ENCLOSURE 7

PROCEDURE 12751-MNGP-QP-9.201, REVISION 0

VISUAL WELD EXAMINATION

12 pages follow

TriVis NDE Services, LLC
A Division of TriVis Inc.

Visual Weld Examination
Procedure No.: 12751-MNGP-QP-9.201 R0

Visual Weld Examination

Revision Summary and Approval

Rev. No.	Revision Summary
0	This is the initial issue of this document as a project specific procedure and is based on the requirements of QP-9.201, Rev 6.

Review and Approval

Approved _____ 03/27/2013
NDE/QC Supervisor/TriVis NDE Level III — Date

Reviewed _____ 04/11/2013
for Quality Assurance Manager — Date

Approved: _____ 04/11/2013
for Department Manager — Date

1.0 PURPOSE

This procedure provides the requirements for direct visual examinations of materials, parts, components, in-process, and final welds on NUHOMS canisters.

2.0 DEFINITIONS

2.1 In-Process Welds – welding performed leading up to the final weld surface (e.g. - tacks, root, etc.) prior to NDE.

2.2 Final Weld Surface – The surface of the final weld after all required surface finishing operations have been completed.

2.3 Work Documents – Include but are not limited to work instructions, procedures, design drawings, and applicable codes.

3.0 REFERENCES

3.1 Applicable Spent Fuel Canister Welding Procedure

3.2 ASME Boiler & Pressure Vessel Code, Section V, Article 9, 1998 Edition w/ Addenda through 1999.

3.3 ASME Boiler & Pressure Vessel Code, Section III, Division I, NB 5300, 1998 Edition w/ Addenda through 1999.

3.4 QP-9.200 Written Practice for the Qualification & Certification of Nondestructive Examination (NDE) Personnel.

3.5 VT Qualification Letter dated June 23, 2006

3.6 12751-MNGP-QP-9.202, Color Contrast Liquid Penetrant (PT) Examination Using the Solvent-Removable Method

4.0 GENERAL REQUIREMENTS

4.1 PERSONNEL REQUIREMENTS

4.1.1 TriVis personnel performing NDE shall be qualified and certified in accordance with QP-9.200, Written Practice for the Qualification & Certification of Nondestructive Examination (NDE) Personnel.

4.1.2 Personnel provided to TriVis, as an approved contractor, shall be certified in accordance with the contractor's written practice developed according to SNT-TC-1A: 1992 or stricter.

4.1.3 Nondestructive examination personnel shall be certified to at least NDE Level II.

4.2 EXAMINATION REQUIREMENTS

4.2.1 Procedure Qualification:

A. The ASME B&PV Code, Section V, Article 9, identifies the requirements listed below as essential variables:

- Change in technique (direct to or from translucent or direct to remote)
- Remote visual aids
- Personal performance requirements (when required)
- Lighting intensity (decrease only)

B. Changes to any of these requirements shall require requalification of this procedure by demonstration and the procedure shall be revised.

C. This procedure was developed from QP-9.201, which was qualified as described in Attachment 1, VT Qualification Letter. Since the initial qualification, none of the essential variables have changed; therefore this procedure is considered a qualified procedure.

4.2.2 Direct Visual Examination:
Direct visual examination may be made when access is sufficient to place the eye within 24 inches of the surface to be examined and at an angle not less than 30 degrees to the surface being examined. Mirrors may be used to assist examinations.

4.2.3 Lighting Requirements:
The specific part, component, weld, or section thereof under immediate examination shall be illuminated with natural or supplemental white light to attain a minimum light intensity of 100 foot candles. The light intensity shall be measured using an appropriate calibrated light meter. Lighting values shall be documented according to Section 8.1 of this procedure.

4.2.4 Measuring Devices:
Machinist scales with 1/64-inch graduations or other devices of equivalent accuracy may be used for the evaluation of defects. Other measuring devices shall be capable of accuracy to the tolerances of the design specifications.

4.2.5 Cleanliness:
Prior to examination, verify the surface to be examined and adjacent areas within at least one (1) inch of the area to be examined is dry and free of dirt, lint, scale, welding slag or flux, spatter, paint, oil, or other extraneous matter that would interfere with the examination. . Either a mechanical method or a solvent method, or both, shall remove paint, oil, rust, grease, scale or other such material.

