NAV03 ET - NONDESTRUCTIVE TESTING (ISO 4.9)

Vendor: _____ Auditor: _____ Date: _____

1.	Routine Scheduled Audit a. Annual ☐ b. Semi-annual ☐ c. Other ☐
2.	Product driven Audit a. Product received by the Prime Vendor that does not meet specification requirements. ☐ b. Product that was installed or was being installed the does not meet specification requirements. ☐ c. Product has failed in service and investigations show it did not meet specification requirements. ☐
What specification is the Audit being performed to?	
3.	Governing Specification: Mark the appropriate specification a. MIL-STD-2132 ☐ b. NAVSEA 250-1500-01 (Welds) ☐ c. MIL-STD-271 (F) ☐ d. T9074-AS-GIB-010/271 ACN1 ☐ e. T9074-AS-GIB-010/271 Revision 1 ☐ f. Other _____ ☐
4.	Program Type: Mark the appropriate program type a. Level I / SubSafe ☐ b. Nuclear Plant Material ☐ c. Fly by Wire Ships Control System ☐ d. Navy Propulsion Program ☐ e. Naval Nuclear Propulsion Program ☐ f. Deep Submergence Systems / Scope of Certification Program ☐ g. Aircraft Launch and Recovery ☐ h. Other _____ ☐
5.	Does the vendor have an NDT Examiner? a. In house ☐ b. Contracted ☐ c. Certified in the method ☐ d. Available for the Audit ☐ e. No Examiner ☐
6.	Is the NDT inspection program administration code or specification complaint? a. Level III Approved written practice ☐ b. Approved procedures i. Level III ☐ ii. Prime contractor ☐ iii. Clearly specifies inspection requirements ☐ iv. Clearly specifies acceptance criteria ☐ v. Qualified to find known defects ☐

	c. Approved technique sheet i. Level III ☐ ii. Prime contractor ☐ iii. Clearly specifies inspection requirements ☐ iv. Clearly specifies acceptance criteria ☐ d. Approved technical work documents i. Level III ☐ ii. Prime contractor ☐ iii. Clearly specifies inspection requirements ☐ iv. Clearly specifies acceptance criteria ☐ e. Inspector records i. Is there a current eye examination ☐ ii. Certifications are current ☐ iii. Previous certifications included ☐ iv. Educational history ☐ f. Workmanship standards i. Available ☐ ii. Controlled ☐
7.	Are material controls in place? a. Segregated (Level I, Subsafe, etc.) ☐ b. Controlled ☐ c. Traceable ☐ d. Procedure for disposition ☐
8.	Are records maintained to confirm that all required inspection processes were performed? a. Description and unique identification of item being inspected ☐ b. Approved procedure identification ☐ c. Acceptance standard used ☐ d. Date of inspection ☐ e. Signatures of inspectors ☐ f. Disposition (accept / reject) of the item inspected ☐ g. Retention (Where and how long) ☐
9.	1. Technical Concerns: List the technical concerns associated with the method. a. <u>Pre-Weld Fit-up and Dimensional</u>: Pre-weld dimensions and fit-up attributes should be verified when applicable. b. <u>Weld Contour (as welded or ground)</u>: An improper weld contour can have a detrimental effect on the integrity of the weld joint and higher level NDT methods such as MT, PT, UT and RT. c. <u>Weld size (minimum and maximum)</u>: Specified weld sizes are based upon engineering, design and service requirements. Weld size verification is an important attribute to ensure the engineered strength weld and component can meet its intended purpose. d. <u>Acceptance Criteria</u>: Acceptance criteria can vary depending on joint design, weld classification and higher level NDT requirements (PT, MT, UT, RT). Inspection procedure and Acceptance criteria should be available to inspector at workstation e. <u>Inadequate Process Controls</u>: Thorough and technically comprehensive VT procedures ensure the inspector has adequate and detailed direction to evaluate any weld or applicable surface.

	f. Inadequate Technique: Inspector technique and methodology when performing visual weld inspection, especially measuring and dimensional verification of weld size and discontinuity size, are critical. Proper use of lighting is an important and helpful component of the inspection to enhance identification of surface discontinuities. Shadow formation caused by ridges and crevices are more readily visible and identifiable with proper flashlight angulation.
10.	Known Process Problems: List the known process problems a. Required inspection tools available b. Inspection tools calibrated (when required) c. Is the lighting adequate (is there a procedure requirement?)

