush as necessary.

CAUTION: Sub-assemblies that contain crevices or inaccessible areas, such as bodies containing socket welded tubing and bonnet assemblies, shall not be detergent cleaned, but shall be cleaned in acetone only per para. 4.4. At Spartanburg, the ultrasonic cleaner may be used.

4.3 Rinse components thoroughly in Grade 'C' water at a temperature of 120° to 160°F for five minutes. Parts shall be rinsed immediately to prevent drying of detergent.

4.3.1 Rinse components with Grade 'B' water.

4.4 Following water rinse, clean the parts in oil-free, unused or redistilled acetone (see para. 7.3). At Spartanburg, the ultrasonic cleaner may be used. Components containing crevices or inaccessible areas are to be cleaned in acetone only (ref. para. 4.2).

Alternatively, the parts may be immersed, in acetone, in a clean metal or glass container and agitated and/or scrubbed, as necessary, with a non-shedding bristle brush.

5.0 DRYING

5.1 The units shall be dried in a clean, dry, oil-free, ventilated area. The drying shall be accomplished with the use of heat lamps to heat the components to drive off the residual acetone. Drying is to be performed within 30 minutes after rinsing.

6.0 FLUSHING

6.1 Applicability

These provisions apply to flushing components when proof flushing is specified on the nuclear traveler. The requirements and cleanliness criteria for the use of filter cloths specified herein apply only to the final flushes to demonstrate that the component is free of particulates.

6.2 Flushing Media Purity

6.2.1 Acetone or alcohol to be used for flushing shall be oil-free, redistilled, or unused and shall be checked for cleanliness in the manner described in para. 6.2.3.

6.2.2 Water to be used for flushing shall be Grade "B" and shall be checked for cleanliness in the manner described in para. 6.2.3.

6.2.3 Filter approximately 20 gallons of the applicable flushing media through a filter of a minimum of 2 unused KIMWIPES (stock no. 34255) supported by a stainless steel grid. The grid shall be ultrasonically cleaned in acetone per para. 4.4, before flushing.

The resulting filter shall be completely free of foreign material. This check shall be performed immediately prior to starting the flush. If packaged, distilled water (Wonder Water or equivalent) is to be used for component flush test, the cleanliness check may be waived.

6.3 Flushing Procedure

5 gallons of the flushing media shall be passed through the component by gravity feed and a filter as described in para 6.2.3 (supported by a strainer or other appropriate means) shall be used to filter the exit fluid. The filtering area of the Kimwipe shall be no larger than 1 square foot. The flushing media may be recirculated and used in other valves of the same lot provided that it is filtered through a 100 micron stainless steel filter prior to re-use.

6.3.1 Flow Rate of Flush

The flush shall be gravity flow.

6.3.2 Duration of Flush

Flushes shall be repeated until the filter meets the acceptance criteria specified in para. 6.4.

6.4 Flushing Acceptance Criteria

The acceptance criteria for flushing of components shall be as follows:

1. The general appearance of the filter shall be that of a clean, white, wet cloth showing no more than slight speckling and no more than slight soiling or staining of any kind from rust or dirt.

2. There shall be no particles on the filter larger than 1/32 in. in any dimension.

3. Readily apparent quantities of unusual impurities in the exit flush or on the filter, such as resin particles, abrasive grit, or other foreign matter, shall be reason for non-acceptance of the flush.

6.5 Drying

Following proof flushing, components shall be dried in accordance with para. 5.0.

7.0 CONTROL

7.1 Dry surfaces shall be examined for freedom from oil, insoluble dirt, and smut by wiping the part with a clean Kimwipe (stock no. 34255) or equivalent. Deposit on the wiper indicates a dirty metal surface which must be recleaned.

7.2 For oxygen cleaning only, an ultraviolet light with a minimum wave length of 3600 angstroms at a distance of 1 foot maximum shall be used to determine the freedom of surfaces from oil, grease and other hydrocarbons. Residue of hydrocarbons will fluoresce when exposed to ultraviolet light in a dark area.

7.3 Only oil-free, unused or redistilled acetone will be used for this cleaning process. The ultrasonic cleaning tanks, at Spartanburg, shall be drained and filled with unused or redistilled acetone for each batch of valve components to be cleaned or when the specified control test, para. 7.1, indicates parts are not clean. As a control for the cleanliness of the acetone for oxygen cleaning, para. 7.2, the ultraviolet examination shall be performed on 100% of the parts. Any reject by the ultraviolet light test will be cause for rejection of the entire batch. If a reject is discovered (para. 7.1 or 7.2), the acetone shall be replaced with redistilled or unused acetone and the parts shall be recleaned.

7.4 Tests shall be conducted on Grade 'B' water to ascertain acceptability of chloride content, electrical conductivity and pH. These tests shall be conducted on each lot of distilled water received, and at least monthly for demineralized water.