4.2.6 Base Material Evaluation:

A. Indications in base materials which are discovered during the process of fabrication or installation shall be dispositioned. Exploration to the extent necessary to determine compliance to work documents shall be governed under the approved weld traveler, approved repair plan, and/or documented engineering disposition.

B. Indications which may warrant further evaluation are:

- Nicks, gouges, dents, or other mechanically or thermally caused surface indications which are suspected to reduce the thickness below the design minimum thickness of the material.
- Any evidence of basic material problems such as laps, seams, laminations, or casting defects related to the material manufacturer.

4.2.7 Base Metal Repairs
Base materials which require excavation and NDE examination and /or repair by welding and post weld NDE examination shall be governed under the approved project specific weld traveler, approved repair plan and documented engineering disposition.

5.0 PROCEDURE

5.1 EXAMINATION PRIOR TO WELDING:

5.1.1 Joint design, edge preparation and fit up shall be examined in accordance with the applicable Spent Fuel Canister Welding procedure and approved drawings to ensure proper tolerances are achieved and that welded areas are free of defects.

5.1.2 Surfaces for welding shall be dry and free of scale, rust, oil, grease, water, and other foreign material.

5.2 HEAT AFFECTED ZONE (HAZ) AND/OR IN-PROCESS AND FINAL WELD EXAMINATION:

The area of examination includes the weld plus 1 inch on either side of the weld surface. As a minimum, the weld surface shall be examined for the following (if applicable):

- coarse ripples
- coarse grooves
- overlap
- abrupt ridges and valleys
- cracks
- porosity
- lack of fusion
- lack of penetration
- undercut

6.0 ACCEPTANCE CRITERIA

6.1 All welds require final inspection in accordance with this procedure and the applicable Spent Fuel Canister Welding procedure.

6.2 An indication shall be considered relevant if dimensions along its major axis meet or exceeds 1/16 (0.0625) inch.

A. Weld reinforcement may be measured with any suitable welding inspection gauge.
B. Weld throat and edge preparation depth may be measured with a depth gauge or similar mechanical gauge for comparison of plate surface to weld depth.

6.3 Weld and HAZ Acceptance Criteria:

A. Cracks: UNACCEPTABLE.
B Incomplete Fusion: UNACCEPTABLE.
C. Stop/Start Craters: UNACCEPTABLE.
D. Linear indications (those indications whose length greater than three times their width): UNACCEPTABLE.
E. Porosity or rounded indications (those which are circular or elliptical with their length equal to or less than three times their width): UNACCEPTABLE.
F. Arc strikes and associated blemishes: UNACCEPTABLE.
G. Weld reinforcement greater than specified in the project weld traveler in the applicable Spent Fuel Canister Welding procedure: UNACCEPTABLE.
H. Undersized welds (underfill): UNACCEPTABLE.
I. Undercut (wash, scalloping or other related non standard terms): shall not exceed 1/32 inch, (0.031) in any direction.

7.0 WELD DEFECT REMOVAL AND REPAIR

Weld defect removal and repair shall be performed and documented in accordance with the applicable Spent Fuel Canister Welding procedure.

8.0 DOCUMENTATION

8.1 Record the result of the examination and all pertinent information for performing the examination on the attached VT/PT Examination Report. Other forms may be used provided the required data is documented. Record the following information as applicable

8.2 All non-rejectable and rejectable indications noted during the inspection shall be documented and detailed.

8.3 The form VT/PT Examination Report shall be filled out in its entirety. N/A all that does not apply.

9.0 ATTACHMENTS

Attachment 1 VT Qualification Letter

10.0 FORMS

12751-MNGP-QP-9.201-01

Visual Weld Examination

TriVis Project Number: 12751	VT/PT Examination Report	Report Number:	Page 1 of 5

Customer: _____
Contract Number: _____
Component ID: _____
Weld Number(s): _____

Date of Examination: _____
Exam Surface: _____
Drawing Number: _____
Original Exam: ☐ Re-examination ☐

Light Meter Number: _____
Calibration Due Date: _____
Verify that the light intensity, at the surface of the test component, is 100 Foot candles (fc) or greater.
Measured Intensity: _____fc Illuminator:_____

Device Number: _____
Calibration Due Date: _____
Verify that all temperature(s) at the surface(s), to be examined, are between 50°F and 325°F.
*Note - Temperatures are recorded in "Additional Information".