Checklist Instructions: Be specific and ask follow-up questions as appropriate.

a. Any condition that is considered to be non-compliant must be specifically documented as to what the deficiency is.
   i. Specification
   ii. Page
   iii. Paragraph
   iv. Detailed description of what was observed

b. Document comments or observations on the checklist at each checkpoint or the comment section, as needed, no matter if the checkpoint is satisfactory or unsatisfactory.

c. Comments on any checkpoint may be positive, as well as negative.

d. If it is observed that an attribute requires additional attention but does not invalidate the inspection, mark the Needs Improvement (NI) column and provide a recommendation in the comments area.

Review all findings with the vendor to be sure there is no confusion as to what the findings are before you leave the vendor site.

Inspector Name: _____

Procedure: _____ VPAR Approval:

Part examined: _____

Administrative Attributes

1.	Are there any corrective actions previously issued for the method/technique being observed that will impact this inspection? If so, have the changes in the response been implemented?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
2.	Are the ET inspection personnel currently certified in accordance with contract requirements (Weld, Tubing, Array, Special technique)?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐

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3.	Is the inspector certified in the technique in which they are being audited? 3 year cert, plus 9 month (NSTP 271 ACN1) or 1 year (NSTP 271R1) currency. For NSTP 271R1, in addition to annual currency, has at least 1 TPE been performed within 2 years of the certification/re-certification date	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
4.	Are records available to include previous certification cycle?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
5.	List inspector certification level and expiration dates for vision (J1) and applicable NDT certifications.	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
6.	Is there an onsite NDT Level III Examiner qualified/certified to contract requirements? Is the certification current?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
7.	Is the Level III subcontracted? Or in-house?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
8.	Does the Level III regularly perform surveillances and technical performance evaluations for Eddy Current inspection personnel?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
9.	Is surveillance/TPE sufficient to assure satisfactory performance of the Inspectors being observed?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
10.	Are there any corrective actions previously issued for ET that will impact this inspection? If so, have the changes in the response been implemented?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
11.	Are the product and materials used to perform the tests controlled and traceable throughout the process (machine, probes, standards, etc.)?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
Procedure/Technique Sheet:		
12.	Did the inspector have the procedure/technique sheet at the examination site and refer to it during the audit? Is the procedure/technique sheet the latest revision?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
13.	Is the procedure/technique sheet qualified, approved, and signed by the Level III Examiner?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
14.	Is the procedure certified to comply with NSTP 271 and/or NSTP 2032?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
15.	Is the procedure/technique sheet in accordance with the specifications called out for in the contract and does it meet all applicable inspection requirements?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐

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16.	Does the contract/work order clearly define the inspection requirements, required quality level, etc.? Is the extent of coverage clearly defined; e.g. Maximum extent, 100%, type of inspection, etc.?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
17.	Did the inspector have the procedure/technique sheet at the examination site and refer to it during the examination? Is the procedure/technique sheet the latest/correct revision?	*Sat* ☐ *Unsat* ☐ *NI* ☐ *N/A* ☐
Equipment		
18.	Is equipment identified in the procedure or addendum being used?	
19.	Instrument manufacturer	
20.	Instrument model no.	
21,	Probe diameter	
22.	Test frequency	
23.	Probe type: Weld - Angle, Straight / Tubing - Bobbin, Array (CXB4)	
24.	Probe size to tube size (Fill Factor)	
25.	Weld inspection / dealloying setup	
26.	Differential channel setup, correct phase angle – Bobbin	
27.	Absolute channel setup, correct voltage(s) – Bobbin	
28.	Array setup	
29	Scanning (manual or automatic) ET Tubing (Inches/Sec to maximum allowable data rate)	
30.	Calibration Standards identification	
31.	Cal Standards correct material and size for job	
32.	Calibration Standards Drawings with Metrology, Chemical Composition Cert, Serial Number	