7.4.1 Reference Test Methods;

ASTM D512 Test Methods for Chloride Ion in Water
ASTM D1293 Test Methods for pH of Water
ASTM D1125 Test Methods for Electrical Conductivity and Resistivity of Water

8.0 PACKAGING

8.1 After inspection and test, all acceptable products shall be packaged in a double-polyethylene bag with a cleaning certification tag placed between the bags. Cleaned in-process parts shall be singly bagged. The bag shall be heat sealed.

8.2 Cleaning Certification Tag.

8.2.1 Alternate #1 (Nuclear Applications)

CLEANED IN HALOGEN FREE SOLUTIONS
FOR NUCLEAR APPLICATIONS
PER HPS-85
HOKE INC., CRESSKILL, N. J. 07626

8.2.2 Alternate #2 (Oxygen Service)

CLEANED IN HALOGEN FREE SOLUTIONS
FOR OXYGEN SERVICE
PER HPS-85
HOKE INC., CRESSKILL, N. J. 07626

HOKE INCORPORATED CRESSKILL, NEW JERSEY

NUCLEAR SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE ☒ SPEC.CHANGE

SRA No. 1705 SHEET 1 OF 2

REQUEST (INCLUDE REASON) Revise HPT-N145, Liquid Penetrant Examination Procedure, Rev. T, to comply with ASME audit recommendations and to update per latest (1986 Edition with Addenda through 1988) ASME Code requirements.

☐ ONLY PARTS CONFORMING TO THE NEW REVISION MAY BE USED.
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Revise HPT-N145, Rev. T, as follows:

1. Add Rev. U to document number at bottom of each page and add revision bars in margin where required. Eliminate page numbers 1A and 1B, 2A (info. now on pages 2,3 and 5)-renumber all pages accordingly.
2. Page 1- Change spec title from "Liquid Penetrant Examination Procedure to ASME Section III" to "Liquid Penetrant Examination Procedure (Visible Dye, Solvent-Removable Method) in Accordance with ASME Code Sections III and V);" eliminate rev. letter in top right corner and typist's initials "jk" in lower left hand corner.
3. Add SRA numbers to previous changes Rev. M, N and P. Rev. M change on Pg. 2 changed from pencil to type.
4. Para. 2.3- Change edition of SNT-TC-1A from "1980" to "1984."
5. Para. 3.1- Revise and expand material testing requirements per latest ASME Code Section V Article 6 (now Paras.3.1 and 3.1.1-3.1.3). Reword sentence concerning customer requirements.
6. Para. 3.2- Change "Uresco/Ardrox" to "Ardrox (formerly Uresco Ardrox)."
7. Para. 4.0- Add "dry and."
8. Para. 5.1- Add acetone "(per Spec. O-A-51)" and new note regarding acetone halogen and sulphur content.
9. Para. 6.2- Add "If bleed-out does not alter the inspection results, development periods of over 30 minutes are permitted."
10. Para. 7.0- Change "alconex or equivalent detergent" to "TritonX or Igepal (or equivalent detergent containing non-ionic wetting agents)."

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ASSEMBLY	1			[illegible]	[illegible]
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DRAFTING	Orig.	d+		[illegible]	[illegible]
PROJ ENGR.	1			[illegible]	4/7/89
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C.C. Smart					
F. Tucker	1			[illegible]	[illegible]
R. Johnson	1			RJJ	4/7/89
TOTAL	6	5			

DWG RELEASE DATE	EST.	ACT.

PREPARED BY: [illegible] DATE 2/22/89
REQUESTED BY: [illegible] DATE 2/21/89
CHANGED BY: [illegible] DATE 2/21/89
CHECKED BY RJJ DATE 2/28/89

See Sheet 2 of 2 for Level III N.D.E. Inspector review and approval.

AUTHORIZATION

PROJ ENG [illegible] DATE 2/23/89
CONF ENG [illegible] DATE 3/1/89
QUAL CONT [illegible] DATE 3/1/89
N.O.A. R.J. Johnson DATE 2/28/89
N.D.E. [illegible] Date 4/5/89
MFG. ENGR. [illegible] DATE 4/7/89

HOKE INCORPORATED CRESSKILL, NEW JERSEY

NUCLEAR SPEC./REVISION AUTHORIZATION

☐ NEW RELEASE ☒ SPEC. CHANGE

SRA No. 1705 SHEET 2 OF 2

REQUEST (INCLUDE REASON)

Revise HPT-N145, Liquid Penetrant Examination Procedure, Rev. T.

