

MIL-M-85337A(NAVY)

15 November 1984

SUPERSEDING

MIL-M-85337(AS)

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## MILITARY SPECIFICATION

## MANUALS, TECHNICAL: QUALITY ASSURANCE PROGRAM; REQUIREMENTS FOR

This specification is approved for use by the Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification establishes technical manual quality assurance (TMQA) requirements necessary to ensure the adequacy and accuracy of TM content through a coordinated contractor and government program. The quality assurance (QA) terms and definitions used in this specification are consistent with those contained in MIL-STD-109 except as defined in 6.3. Procedures are established for the development and implementation of a contractor program encompassing the conduct of TMQA program reviews, quality reviews, in-process reviews, adequacy reviews, validation, and verification requirements.

1.2 Applicability. This specification applies to all TM procurements when referenced in the contract or other contractual document.

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Commanding Officer, Naval Air Engineering Specifications and Standards Department (ESSD) Code 93, Lakehurst, NJ 08733 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

## SPECIFICATIONS

## MILITARY

MIL-Q-9858 - Quality Program Requirements  
MIL-I-45208 - Inspection System Requirements

2.1.2 Other government documents, drawings, and publications. The following other government documents, drawings, and publications form a part of this specification to the extent specified herein.

NAVAIR 00-25-700 - Technical Manual Preparation Guide for Technical Writers, Editors, and Illustrators  
NAVPERS 18068 - Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards

(Copies of specifications, standards, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.1.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

## 3. REQUIREMENTS

3.1 TMQA program. The contractor shall establish a TMQA program (see 6.3.7) in accordance with the requirements of this specification which supplements and details the requirements of MIL-Q-9858 and MIL-I-45208 to ensure the development of technically accurate and complete TMs. A QA program developed as a result of material generated by the requirements of MIL-Q-9858 and MIL-I-45208 will be reviewed by the requiring activity for acceptance provided it satisfies the requirements of this specification. The contractor's QA program shall encompass the accountability for and development of quality control functions required for the management of the following TM program elements:

- a. Source data collection.
- b. Intermediate product (see 6.3.5).
- c. Graphics and illustrations.

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- d. Validation (see 6.3.10).
- e. Internal coordination.
- f. Records.
- g. Verification support.
- h. Final product.

3.1.1 TMQA program plan. When specified (see 6.2.1), the contractor shall prepare a plan which shall describe the scope and approach of the TMQA program (see 6.2.2).

3.1.1.1 Guidance and Quality Planning Conference. The Guidance and Quality Planning Conference is conducted to ensure the contractor's understanding of applicable specifications, technical manual contract requirements, formal instructions, established policies, and program requirements. Such conferences may be requested by either the contractor or government.

3.1.1.2 Program plan acceptance. The government will furnish written notice of the acceptability of the contractor's TMQA program plan.

3.1.1.3 Program plan and implementation. Implementation of the TMQA program plan shall be evidenced by development of:

- a. work instructions and their use (see 6.3.12);
- b. review procedures and records;
- c. corrective and preventive action procedures;
- d. support for QA functions;
- e. product validation procedures; and
- f. compliance with the approved milestone dates.

3.2 QA program organization. The contractor's QA program organization shall have well defined responsibility, authority, and the organizational freedom to identify and evaluate QA problems and to recommend and initiate solutions.

3.3 QA program functions. All TM elements and processes shall be evaluated by contractor and government QA personnel at various stages of development, by any or all of the following QA program functions:

- a. Guidance and quality planning conferences (see 3.1.1.1).
- b. Adequacy reviews (see 6.3.1).

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- c. In-process reviews (see 6.3.6).
- d. Quality program reviews (see 6.3.8).
- e. Quality reviews (see 6.3.9).
- f. Validation (see 6.3.10).
- g. Verification (see 6.3.11).

3.3.1 Quality reviews. During TM development and production, the contractor shall perform reviews of the TM and of all the constituent elements and processes. The reviews shall be used to assess compliance with the TMQA program plan and provide for corrective action.

3.3.1.1 Quality records. The contractor shall maintain objective records of all quality reviews.

3.3.1.2 Corrective action. The contractor shall initiate a process of corrective action for detected deficiencies. The contractor shall implement preventive action programs to counter any apparent deficiency trends. The detection of deficiencies which are recognized and are not cited in the CD shall be added to the CD in the TMQA program plan.