Examination Method(s)

☐ Direct Visual Examination
Procedure:_____Rev.___
☐ Solvent Removable PT Exam.
Procedure:_____Rev.___

Penetrant Family:_____
Penetrant: _____ Batch: _____ Dwell: _____
Cleaner: _____ Batch: _____ Dry: _____
Developer: _____ Batch: _____ Develop: _____
Note - Dwell, Dry and Develop are express in minutes recorded.

ADDITIONAL INFORMATION

EXAMINATION RESULTS

SATISFACTORY ☐ UNSATISFACTORY ☐ SECOND EXAMINER N/A ☐

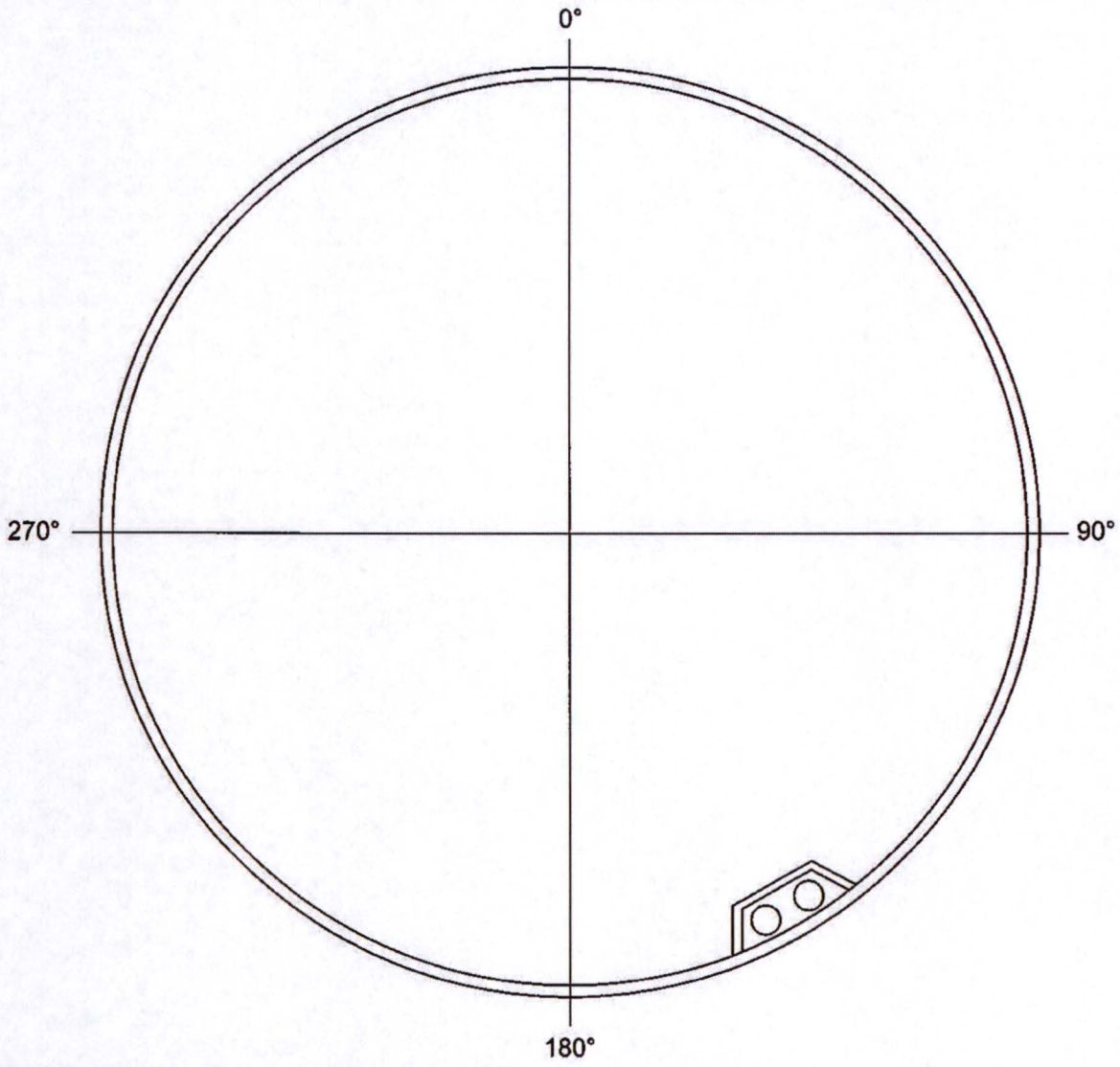
EXAMINER: _____ LEVEL _____ _____
(Print Name) (Signature)