Continued:

11. Para. 8.3- Change "unacceptable mechanical discontinuities" to "imperfections." Also see item #17.
12. Para. 9.1- Change wording, add "appendices", add note to refer to the Nuclear Traveler for inspection requirements.
13. Para. 10.1 and Form- include latest Liquid Penetrant Test Report form (Form LPTR).
14. Made minor punctuation, spelling, grammatical corrections to Paras. 2.2, 2.3, 3.2, 4.0, 4.1.1, 5.1, 5.2, 5.3, 5.3.1, 5.3.2, 5.4, 6.1, 7.0, 8.1, 9.1.1, 9.1.1c and d, 9.1.2c and d1, 9.1.3a, 9.1.4 and 9.1.4a, 10.1, 1.0, 2.1.
15. Para. 6.1-at beginning of third sentence, add "Since the true size and type of discontinuities are difficult to evaluate if the penetrant diffuses excessively into the developer,"
16. Para. 8.1-change "localized surface imperfections" to "localized surface discontinuities,"
17. Para. 8.3-in last sentence, add "equal to or."

To be Rev. U

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PURCHASING					
ASSEMBLY	1				
MILITARY SALES					
COST DEPT.					
DRAFTING Orig.		4+			
PROJ. ENGR.					
CHIEF ENGR.					
MARKETING					
SAFETY FILE					
PROD. CONTROL					
ECN COORDINATOR					
MASTER SCHEDULER					
D.C. Snart-					
E. Tucker	1				
R. Johnson	1				
TOTAL	6	5			

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DWG RELEASE DATE	EST	ACT

PREPARED BY [illegible] DATE 2/22/89
REQUESTED BY [illegible] DATE 2/21/89
CHANGED BY [illegible] DATE 2/21/89
CHECKED BY [illegible] DATE 2/28/89

Revision has been reviewed and approved by Level III N.D.E. Inspector.

Level III Inspector — Date 2-28-89

AUTHORIZATION

PROJ. ENG. [illegible] DATE 2/23/89
CONF. ENG. [illegible] DATE 3/1/89
QUAL. CONT. [illegible] DATE 3/7/89
N.O.A. R. Johnson DATE 2/28/89
A.N.I. [illegible] DATE 3/9/89
MFG. ENGR. [illegible] DATE 3/9/89

FORM 4 MAR 81

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LIQUID PENETRANT EXAMINATION PROCEDURE

(Visible Dye, Solvent-Removable Method) in Accordance with ASME Code Sections III and V

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

DATE October 6, 1971

PREPARED - James F. Mc Geen
PROJECT ENGINEER

APPROVED - John K. Smith Jr.

APPROVED - Maurice A. Webb
DIRECTOR OF ENGINEERING

CHANGE LETTER	DATE	APP'D	PAGES AFFECTED	REMARKS
A	1-20-72	JPa	1, 5, 6, 2	Revised Section 8.1
B	2-21-72	JFG		
C	5-28-72	RS	2, 5, 6	Revised para 5.1, 5.2 Added "SNT-TC-1A" to para. 2 Added para. 8.1.6
D	[illegible]	7/6/72	para 5.4 & 7.1	
E	[illegible]	7/27/72	5, 6	Clarified par 8.1, 8.1.5, 8.1.6

DOC. NO. HPT-N145

PAGE 1 OF 7

Rev. U
Procedure was demonstrated to satisfaction of ANI.

[illegible] 11/2/17

Change Letter	Date	Appr'd	Pages Affected	Remarks
F	7-9-73		2	Clarified Para. 3.2
G	9-13-73		3, 5	60° was 50° added para. 8 9 was 8; 10 was 9
H	4-24-74		1A,2,6,7, E-154	Revised per HEDL V0016
I	6-11-74		2,3,4	Editorial Change Par. 1.0,2.3,4.1, 5.2,5.4 Par. 3.0 Revised to allow special customer requests. Par. 7.1 revised to permit water wash Appendix A Added
J	10/8/75		ALL	Revised to comply to 1974 Code - Added Supplement No. 1 for special customer acceptance standards.
K	1/20/76		ALL	Wording changes, Supplement No. 1 included in Appendix and amended to customer request. Added Para 4.1.2 Page 3.

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 10-2

Change Letter	Date	App'd	Pages Affected	Remarks
L	9/28/76	9/29	2	Added Para. 3.3
			1	Changes in Appendix A Para. A1 & A2
			2	Changes in Appendix A Para. A3.2
			3	Changes in Appendix A Addition to A3.4
M	3/11/77	3/11/77	2A 2	Delete Ardrox Matl. Added NOTE to Sec.3.1 (SRA 312)
N	10/10/77	VCO Lev III 10/10/77	3 & 4	Add 1" adjacent areas, profuse bleeding areas and adequate illumination (Sec. V) (SRA 393)
P	6/25/80	VCO Lev III 6/25/80	2	Change halogen to chloride per Summer '79 Addenda.
			2A	Delete Turco materials & add Ardrox materials.
			2 App A	Delete aerosol container (SRA 793)
Q	7/21/83		2,2A, 5, & Suppl.1	See SRA-1061. 8/25/83
R	2/13/87		2A	Change Developer Part No. 9D8 to 9D1B See SRA-1527 8/13/87
S	7/27/87		3.2, Appendix A Page 2	See SRA 1580
T	1/5/88		2A, 7, TR Form; Appendix A Page 2 & 4	See SRA 1610
U	2/21/89		All	Change SNT-TC-1A to 1984 edition and update (See SRA 1705). Demonstrated to ANI at MOS 7/13/89

HOKE INCORPORATED
CRESSKILL, NEW JERSEY

E 101-2

1.0 SCOPE

This document specifies the method, materials and standards for solvent-removable, visible dye liquid penetrant examination in accordance with ASME Code Section III and Section V.