3.3.1.3 Data base control. (see 6.3.2 and 6.3.3) The contractor shall ensure that the most current source data is available and utilized for TM development. The following are examples of the types of items and control documents that are considered appropriate source data:

a. Description of source data

- (1) Procurement and test specification.
- (2) Proposal technical description.
- (3) Photos of mockups or equipment.
- (4) Support of equipment description data.
- (5) Task analysis data.
- (6) Maintenance plan.
- (7) Special user personnel qualifications as defined

in NAVPERS 18068.

- (8) Notes and materials from vendors.
- (9) Failure modes and effects analysis data.
- (10) Engineering reports.
- (11) Blueprints/drawings/sketches.
- (12) Vendor brochures and commercial manuals.
- (13) Engineering change proposals (ECPs).
- (14) Logistics support analysis records (LSARs).
- (15) Maintenance engineering analysis records.

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- (16) Hazard analysis.
- (17) Subsystem hazard analysis.
- (18) Support equipment requirements sheets.
- (19) Provisioning data.
- (20) Classification (DD 254).
- (21) Local engineering specifications.
- (22) Manual change releases.
- (23) Technical publication deficiency reports.
- (24) Technical manual deficiency/evaluation reports.
- (25) Validation/verification comments.
- (26) Design change notices. (DCN).
- (27) Supply item change records (SICRs).

## b. Data base control documents

- (1) Data recording and cataloging system developed.
- (2) Management forms developed.
- (3) Liaison with data release authority established.
- (4) Procedure for ECP routing for TM input.
- (5) Release schedule tracking documented.
- (6) Liaison with design and training groups established and documented.
- (7) Procedures for engineering review of draft material and sign-off developed.

3.3.1.4 Task identification matrix or equivalent. The TM content and organization shall be consistent with a task identification matrix or equivalent, prepared in accordance with the guidelines provided by NAVAIR 00-25-700 or similar developmental methodology. The task identification matrix or its equivalent shall ensure that all required levels of maintenance are sufficiently detailed and complete. The task identification matrix or equivalent shall be in agreement with the logistic support analysis (LSA) task analysis data, approved maintenance plan, and approved source, maintenance, and recoverability (SM&R) codes.

3.3.1.5 Control of subcontractors and vendors. The contractor shall ensure the quality of TMs prepared by subcontractors and suppliers.

3.3.1.6 Sampling plans. All TM products, regardless of percentage of completion, shall be sampled and evaluated as a method of determining the acceptability of product in development. Sampling plans shall be as specified in the QA program plan.

3.3.2 Quality program reviews. The contractor shall support quality program reviews as requested by the government (see 4.3) and provide access to QA records as specified in the TMQA program plan.

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**3.3.3 Validation.** Validation is a contractor QA responsibility which shall be accomplished for all TMs, changes, and revisions thereto. A TM shall not be considered validated until the following conditions have been fulfilled:

a. Contractor's engineering technical review (see 6.3.4) has been completed.

b. Information reflects configuration of the systems/equipment and includes all engineering changes.

c. Procedural instructions are readily understandable by the intended user and adequate to perform all operations and maintenance functions.

d. Adequacy of data is checked to ensure that it supports the approved maintenance and support plan.

e. Hardware of the proper configuration is available for the validation effort.

**3.3.3.1 Validation plan.** When specified (see 6.2.1), a validation plan shall be developed and shall be acceptable to the government (see 6.2.2). It shall reflect compatibility with the overall maintenance and support plan, outline the contractor's recommended validation procedure, and indicate the scope of the validation effort. It shall also include manuals for which requirements have yet to be defined, such as equipment component and support equipment manuals. The plan shall include recommendations for simultaneous validation/verification as appropriate.

**3.3.3.2 Validation performance.** Theory and principles of operation, system/component description, SM&R codes, schematic, and wiring data shall be validated against engineering source data. Operating and maintenance procedures including checkout, alignment, scheduled removal and replacement instructions, and associated checklists shall be validated against the system/equipment by actual demonstration. Malfunctions shall not be introduced into the system or equipment for the purpose of validation unless specifically required for certification of procedural tasks or system tests. Destructive malfunctions shall not be introduced into the system or equipment for any purpose.

**3.3.3.3 Support equipment.** Government approved support equipment shall be utilized in the performance of validation. Simulation or substitution of support equipment shall be approved by the government. It is the responsibility of the contractor to request government furnished equipment in order to support the validation effort.

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3.3.3.4 Validation records. Records of all validations performed shall be maintained. These records shall indicate the affected manuals, weapon system, component part number, or serial number. The records shall be maintained and be available for government review.