EXAMINER: _____ LEVEL _____ _____
(Print Name) (Signature)

Form 12751-MNGP-9.201-01

Visual Weld Examination

TriVis Project Number: 12751	VT/PT Examination Report	Report Number:
PAGE: 2 of 5	Continuation Sheet for ITC Components: ITC WELD SECTION	

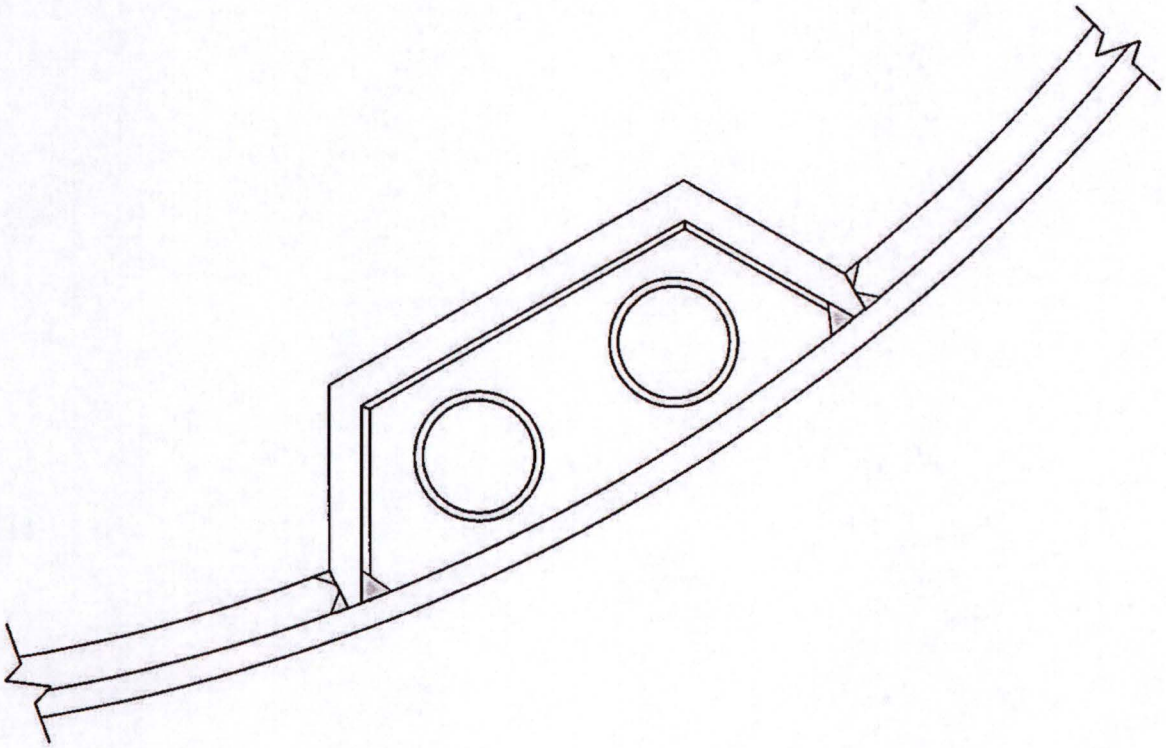


Notes: _____

Form 12751-MNGP-QP-9.201-01

Visual Weld Examination

TriVis Project Number: 12751	VT/PT Examination Report	Report Number:
PAGE: 3 of 5	Continuation Sheet for ITC Components: KEYWAY SECTION	