2.0 GENERAL REQUIREMENTS

2.1 This procedure provides the method of performing liquid penetrant examination to detect discontinuities open to the surface such as cracks, voids or porosity. The adjacent area, for a distance of one inch either side, shall be included in this test.

2.2 This procedure shall be used to examine ferrous and non-ferrous materials in the following forms: cast, forged, bar, sheet, including swaged and welded conditions, up to and including twelve inch diameter.

2.3 This procedure shall be performed only by personnel qualified to the standards of SNT-TC-1A (1984) as qualified by a Level III Examiner and supervised by the Hoke Quality Control Manager. Interpretation and evaluation of results of examination shall be performed only by Level II or Level III Examiners. Qualification documentation shall be recorded and filed in the Quality Control Office.

3.0 EXAMINATION MATERIALS

3.1 Each batch of the penetrant materials and cleaning solvents must be analyzed and certified by the manufacturer as to the actual sulphur and halogen content in accordance with ASME Section V Article 6.

3.1.1 Analyze for sulphur content as follows:

a) An individual sample of the penetrant materials shall be prepared for analysis by heating 50 grams (100 grams for cleaner/remover material) of the material in a 150mm nominal diameter glass Petri dish at a temperature of 194°F to 212°F for 60 minutes.

CAUTION: Provide adequate ventilation to dissipate the emitted vapor.

b) Analyze the residue as follows: If the residue is less than 0.0025 grams (0.005 grams for cleaner/remover material), the material is acceptable without further analysis. If the residue is 0.0025 grams or more (0.005 grams or more for cleaner/remover material), the procedure in 3.1.1(a) shall be repeated and the residue analyzed per ASTM D 129 or ASTM D 1552 or, alternately, the material may be decomposed in accordance with ASTM D 129 and analyzed per ASTM D 516 Method B.

NOTE: The alternate methods of residue analysis specified above can be used on both penetrant materials and cleaner/remover materials.

c) The sulphur content shall not exceed 1% of the residue by weight.

3.1.2 Analyze for chlorine and fluorine as follows:
a) Same as 3.1.1(a) above, including the CAUTION note.
b) Analyze the residue as follows: If the residue is less than 0.0025 grams (0.005 grams for cleaner/remover material), the material is acceptable without further analysis. If the residue is 0.0025 grams or more (0.005 grams or more for cleaner/remover material), the procedure in 3.1.1(a) shall be repeated and the residue analyzed per ASTM D808 or SE-165 Annex 2 for chlorine and SE-165 Annex 3 for fluorine.
c) The chlorine plus fluorine content shall not exceed 1% of the residue by weight.

3.1.3 Modifications to these requirements may be required by certain customers and are addressed in the appropriate appendix/supplement.

3.2 Penetrant materials used shall be Ardrox (formerly Uresco Ardrex) Co. visible dye penetrant 996 (aerosol or bulk), cleaner/remover 9PR50 (aerosol), and wet non-aqueous developer suspension 9D1B (aerosol or bulk).

Aerosol propellant must be verified that it is non-halogenated.

4.0 SURFACE PREPARATION

General Requirements - Surfaces to be examined and adjacent areas within 1 inch shall be dry and free from scale, slag, and adhering or embedded sand or other extraneous materials.

4.1.1 As-welded surfaces, following the removal of slag, shall be considered suitable for liquid penetrant examination without grinding, if this does not interfere with interpretation of the test results and if the weld contour blends into the base metal without undercutting. Shot, sand, grit and vapor blasting shall not be done on surfaces which are to be examined, unless the process has been approved in conjunction with the L.P. examination.

4.1.2 Surfaces which are inaccessible or which would produce meaningless examination results, shall not be examined by this procedure. Examples of such surfaces are small inside diameters, drilled holes, threaded or knurled surfaces, or engraved areas.

4.2 Surfaces, for which a specific finish is required, shall be given this surface finish prior to the final liquid penetrant examination prescribed by the applicable specifications. Examination at intermediate stages of fabrication shall be permitted.

5.0 TEST PROCEDURE

NOTE: Acetone per Federal Spec. O-A-51 meets the halogen and sulphur requirements of Paragraph 3.1 (ref. ASME Code Section V Subarticle T-625).

5.1 Pretest cleaning shall be done with an acetone (per Fed.Spec. O-A-51) wash on the test area followed by complete air drying, allowing a minimum evaporation time of five (5) minutes.
ABRASIVE CLEANING SHALL NOT BE USED.