3.3.3.5 Disposition of validated data. Corrections and significant comments resulting from validation shall be incorporated prior to the certification and acceptance of the TM.

3.3.3.6 Validation certification. When specified (see 6.2.1), the contractor shall prepare a validation certificate attesting to the TM adequacy and accuracy (see 6.2.2).

3.3.3.7 Combined validation/verification. When authorized by the government, verification shall be performed concurrently with validation. The government retains jurisdiction over a combined validation/verification in coordination with the contractor.

3.3.4 Verification. When specified (see 6.2.1), verification shall be accomplished under the jurisdiction of the government and may include contractor support.

3.3.4.1 Verification plan. When specified (see 6.2.1), a verification plan (see 6.2.2) shall be developed by the contractor to be reviewed and accepted by the government.

3.3.4.2 Verification planning data cards. When specified (see 6.2.1), the contractor shall develop verification planning data tailored to each effort. Since the verification effort is proportional to the scope of the manual and complexity of the hardware/equipment, the number of verification planning data cards (see 6.2.2) may vary as follows:

a. A manual covering a single level of maintenance on a single item will normally require only one planning card.

b. A manual covering more than one level of maintenance will normally require planning data cards for each level of maintenance.

c. An organizational level maintenance instruction manual will normally require a separate planning card for each prime heading.

3.3.4.3 Verification sequence control chart. When specified (see 6.2.1), a verification sequence control chart (see 6.2.2) shall be prepared by the contractor when:

a. several manuals are to be verified under a concerted effort,

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b. several parts of a single manual are to be verified simultaneously, or

c. a preferred sequence is required to maintain continuity in task performance.

3.3.4.4 Verification support requirements. Contractor support of verification shall consist of the following:

a. Serves as verification recorder, if required.

b. Provides assistance in performing verification tasks, if required.

3.3.4.4.1 Verification disposition records. The contractor shall disposition the comments and correct manual discrepancies recorded during verification. The government will review and indicate acceptance of verification dispositions.

3.3.4.5 Technical manual verification incorporation certification. When specified (see 6.2.1) and upon completion of all verification actions, the contractor shall prepare a certificate attesting that all discrepancies and deficiencies recorded during verification have been corrected or resolved (see 6.2.2). Final acceptance of the TM will be in accordance with terms of the contract.

3.3.5 Technical manual evaluation records. Records shall be maintained during in-process reviews, validation and verification efforts. The records (see 6.2.2) shall document quality problems and disposition recommendations. The records shall adequately identify the items in the manual(s) to which the comments/recommendations apply.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein unless disapproved by the government. The government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements (see 6.2.1).



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4.2 QA responsibilities. The contractor shall be responsible for the implementation of the TMOA program plan (see 3.1.1) and for product quality.

4.2.1 TMOA program reviews. During the TMOA program review, the contractor shall demonstrate to the government the operation of the TMOA program. This shall include review of data generated during contractor quality reviews and quality related reports and records. TMOA program reviews chaired by a government representative will be conducted at the contractor's facility. All quality review results will be documented by the government.

4.2.2 Quality reviews. The contractor's QA organization shall conduct quality reviews to ascertain compliance to the requirements cited in Section 3 of this specification. Quality reviews shall be conducted to evaluate the availability and adequacy of materials, processes, procedures, and intermediate products which constitute TM development. Sampling plans (see 3.3.1.6) shall be as specified in the TMOA program plan.

4.2.3 Quality records. The contractor's compliance with the requirement of 3.3.1.1 will be determined by the accuracy, currency, and the completeness of records as specified in the contract and the TMOA program plan. Objective evidence shall be demonstrated by the ease of retrieval of specific information from records and their accuracy, currency, and completeness at the time of the government representative's request.

4.2.4 Corrective action. The contractor QA personnel shall approve all corrective and preventive actions taken in response to all recorded deficiencies. Objective evidence of the effectiveness of the corrective action program for each deficiency shall be maintained.

4.2.5 Data base control. The presence, adequacy, and completion of technical publication data base shall be evaluated for conformance to 3.3.1.3.

4.2.6 Task identification matrix or equivalent. The requirements of 3.3.1.4 shall be reviewed to determine that all levels are sufficiently detailed and completed. Evaluation shall include a comparison of the tasks identified to the current configuration of hardware.

