DCMA NSEO MANUFACTURING PROCESS REVIEW (MPR) CHECKLIST #03RT

RADIOGRAPHIC TESTING

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| **SUPPLIER & CAGE:**  |  |
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| **LOCATION:** |  |
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**Program Type:**

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|  | Level I/SUSBAFE (LI/SS) |  | Navy Propulsion Program (NPP) |  | Deep Submergence Systems/Scope of Certification Program (DSS-SOC) |
|  | Nuclear Plant Material (NPM) |  | Naval Nuclear Propulsion Program (NNPP) |  | Aircraft Launch & Recovery Equipment (ALRE) |
|  | Fly By Wire Ships Control Systems (FBWSCS) |  | Ships Critical Safety Items (SCSIs) |  | Other: |

**Contractual Requirement(s) for this Process:**

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**Supplier Procedure Number(s), Title(s) & Revision Level(s)/Date(s):**

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| **Process Reviewed By:**  |  |
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| **Date(s) of Review:** |  |
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**Process Concerns and Guidance:**

* Use of an incorrect penetrameter/image quality indicator (wrong material type/group, wrong size, etc...) or improper placement of penetrameter.
* Evaluating radiographic film to the incorrect minimum quality level could result in the acceptance of defective material
* Inadequate supplier radiation safety controls during radiography could result in unsafe conditions and radiation exposure to personnel.
* Inadequate radiographic film processing, handling, and storage could result in the degraded or damaged radiographs.
* Insufficient coverage of the full area of interest.
* Inspection procedure and acceptance criteria not available to inspector at workstation.
* Incorrect acceptance criteria utilized.
* Rough surface conditions or welds can interfere with film interpretation and mask indications.
* Part configuration and/or significant thickness changes make technique development difficult and sometimes costly.
* The cost of radiographic equipment and a shortage of qualified radiographers and examiners cause many suppliers to rely heavily on inspection labs that may not have adequate or verified process controls or NDT programs.
* Conformance to specifications with Radiographic Technique attributes and variables.
* Radiographic records and verification that all indications are identified, evaluated, dispositioned, documented and correlate to the component including inadvertent indications in or out of the area of interest.
* Radiographic Shooting Sketches (RSS) not meeting specification requirements or proper development or approval.

**Governing Specifications**:

* NAVSEA 250-1500-1
* MIL-STD-2132
* T9074-AS-GIB-010/271

**Additional Oversight Checklists**

* Addendums to this MPS checklist are available to use for a more in-depth process surveillance. If used, the completed Addendum(s) are to be attached to the PDREP Surveillance Plan with the base checklist.

* 03 MPR-MPS - Addendum 1 – NDT Qualification, Certification and Oversight

**General Instructions for Radiographic Testing Process Reviews:**

Navy Supplier contracts may invoke various, governing NDT specifications. This checklist may not include all of the requirements of all of the possible specifications that may be called out in a Navy contract and is, therefore, offered as guidance. It is incumbent upon the QAR to review the governing specifications imposed on the supplier being audited and adjust this checklist accordingly. Additional checklists regarding Mil-STD, ASTM, and personnel certification specifications can be found in the NSEO NDT Toolbox. Use this over-arching checklist in tandem with the additional, specific checklists. (Example: an audit of an NDT lab for radiography may require the use of this checklist, the NAVSEA-250-1500 checklist, the SNT-TC-1a checklist and possibly numerous MIL-STD and/or ASTM checklists.)

**A**. **MANPOWER:**

1. Is there a Written Practice for the control and administration of NDT personnel training, examination, certification and oversight approved by the Level III Examiner? (Addendum 1 available if needed)

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1. Are the personnel performing the inspection and testing functions of the appropriate skill/experience level and/or properly trained/certified to perform the required inspections/tests? ***What are the requirements?***

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1. Record all operations observed (include type and specification, where applicable) and the corresponding inspectors’ names. Are any personnel certifications expired and are they still working in the process? (NAV03-9)

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1. Are all NDT personnel, including the examiner, recertified by examination at a minimum interval as required by specification? (NAV03-3)

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1. Are adequate records available to administer personnel qualification (e.g. name, evidence of examination given, grade, re-certification dates, signature of examiner)? (NAV03-4)

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1. Do records include evidence of performance of applicable NDT during the last 9 months or performance of required surveillance and technical performance evaluations as applicable to maintain qualification? (NAV03-5) ***What are the requirements?***

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1. Are vision test records available? Do vision test records note corrective aids (glasses) when applicable? Do these records indicate a J1 Jaeger test or equivalent brightness discrimination on an annual basis, when applicable? (NAV03-6A/B/7)

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1. Are the credentials of the training/certification official in accordance with specification requirements? ***What are the requirements?***

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1. Is there a corrective action system or remedial training plan in place for when inspector errors occur and is there evidence that it is followed?

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**B. MATERIALS**:

1. Are materials controlled and traceable throughout the process?

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1. Are certifications for materials used in the process reviewed for acceptance and maintained on file for review?

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1. Do the materials comply with contract/specification and/or supplier-imposed technical requirements? ***What were the materials reviewed?***

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1. Are there controls to ensure conforming material is consistently used in the process?

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1. Are materials traceable and identified, as required, and within shelf life, if applicable? ***(There are shelf lives for chemicals. Check the manufacturer’s certification or the chemical drum for this information)***

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1. Are new/unused open and unopened radiographic film packages properly stored and within the shelf life/not expired? (NAV03-36)

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**C. MACHINERY**:

1. Is **inspection and testing equipment** of the required adequacy, accuracy, precision, and range to assure supplies produced comply with specifications and drawings? *What Items were sampled and were they part of the supplier’s calibration program and within the calibration/check cycle?*

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1. Does equipment that requires qualification or certification approval have contractual approval for use?