5.2 Penetrant application shall be brushed, dipped or sprayed on a clean, dry surface and shall be wetted for 15-20 minutes. The penetrant and test surface shall be maintained at a temperature recommended by the manufacturer but in no case less than 60°F nor greater than 100°F.

5.3 Penetrant shall be removed from all surfaces as follows:

5.3.1 As much excess penetrant as possible shall be removed by first wiping the surface thoroughly with a clean, dry, lint-free cloth or absorbent paper.

5.3.2 The remaining excess penetrant shall be removed by wiping the surface with a clean, lint-free cloth or absorbent paper dampened with penetrant remover. Acetone shall not be used to remove excess penetrant.

5.3.3 Flushing of the surface with any liquid following application of the penetrant and prior to developing shall be prohibited.

5.4 The drying of the test surfaces after the removal of the excess penetrant shall be accomplished only by normal evaporation, or by blotting with absorbent paper or clean, lint-free cloth. Forced air circulation in excess of normal ventilation on the inspection area shall not be used. The time for surface drying after removal of excess penetrant and prior to application of the developer shall be limited to a minimum of 5 minutes and a maximum of ten minutes.

6.0 DEVELOPING

6.1 After penetrant has been removed and parts are dried, a thin, uniform coating of developer shall be sprayed on the test area. The developer shall be thoroughly agitated both before using and periodically during application. Since the true size and type of discontinuities are difficult to evaluate if the penetrant diffuses excessively into the developer, observe the surface during application of the developer for indications which tend to bleed profusely.

6.2 Final examination shall be made a minimum of 7 minutes and no later than 30 minutes after the developer has dried. If bleed-out does not alter the inspection results, development periods of over 30 minutes are permitted. The examination shall be performed under adequate illumination to ensure no loss of sensitivity.

7.0 FINAL CLEANING

When the examination is concluded, the penetrant materials shall be removed as soon as possible. Absorbent paper or a clean, lint-free cloth may be used to remove the dry, white powder. The residual material shall be removed with an acetone dampened cloth, or by water washing using TritonX or Igepal (or equivalent detergent containing nonionic wetting agents) followed by acetone cleaning.

8.0 EVALUATION OF INDICATIONS

8.1 Mechanical discontinuities at the surface will be indicated by bleeding out of the penetrant; however, localized surface discontinuities, such as may occur from machining marks or surface conditions, may produce similar indications which are not relevant to the detection of unacceptable discontinuities.

8.2 Any indication in excess of the acceptance standards, which is believed to be non-relevant, shall be regarded as a defect and shall be re-examined to verify whether or not actual defects are present. Surface conditioning may precede the re-examination. Non-relevant indications and broad areas of pigmentation which would mask indications of defects are un-acceptable, and the areas shall be cleaned and re-examined.

8.3 Relevant indications are those which result from imperfections. Linear indications are those indications in which the length is more than three times the width. Rounded indications are indications which are circular or elliptical with the length equal to or less than three times the width.

9.0 ACCEPTANCE STANDARDS

9.1 Acceptance standards shall be according to ASME Section III, as listed below, and in supplements/appendices to this procedure, addressing specific customers requirements.

NOTE: Refer to the Nuclear Traveler to determine inspection requirements.

9.1.1 Castings, forgings, bar, seamless and welded (without filler metal) tubular products and fittings and weld repair of same for bodies, bonnets, seats, stub extensions to bodies and plugs.

The following relevant indications are unacceptable:

a. Linear indications greater than 1/16" long for materials less than 5/8" thick, greater than 1/8" long for materials from 5/8" thick to under 2" thick and 3/16" long for materials 2" thick and greater.

b. Rounded indications with any dimension greater than 1/8" for thicknesses less than 5/8" and greater than 3/16" for thicknesses 5/8" and greater.

c. Four or more indications in a line separated by 1/16" or less, edge-to-edge.

d. Ten or more indications in any 6 square inches of area, whose major dimension is no more than 6" with the dimensions taken in the most unfavorable location relative to the indications being evaluated.

9.1.2 Welds (other than bellows and repair welds to above). The following relevant indications are unacceptable:

a. Any cracks and linear indications.

b. Rounded indications with dimensions greater than 3/16".

c. Four or more rounded indications in a line separated by 1/16 inch or less, edge-to-edge.

d. 1) Ten or more rounded indications in any six square inches of surface, with the major dimension of this area not to exceed six inches with the area taken in the most unfavorable location relative to the indications being evaluated.

2) Indications whose major dimensions are greater than 1/16 inch shall be considered relevant.

9.1.3 Finished stems.

a. There shall be no defects, linear or otherwise.

9.1.4 Hardfaced surfaces of seats and plugs (after machining).

a. Any cracks or linear indications are unacceptable, as are rounded pores exceeding 2 pores for 6"

of circumference with the pore size not exceeding 1/64". Pore spacing must be greater than 1/16".