4.2.7 Control of subcontractors and vendors. Successful implementation of the contractor's procedures designed specifically for control of subcontractors and vendors shall be the evidence of compliance with 3.3.1.5. As a minimum, the contractor shall establish procedures for the following:

- a. The selection of qualified suppliers.

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b. The transmission of quality requirements for subcontractors and vendors.

c. The inspection of subcontractor and vendor records and corrective action procedures.

d. The evaluation of subcontractor and vendor material, processes, and products.

4.2.8 Sampling plans. The contractor's QA organization shall, when appropriate, utilize sampling techniques (see 3.3.1.6) for evaluation of product.

4.2.8.1 Classification of defects (CD). The CD table associated with the contractor sampling plans shall be made available during the Guidance and Quality Planning Conference (see 3.1.1.1). The CD shall be patterned after the CD listed below for product evaluation. The contractor and the government may jointly classify additional defects applicable to the specific products being procured.

a. Major defects (incorrect, incomplete, missing)

- (1) maintenance procedures;
- (2) values and tolerances;
- (3) illustrations, schematics, wiring diagrams;
- (4) part numbers;
- (5) references and indices;
- (6) safety - notes, cautions, warnings;
- (7) technical content (source dates/hardware comparison);
- (8) classified matter (incorrect identification/handling);
- (9) charts and tables; and
- (10) an excess of any one or combination of the following: unfamiliar words, inconsistent vocabulary, long sentences, long paragraphs, noninformative headings, organization not based on immediate needs of the user, and complex or unclear illustrations.

b. Minor defects (incorrect, incomplete, missing)

- (1) typographical errors;
- (2) collated pages;
- (3) SM&R codes;
- (4) style and format (writer's guide errors); and
- (5) MIARS (cartridge, damage, inverted film, file density, film inverted).

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- 4.3 Government inspection. The government reserves the right to conduct a Guidance and Quality Planning Conference and quality program reviews throughout the term of the contract to ensure compliance with the QA program plan, applicable TM specifications, the contract, and the production of a quality product (see 6.2.1).
- 4.4 In-process reviews (IPRs). IPRs will be authorized and convened by the government. The contractor shall support IPRs and provide access to TM materials, intermediate, and final products. As a minimum, IPRs will include evaluation of source data, TM plans/outlines, presentation methods, modes of preparation, specification compliance, completed text and artwork, and readability.
- 4.5 Adequacy review. When specified (see 6.2.1), adequacy reviews will be authorized and convened by the government to monitor the preparation of illustrated parts breakdown (IPB) and documentation in support of the planned maintenance system (PMS) and may be conducted on maintenance manuals to determine adequacy prior to verification. Adequacy reviews will be conducted on IPBs to ensure that the coverage is in accordance with the approved SM&R codes; PMS documentation will be reviewed to ensure it is ready for fleet evaluation.
- 4.6 IPR/adequacy review location. IPRs and adequacy reviews will be held at the contractor's facility but can be held at a designated government facility. IPR/adequacy reviews intended for locations other than the contractor's facility must be approved by the government (see 6.2.1). The contractor may request IPR/adequacy reviews at any time during the term of the contract when assistance or clarification is desired. The government will request additional IPR/adequacy reviews when it appears the program is not proceeding according to schedule.
- 4.7 IPR/adequacy review records. The government will act as recorder and record decisions, results, and findings during the IPR/adequacy review evaluation utilizing the Technical Manual Evaluation Record. The government will provide a copy of all recorded IPR/adequacy reviews to the contractor.
- 4.8 Disposition of IPR/adequacy review findings. The government and the contractor shall resolve IPR/adequacy review findings that involve problem areas or findings that require further evaluation before final disposition. Discrepancy or deficiency found as the result of the IPR/adequacy review shall be corrected prior to certification and acceptance of the TM.

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## 5. PACKAGING

5.1 Preparation for delivery. Items shall be packaged in the most economical manner that will provide adequate protection during shipment in accordance with accepted industrial packaging procedures.

## 6. NOTES

6.1 Intended use. This specification is intended for use in establishing a QA program applicable to the development of the TMs required in support of Navy operation and maintenance functions.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Whether a TMQA program plan is required (see 3.1.1).
- c. Whether a validation plan is required (see 3.3.3.1).
- d. Whether a validation certificate is required (see 3.3.3.6).
- e. Whether verification is required (see 3.3.4).
- f. Whether a verification plan is required (see 3.3.4.1).
- g. Whether verification planning data cards are required (see 3.3.4.2).
- h. Whether a verification sequence control chart is required (see 3.3.4.3).
- i. Whether contractor support is required at verification (see 3.3.4.4).
- j. Whether a verification certification is required (see 3.3.4.5).
- k. Responsibility for inspection (see 4.1).
- l. Government options to conduct Guidance and Quality Planning Conference and quality program reviews (see 4.3).