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		X Denotes Applicable Attribute	
Calibration Process		**Weld**	**Tubing**
33.	Is inspection and testing equipment of the required adequacy, accuracy, precision, and range to assure products comply with specifications and drawings?	x	x
34.	What Items were sampled and were they part of the supplier's calibration program and within the calibration/check cycle?	x	x
35.	Was the selection of probe(s) correct for the weld/condenser/tube type per procedure requirements?	x	x
36.	Weld inspection / dealloying setup	x	
37.	Differential channel setup, correct phase angle - Bobbin/Weld	x	x
38.	Absolute channel setup, correct voltage(s) - Bobbin		x
39.	Array setup		x
40.	Is proper centering maintained for array probes? - No wear on the centering fingers		x
41.	Is the Inspector/Analyst/Operator familiar with the equipment used to perform Calibration/Testing?	x	x
Inspection		**X Denotes Applicable Attribute**	
Scanning		**Weld**	**Tubing**
42.	Were all good safety practices being followed?	x	x
43.	Was the weld joint/tube properly identified? Use of correct tube sheet map or a weld joint index from drawing	x	x
44.	Is the inspection performed in the final surface and heat treat condition unless otherwise allowed.	x	
45.	Is the surface finish of the piece being tested in accordance with the procedure?	x	

46.	Was the weld area to be inspected properly cleaned and prepared? (No spatter, etc.)	x	
47.	Was the condenser/heat exchanger/tubing to be inspected properly cleaned and prepared? Is the condenser/heat exchanger tagged-out for confined space entry (if required)?		x
48.	Are proper scanning techniques used? (Indexing, scanning speed, pull speeds, etc.)	x	x
49.	Was the weld probe maintained at the proper angel to the weld face?	x	
50.	Did the inspector get proper coverage of both weld and HAZ and all required directions?	x	
51.	Are these products in final form or configuration? If these products are not in the final form (fastener, hollow round pressure containing part, etc.) are they being inspected to the requirements of their final form and at the latest stage of manufacture?	x	x
52.	For complex shaped components or materials does the inspection ensure adequate examination of the entire weld from all surfaces?	x	x
53.	Was the Inspector attentive to the instrument display during examination?	x	x
54.	Have the parts been properly pre-cleaned? Is the part coated/painted? If painted is the coating non-conductive and has the thickness been verified? If thickness is greater than .040" has appropriate approval been obtained? Describe:	x	
55.	Was the calibration checked at the conclusion of the exam prior to turning off the equipment? Was it within acceptable limits when/if checked? (See results for out of tolerance)	x	x
Eddy Current Evaluation		**X Denotes Applicable Attribute**	
Weld Inspection Results		**Weld**	**Tubing**
56.	Did the indication signal meet or exceed the calibration notch signal?	x	

Bobbin, Differential, Array		**X Denotes Applicable Attribute**	
57.	**Bobbin Results**	**Weld**	**Tubing**
57a.	Were rejectable bobbin indications found during this inspection. Were they properly reported?		x
57b.	Voltages ± 10 volts (out of calibration if exceeded)		x
57c.	Tube Plugging criteria met		x
58.	**Differential Results**	**Weld**	**Tubing**
58a.	Were rejectable bobbin indications found during this inspection. Were they properly reported?		x
58b.	Tube Plugging criteria met		x
58c.	40 ° phase angle ± 5° (out of calibration if exceeded)		x
58d.	Test frequencies (Correct Subtraction frequencies for "mix" channels)		x
59.	**Array Inspection Results**	**Weld**	**Tubing**
59a.	Were Single Axial Indications (SAIs) or Single Circumferential Indications (SCIs) found during this inspection? Were they properly reported?		x
59b.	Were any Volumetric Indication (VOL) located? Were they properly reported?		x
59c.	IAV indication (I for ID, A for Array, V for Voltage) include voltage ratio(s) information in Utility 3		x
59d.	Was tube replication used		x
59e.	Did replication reveal a pluggable defect as measured on an optical comparator? Did ET/ECA information agree with replication?		x

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60.	**Overall Knowledge**	**Weld**	**Tubing**
60a.	Did the acquisition operator demonstrate knowledge of the correct equipment setup and how to properly organize and pull standards?		x
60b.	Were acquisition/analysis technique sheets followed.		x
60c.	Did the data analyst demonstrate knowledge of the correct acceptance criteria and how the acceptance criterion is determined?		x
60d.	Are inspection records adequate and maintained to confirm that all required inspection processes were performed?	x	x
60e.	Was a report filled out correctly and with all the information and signatures required by the procedure, applicable specification and with proper disposition/recording of the discontinuities?	x	x

NOTE: The ET Consolidated attribute list does not list the paragraph numbers of the specification publications it is designed for (NSTP 2032, NSTP 271, NINST 9254.1). Each organization may choose to insert the paragraph numbers for the particular specification(s) they are working to and to provide assistance to audit personnel as needed.

Concerns/Comments