9.1.5 Bellows and bellows welds. Unacceptable indications are:

a. Any cracks, linear, or rounded indications. (Also there shall be no indications in the sheet or tube before forming bellows).

9.1.6 Bolts, studs and nuts (greater than 1" nominal bolt size).

The examination shall be performed on the material stock at approximately the finished diameter before threading and after heading (if involved). The following relevant indications are unacceptable:

a. Linear nonaxial indications.

b. Linear axial indications greater than 1" in length.

10.0 RECORDS

10.1 A record of all Liquid Penetrant Examinations shall be maintained for a minimum of seven years. Examination certificates, when necessary, shall be supplied to the customer. Results shall be recorded on Liquid Penetrant Test Report (sample of Form LPTR attached).

HOKE INCORPORATED
ONE TENAKILL PARK • CRESSKILL, NJ 07626
899 SIMUEL ROAD • SPARTANBURG, S.C. 29303

LIQUID PENETRANT TEST REPORT

PART DESCRIPTION _____

PART NUMBER _____ REV. _____

QUANTITY (QTY) _____ HEAT CODE _____

ASSY. ORDER NO./
NUCLEAR TRAVELER NO. _____ CUSTOMER SPEC. NO. _____

CUSTOMER _____ SALES ORDER/PROJECT NO. _____

CUSTOMER P.O. NO. _____ CUSTOMER P/N _____

TEST DESCRIPTION

SPECIFICATION _____ REV. _____

DYE PENETRANT MATERIALS: ☐ ARDROX
☐ MAGNAFLUX SPOTCHECK
☐ OTHER (SPECIFY BELOW)
_____

	BATCH NO.
DYE	
REMOVER/ CLEANER	
DEVELOPER	

TYPE OF OBSERVATION Visual

INSPECTION RESULTS

QTY ACCEPTED _____ S/N _____

QTY REJECTED _____ S/N _____

QC NCR NO. _____

REMARKS:

OPERATOR _____ LEVEL _____ DATE _____

INSPECTOR _____ LEVEL _____ DATE _____

H58-~~200~~-50 O-RING CURE DATE CONTROL
cure Date Age Control 80 QUARTERS

DATE	CURE DATE	EXPIRATION DATE	REVIEWED BY	COMMENTS	HT CODE
1-4-91	4088	4808	JAB	A	

* A/R - ACCEPT / REJECT

H58-114-50 O-RING CURE DATE CONTROL

cure Date Age Control 80 QUARTERS

DATE	CURE DATE	EXPIRATION DATE	REVIEWED BY	COMMENTS	HT CODE
1-4-11	1Q89	1C09	JB	A	

* A/R - ACCEPT / REJECT

O-RING CURE DATE CONTROL

H58-112-3D cure Date Age Control 8Q QUARTERS

DATE	CURE DATE	EXPIRATION DATE	REVIEWED BY	COMMENTS	HT CODE
1-4-91	1089	1209	JSB	A	

* A/R - ACCEPT / REJECT

O-RING CURE DATE CONTROL

H58-156-50 cure Date Age Control 80 QUARTERS

DATE	CURE DATE	EXPIRATION DATE	REVIEWED BY	COMMENTS	HT CODE
1-4-91	1087	1707	JB	11	

* A/R - ACCEPT / REJECT

FLUID CONTROL SPECIALISTS

HOKE

HOKE INCORPORATED

ONE TENAKILL PARK • CRESSKILL, N.J. 07626

PHONE (201) 568-9100 TELEX 135428

CERTIFICATION TO SNT-TC-1A
LIQUID PENETRANT EXAMINATION
LEVEL III

This is to certify that James Free of Applied Technical Services Inc, Greenville, SC, is appointed by Hoke as the Level III Examiner for Magnetic Particles, Liquid Penetrant and Radiography examinations as of August 6, 1990. He is qualified to establish techniques, interpret specifications and codes, designate the test method and techniques used, and interpret results. He has sufficient education, experience and practical background in materials technology to assist in establishing tests and acceptance criteria when required. He has a knowledge of other commonly used NDT methods and he is responsible for instructing and conducting examinations of NDT Level I and NDT Level II personnel.

His experience and education records are on file at Hoke.

This certification is issued with examination in accordance with SNT-TC-1A based on the latest certification records dated 1/2/90.

Ronald J. Williams
Director of Quality

Walter Jones III
C.E.O.

APPLIED TECHNICAL SERVICES, INCORPORATED

Branch Office
1218 Donaldson Road
Greenville, South Carolina 29605
(803) 299-0525
Fax # (803) 277-5824

Main Office
1190 Atlanta Industrial Drive
Marietta, Georgia 30066
(404) 423-1400
Fax # (404) 424-6415

Branch Office
108-A Castle Drive
Madison, Alabama 35758
(205) 837-7777
Fax # (205) 830-4474

QUALIFICATION AND CERTIFICATION OF NONDESTRUCTIVE INSPECTION PERSONNEL

I hereby certify that the following named employee of Applied Technical Services possesses the necessary qualifications and is certified to perform the level of inspection as indicated.