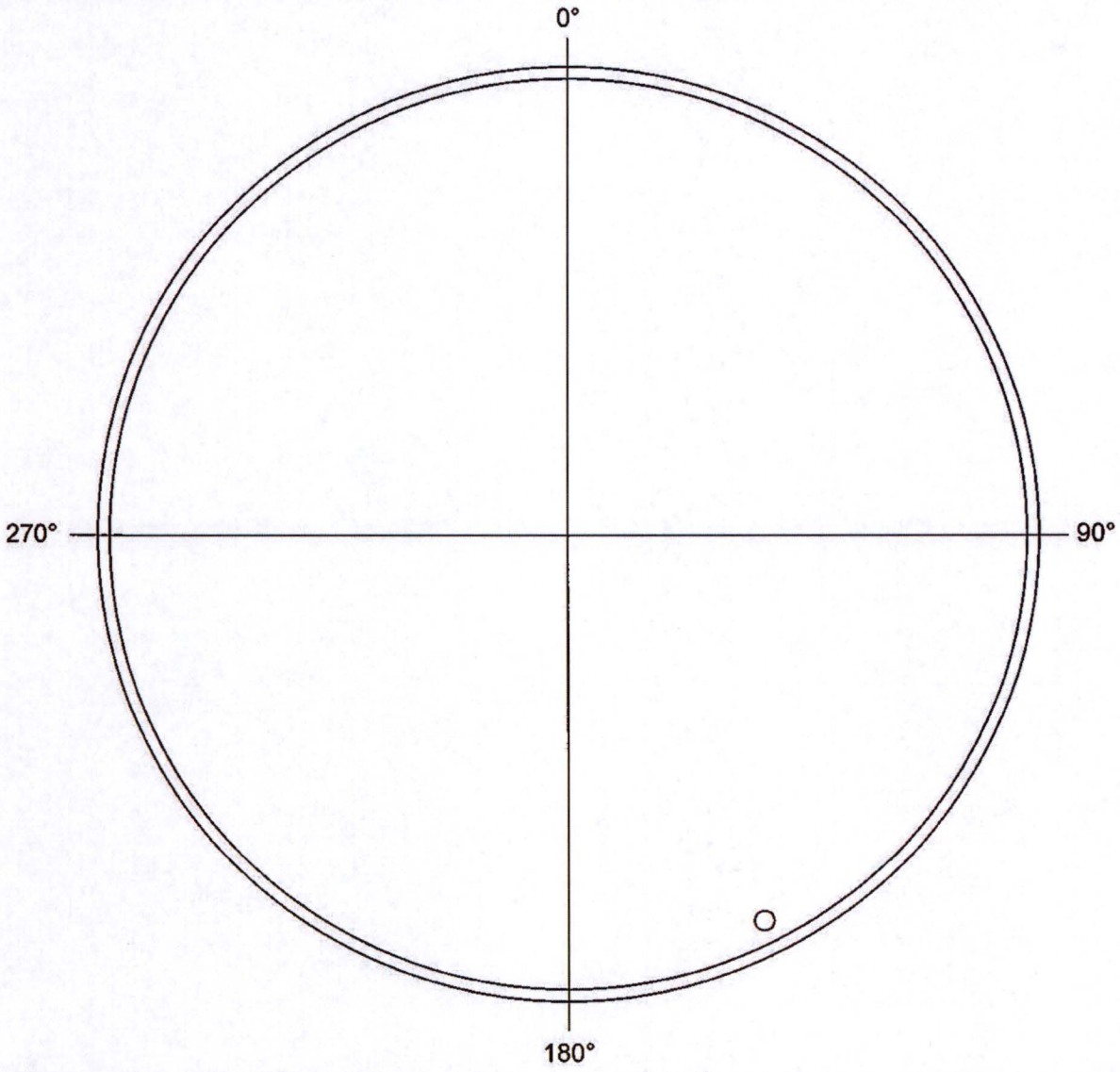


Notes: _____

Form 12751-MNGP-QP-9.201-01

Visual Weld Examination

TriVis Project Number: 12751	VT/PT Examination Report	Report Number:
PAGE: 4 of 5	Continuation Sheet for OTC Components: OTC WELD SECTION	