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1. Identify the NDT equipment available at this facility. Is Government owned equipment adequately protected/maintained in accordance with a documented process?

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1. Are standards, traceable to NIST, available to verify the accuracy of the testing equipment?

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1. **Note: *Equipment Calibration* –** Radiographic examination equipment, including radiation safety equipment, should be checked for performance and accuracy at the time of purchase and at defined intervals thereafter; whenever malfunction is suspected, when specified by the Cognizant Engineering Organization, or whenever electrical maintenance that might affect equipment accuracy is performed. Governing contract NDT specifications will define these requirements. ***What requirements are applicable to this facility? Does the equipment meet these requirements?***

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1. Are penetrameters correctly identified with lead numbers or engraved strips indicating material thickness? Are penetrameters permanently identified by material or principal alloy? (NAV03-31/32)

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**D**. **METHODS**:

1. Is the correct NDT procedure readily available to the inspector and approved (if required)? Identify procedure number, revision, date, and applicable Approval Number (if applicable).(NAV03-2/26)

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1. Are work instructions, test procedures, travelers, etc. being used current, adequate, clear, concise and up to date (latest revision) to allow only contractually conforming supplies to be delivered to the Government? ***What documents (identifying number & revision) were reviewed?***

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1. Do records of RT clearly identify the results of the inspections and tests performed and include traceability back to the procedure, lot/heat numbers of parts tested, instruments used, and personnel who performed each inspection?

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1. Are changes to methods (instructions) controlled and distributed adequately and timely to affected personnel?

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1. Is there supplier data available for analysis that can substantiate the effectiveness or ineffectiveness of this process? ***If available, what data was reviewed, and what does the data indicate?***

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1. Is a sketch, drawing, written procedure, or equivalent record available to show the set-up used to make each radiograph? Is the set-up documentation legible, and does it contain all the information required by the applicable specification? (NAV03-27A/B)

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1. Is there a system for positive identification of RT film correlating to the part inspected? (NAV03-28)

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1. Are the RT location markers maintained on the part to permit coordination with the images on the film? (NAV03-29)

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1. Verify RT records contain the following: (NAV03-38 a through o)
	1. Correct penetrameter size used
	2. Correct penetrameter material/group used
	3. Proper shim material/group and thickness used
	4. Correct source-to-film distance used
	5. Film density on penetrameter image is not greater than 15% of the density in area of interest
	6. Film density (single film viewing) is 1.5 to 4.0 in area(s) to be examined
	7. Film density (double film viewing) is 2.0 to 4.0 in area(s) to be examined
	8. Radiograph(s) show complete coverage
	9. Complete coverage of repaired area(s)
	10. Original radiographs of repaired area(s) included with over-read package (if applicable)
	11. Radiographic Shooting Sketch provided with over-read package
	12. Shooting sketch specifies wall thickness of item
	13. Sketch(es) showing location(s), size(s), shape(s) of repaired area(s) included with over-read package
	14. Discontinuities, both acceptable and rejectable have been recorded and dispositioned
	15. Radiographic Inspection Report has Contractor Approval when required by the purchase order/contract

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**E.** **ENVIRONMENT**:

1. Is the process conducted under controlled environmental conditions as required by contractual and/or supplier-imposed technical requirements? ***What are the environmental conditions and are they monitored (charts, gages, etc., within calibration)?***

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1. Is safety equipment available and in use, if needed? ***What are the safety requirements for this process?***

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1. Is the film viewing facility constructed to exclude objectionable background lighting and contain a film viewer with a cooling device and densitometer? (NAV03-30)

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1. Are radiographic film storage areas adequate (temperature, humidity and environment clean and dry)? (NAV03-35)

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**F. PRODUCT EXAMINATION:**

***The QAR must perform a product examination in order to verify the output of the process being reviewed and document the results below. If at all possible the QAR should witness performance of the inspection/test by supplier personnel to verify competency of supplier personnel.***

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| Date(s) Conducted: |  |
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| Product Examination Performed By: |  |
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| Contract Number(s): |  |
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| Part Number(s)/Serial number(s): |  |
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| Part Nomenclature(s): |  |
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| Supplier Personnel Contacted and Titles: |  |
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| Drawing Number & Revision: |  |
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| Lot Size and Sample Size: |  |

1. Is the inspector properly qualified and performing the NDT in accordance with the correct procedure and meeting all requirements of the applicable NDT specification being performed (proper method/set-up)? (NAV03-26B)

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1. Is the correct penetrameter being used (size and group)? (NAV03-33)

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1. Is the exposure time adequate to meet the required film density? (NAV03-34)

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1. Are all artifacts identified and dispositioned on the reader sheet? (NAV03-37)

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1. Does the inspector complete the inspection record properly?

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| Additional PE Characteristics Examined: | # Observations |
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1. Identify the inspection methods (W, I, T, V) used to verify conformance with procedures and standards:

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| **W** |  |  | **I** |  |  | **T** |  |  | **V** |  |

**PE Comments/Concerns**

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| **Overall MPR Results:** | **SATISFACTORY** |  | **UNSATISFACTORY** |  |

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| **Corrective Action Generated?** | **No** |  |  | **Yes** |  |  | **CAR#** |  |

FOLLOW-UP ACTION REQUIRED?

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**SUMMARY/NOTES/COMMENTS/CONCERNS**:

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