Name: James Free
Inspection Method: Liquid Penetrant
Qualification Level: III
Composite Score: SNT-TC-1A: 90.5, MIL-STD-110: 89.7
Test Date: January 5, 1990
Certification Expiration Date: Janurary 5, 1995
Certified in Accordance with SNT-TC-1A 1988 Edition
Education: Diploma from Dothan High School.

Experience: ATS, 5/87 to 1/90. Performed penetrant inspection Certified Level II R.T.,M.T., P.T., U.T., E.T. and trained Level I and II inspection personnel.

Technical Services Lab: 3/82 to 5/87. Performed penetrant inspections. Certified Level II R.T., M.T. and P.T. Trained, tested and supervised other NDT technicians.

Training: Level I: 4 hrs. General Dynamics
Instructor: L. Mazyette

Level II: 8 hrs. General Dynamics
Instructor: J. Williamson

SNT-TC-1A

	Exam Grade	% Weight	Weight Score
Basic:	92.3	.4	36.9
Specific:	90.0	.4	36.0
Method:	87.9	.2	17.6
Composite Grade:			90.

MIL-STD-410

	Exam Grade	% Weight	Weight Score
General:	87.9	.3	26.4
Specific:	90.0	.3	27.0
Practical:	90.0	.4	36.0
Composite Grade:			89.7

Authorized Signature
J. J. Hills
Level III Examiner

January 8, 1990
Date

APPLIED TECHNICAL SERVICES, INCORPORATED

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1218 Donaldson Road
Greenville, South Carolina 29605
(803) 299-0525
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Fax # (404) 424-6415

Branch Office
108-A Castle Drive
Madison, Alabama 35758
(205) 837-7777
Fax # (205) 830-4474

Test		Meets Without Eye Correction	Meets With Eye Correction	Does Not Meet
1) Far Vision Snellen 20/30 or Ortho-Rater 7	Right Eye	[ ]	[✓]	[ ]
	Left Eye	[✓]	[ ]	[ ]
2) Near Vision Ortho-Rater 8 or Jaeger #1, at 12"	One Eye	[✓]	[ ]	[ ]
Ortho-Rter 7 or Jaeger #3, at 12"	Other Eye	[ ]	[ ]	[ ]

	Meets	Does Not Meet
3) Depth Perception Ortho-Rater and 3 out of 9 or Verhoff any 5 out of 8	[✓]	[ ]
	[ ]	[ ]
4) Color Perception Ortho-Rater Minimum of 4 or Pseudo-Iso Chromatic Minimum of 14	[ ]	[ ]
	[✓]	[ ]
5) Red/Green Differentiation	[✓]	[ ]
6) Blue/Yellow Differentiation	[✓]	[ ]

I certify that I, DR. STEVE R. CHANDLER, administered an eye exam.
PRINT OR TYPE NAME OF EYE EXAMINER
to JAMES A. FREE, on OCT. 11, 1990 which demonstrated the vision capabilit[illegible] indicated above.

I hold one of the following job titles: Please check one:

[X] Optometrist
[ ] Medical Doctor
[ ] Registered Nurse
[ ] Certified Physician Assistant
[ ] Level III or Designated Representative

State License Number [illegible]85

EYE CARE CENTER #01
P.O. BOX 1096
PIEDMONT, S.C. 29673
Professional Address

[803] 295-3550
Telephone Number

Signature of Eye Examiner

HOKE INCORPORATED

1 TENAKILL PARK
CRESSKILL, NEW JERSEY 07626 (201) 568-9100

SUBMIT INVOICES IN TRIPLICATE TO ABOVE ADDRESS
ATTN: ACCTS. PAYABLE

PURCHASE ORDER 24526

Order Date	Page	Vendor Code	Suffix "X" Indicates No Overshipment permitted
4/23/92	01		☐

Certificate of compliance ☐ with req. specifications & drawings req. in dup.	Account Code	Job No.
	0225260185	

Requisitioned By	Notify on Receipt
ROD LEWIS	ROD LEWIS

TO Tabor Environmental Services, Inc.
747 Samuel Road
Spartanburg, SC 29301

SHIP TO Hoke, Inc.
895 Samuel Road
Spartanburg, SC 29303

Terms	F.O.B.	Ship Via	Date Promised	☐ NOT FOR RESALE	☐ FOR RESALE ☐ FOR MFG. ☐ FOR R&D } EXEMPT REG. NO.
Net 30					

Delivery: Not Sooner Than ____ Not Later Than ____

☐ CONFIRMING ORDER OF 4/24/92 Date

PER YOUR QUOTATION OF ____

ITEM NO.	QUANTITY	UNIT	DESCRIPTION
1			Blanket order to perform testing of demineralized water to ASTM D512-89 D1293-84 D1125-82 Once per month @ $60.00
2			Gravimetric Analysis Twice per month per EPS 125 @ $10.00 Test reports must be furnished to Hoke Quality Assurance: Attn: Ron Lewis

Confirming

EXPEDITING REGISTER

Purchase Order No. Must Appear On All Invoices, Delivery Bills, Cases, Packages, Certification, etc.