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- m. Whether adequacy reviews are required (see 4.5).
- n. IPR adequacy review locations (see 4.6).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DID) (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DAR 7-104.9(n)(2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs:

<u>PARA. NO.</u>	<u>DATA REQUIREMENT TITLE</u>	<u>APPLICABLE DID NO.</u>	<u>OPTION</u>
3.1.1	Technical Manual Quality Assurance Program Plan	DI-M-2194	-
3.3.3.1	Validation Plan	DI-M-2195	-
3.3.3.6	Validation Certification	DI-M-2196	-
3.3.4.1	Verification Plan	DI-M-2198	-
3.3.4.2	Verification Planning Data Cards	DI-M-2199	-
3.3.4.3	Verification Sequence Control Chart	DI-M-2200	-
3.3.4.5	Technical Manual Verification Incorporation certification	DI-M-2201	-
3.3.5	Technical Manual Evaluation Records	DI-M-2197	-

(Data Item Description related to this specification and identified in Section 6 will be approved and listed as such in DDD 5000.19L., Vol. II, AMSDL. Copies of DIDs required by contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

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6.3 Definitions. QA terms not listed in MIL-STD-109 are included in the definitions described in 6.3.1 through 6.3.12.

6.3.1 Adequacy. A depth of scope of coverage sufficient to support all tasks and functions at the prescribed level of the user, consistent with the equipment to be used and the mission environment in which the manual is to be utilized.

6.3.2 Data Base. Data used in the preparation of technical information. These data consist of such things as government specifications, standards, instructions, engineering design data, LSAR, DCN, SICR, etc.

6.3.3 Data base control. The systematic management and recording of the presence, accuracy, currency, and completeness of the source data.

6.3.4 Engineering technical review. The action by engineering personnel to ensure the technical accuracy and adequacy of the source data being utilized in the development of the TM.

6.3.5 Intermediate product. Work in progress and supporting source data.

6.3.6 In-process review (IPR). A review of contractual requirements, technical documentation, and TM increments which may be carried out at any time during the manual development to:

- a. evaluate the product;
- b. ensure that the technical requirement, documentation, and manual are being written according to the applicable specifications; and
- c. correctly reflect the approved configurations of the appropriate hardware.

6.3.7 Technical Manual Quality Assurance Program. A systemic, coordinate effort to establish a high level of confidence that the TM product offered conforms to established, contractually defined technical requirements. A QA program includes efforts by the procuring activity and preparing activity including IPRs, validation, and verification.

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6.3.8 Quality program review. A government evaluation of quality-related data generated by the contractor as part of the QA program. The government evaluation determines contractor compliance with the approved TMQA program plan. Quality program reviews evaluate the contractor QA program and should not be confused with technical reviews of TMs (e.g., IPRs).

6.3.9 Quality review. A selective comparison of development processes and products with a given set of standards or objectives.

6.3.10 Validation. The final QA iteration required of the contractor or preparing activity during which the TM is tested for technical adequacy and accuracy and compliance with the provisions of the specifications and other technical contractual requirements. Validation is accomplished by actual performance or TM procedures checked against the system or equipment for which the manual was written. Validation is normally conducted at the preparing activity or vendor's facility. In extenuating circumstances, validation may be conducted at an operational site.

6.3.11 Verification. The final QA iteration by the government for acceptance of the TM during which the TM is tested to determine its adequacy and operational suitability for the operation and maintenance of equipment. Verification may be tailored based on the government's confidence level in the preparing activity's QA program, compliance with provisions of the specifications and other technical contract requirements, and effective integration of logistic support requirements for the tasks to be performed. Verification is conducted with production equipment and with qualified fleet personnel of the prescribed skill level from the operating command or facility assigned to operate and maintain the equipment.

6.3.12 Work instructions. The written directions for accomplishing tasks of a type and in the detail appropriate to the task and the people performing the task (e.g., writers and illustrators guide, procedural instructions).

Review activities:

Navy - EC  
SA  
MC  
SH  
YD  
OS  
NM

Preparing activity:

Navy - AS  
(Project QCIC-N045)

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