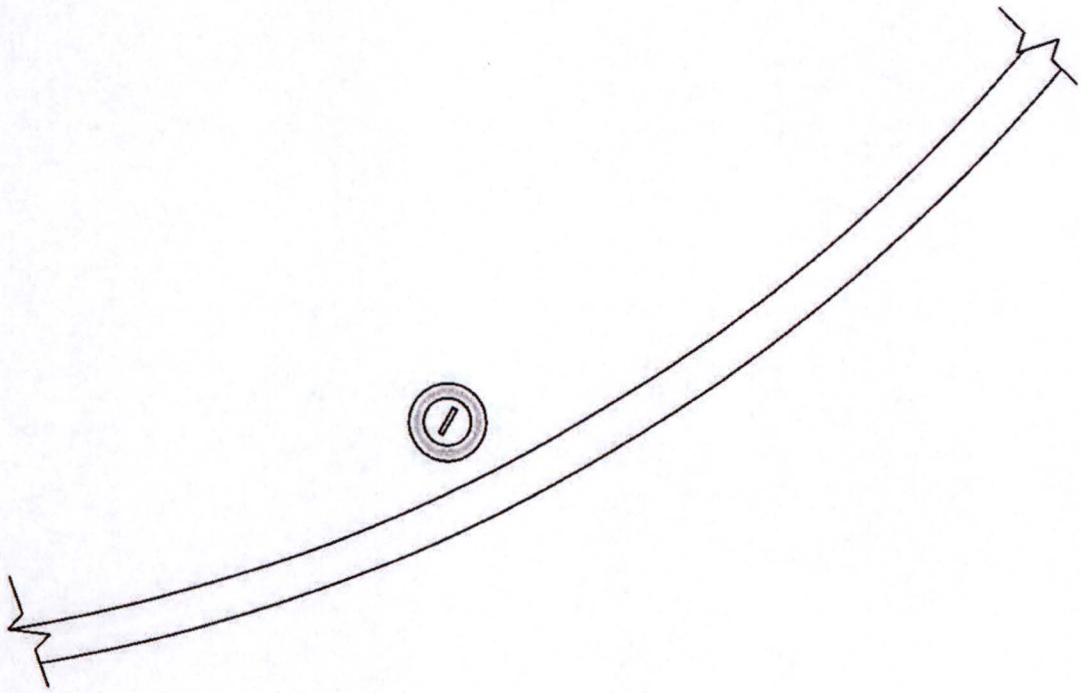


Notes: _____

Form 12751-MNGP-QP-9.201-01

Visual Weld Examination

TriVis Project Number: 12751	VT/PT Examination Report	Report Number:
PAGE: 5 of 5	Continuation Sheet for OTC Components: PLUG WELD SECTION	



Notes: _____

Form 12751-MNGP-QP-9.201-01

ATTACHMENT 1

LEAK TESTING SPECIALISTS, INC.
www.leaktestingspec.com
5790 Hoffner Ave. Suite 505 Orlando, FL 32822 Phone (407) 737-6415 Fax (407) 737-6416
Offices in: Washington, DC – Portland, OR – Orlando, FL

June 23, 2006

To: Letter to file

The purpose of this letter is to document the Procedure Qualification as described in section 4.2, paragraph 4.2.1 of TriVis Inc. Visual procedure, QP-9.201 Revision 1, VISUAL WELD EXAMINATION OF DRY CASK ASSEMBLY using the direct visual method.
The qualification was performed in accordance with the above listed procedure, and ASME Section V Article 9, 1998 Edition with 1999 & 2000 Addenda's.

Natural lighting supplemented by a flashlight, 12" ruler, 6" scale with 1/32" and 1/64" increments, a light meter, and a surface similar to that to be examined were used for this demonstration. Placing the scale on the surface at the least discernible location, holding the flashlight at approximately 12", and maintaining the eye within 24" at an angle greater than 30°, both the 1/32" and 1/64" increments were clearly visible.

Light Meter – (LTS) LM-001
Light intensity @ approximately 12" was 184 fc.

In conclusion, this demonstration qualifies the adequacy of TriVis Inc. Visual procedure, QP-9.201, Revision 01.

Demonstration was performed by David Hecksel (LTS)

David Hecksel
Leak Testing Specialists, Inc.
Level II VT

Note: Because this qualification letter is written to the TriVis core document QP-9.201, correlation is recognized between said document and this project specific document (12751-MNGP-QP-9.201 Rev 0).