CONDITIONS

1) All orders to be effective must bear authorized signature.
2) No higher prices than indicated herein can be invoiced without our written authorization.
3) Invoices rendered must certify that you are complying with all applicable provisions of Government price and labor regulations.
4) Additional terms and conditions are listed on the back of this order.
5) Acknowledgement must be returned by ____

INFORMATION RECEIVED

VENDOR'S SIGNATURE: ____ REFER INQUIRIES TO: Carolyn Dutton

DATE: ____ AUTHORIZED SIGNATURE: ____

REQUIREMENTS:
PH@25°C - 5.5 TO 8.0
CHLORIDE — LESS THAN 1 PPM
CONDUCTIVITY@25°C -- 20 MICROMHOS/CC MAX.

TESTING OF DEMINERALIZED WATER
PER: K. S-85

DATE	PH	CHLORIDE	CONDUCTIVITY	ACCEPT/REJECT A/R	TEST REPORT #	CHECKED BY:

HOKE INCORPORATED
ONE TENAKILL PARK • CRESSKILL, N.J. 07626
PHONE (201) 568-9100 TELEX 135428

October 30, 1990

Mr. Alan Bagner
American Society of Mechanical Engineers
345 E. 47th Street
New York, New York 10016

SUBJECT: Company Organizational Revisions: Quality System Certification (QSC-541, QSC-541-1, QSC-541-2); Certification of Authorization (N-2809, N-2810)

Dear Sir:

Please be advised that we are in the process of implementing company organizational changes Our estimated timetable for the completion of the related changes is the first quarter of 1991. As soon as these changes have been completed we will revise both of our Quality Manuals, and submit them for your review.

If I can be of any further assistance, please advise.

Very truly yours,

HOKE INCORPORATED

Ronald J. Williams
Director of Quality

RJW/clb

cc: W. Jones
J. Gannon
J. Doblosky
R.N. Fowler - Authorized Nuclear Inspection Supervisor

HOKE INCORPORATED

1 TENAKILL PARK
CRESSKILL, NEW JERSEY 07626 (201) 568-9100

SUBMIT INVOICES IN TRIPLICATE TO ABOVE ADDRESS
ATTN: ACCTS. PAYABLE

PURCHASE ORDER [illegible]

Order Date	Page	Vendor Code	Suffix "X" Indicate No Overshipments permitted.
4/22/91	01		☐

Certificate of compliance ☐ with req. specifications & drawings req. in sup.	Account Code	Job No.
	[illegible]	

Requisitioned By	Notify on Receipt
Rob Lewis	Bob Lewis

TO: Tabor Environmental Services, Inc.
747 Samuel Road
Spartanburg, SC 29301

SHIP TO: Hoke, Inc.
895 Samuel Road
Spartanburg, SC 29303

Terms	F.O.B.	Ship Via	Date Promised	NOT FOR RESALE	☐ FOR RESALE ☐ FOR MFG. ☐ FOR R&D	EXEMPT REG. NO.
Net 30				☐		

Delivery: Not Sooner Than ____ Not Later Than ____

☐ CONFIRMING ORDER OF ____ Date

☐ FOR YOUR QUOTATION OF ____

ITEM NO.	QUANTITY	UNIT	DESCRIPTION
1			Blanket Order to perform testing of Cemberalia water to ASTM D512-89 D1293-84 D1125-82 Once per month @ $60.00
2			Gravimetric Analysis Twice per month per EPA 120 @ $10.00

Test reports must be furnished to Hoke Quality Assurance: Attn: Ron Lewis

Confirming

EXPEDITING REGISTER

Purchase Order No. Must Appear On All Invoices, Delivery Slips, Cases, Packages, Certification, etc.

INFO. AS ON RECEIVED

CONDITIONS

1) All orders to be effective must bear authorized signature.
2) No higher prices than indicated herein can be invoiced without our written authorization.
3) Invoices rendered must certify that you are complying with all applicable provisions of Government price and labor regulations.
4) Additional terms and conditions are listed on the back of this order.
5) Acknowledgement must be returned by ____

VENDOR'S SIGNATURE: ____ REFER INQUIRIES TO: Carolyn Dotson

DATE ____ AUTHORIZED SIGNATURE: ____

REQUIREMENTS:
PH@25°C - 5.5 TO 8.0
CHLORIDE — LESS THAN 1 PPM
CONDUCTIVITY@25°C — 20 MICROMHOS/CC MAX.

TESTING OF DEMINERALIZED WATER

PER:R. 5-85

DATE	PH	CHLORIDE	CONDUCTIVITY	ACCEPT/REJECT A/R	TEST REPORT #	CHECKED BY: