

## SECTION 01782

### OMSI MANUALS FOR DESIGN/BUILD

06/02

#### PART 1 GENERAL

##### 1.1 SUMMARY

This section includes requirements for developing Operation and Maintenance Support Information ( OMSI ) Manuals for the facility being designed and constructed by the Design-Build Contractor and the Architect/Engineer Designer of Record. The purpose of the OMSI Manuals is to provide to operating and maintenance personnel factual, concise and comprehensive as-built information that describes the efficient, economical and safe operation, maintenance, and repair of the facility and its systems. The manuals shall be used as the basis for any training required under the technical sections of these specifications.

##### 1.2 SUBMITTALS DURING CONSTRUCTION

Submit the following for oversight and acceptance by the Government as specified herein.

Operation and Maintenance Data

Draft OMSI manual

Complete OMSI manual

CD-ROM

CD-ROM or disk supporting files

Training Plan and Agenda for Video Tape

Complete Video Tape(s)

##### 1.3 DRAFT OMSI MANUAL

Submit two (2) copies of the draft OMSI Manual 180 calendar days prior to contract completion date.

The purpose of this submittal is to present the plan being followed for preparation of the OMSI Manual. Include binders, cover insert sheets, spine insert sheets, preface, tables of contents, dividers, and other materials as necessary to demonstrate the proposed physical arrangement of the OMSI manuals and the quality of the copies, dividers and tabs. Submit the following as a minimum:

- a. OMSI Part I, Facility Information. Provide all available information for Part I, Facility Information.

b. OMSI Part II, Primary Systems Information. Identify all systems that will be addressed in Part II, Primary Systems Information. Select one system of moderate complexity and develop the various operational and maintenance aspects of the system. This development should have sufficient depth to clearly demonstrate the arrangement and level of detail proposed for all systems that will be included in the completed OMSI documentation.

c. OMSI Part III, Product Data. Provide at least one Division of Part III, Product Data, essentially complete.

#### **1.4 COMPLETE OMSI MANUAL**

Submit two (2) copies of the complete OMSI Manual 30 calendar days prior to contract completion date.

#### **1.5 CD-ROM**

After validating the contents of the OMSI Manuals during training on the systems listed under Part II of the OMSI Manuals, incorporate all changes in the actual manuals and provide the OMSI manuals in a Compact Disk - Read Only Memory ( CD-ROM ) format. Two sets of disks are required. CD-ROM shall work in any IBM compatible personal computer. Files shall be in ADOBE Acrobat's Portable Document Format ( ".pdf" ). Provide the Adobe Acrobat Reader software on the CD for installing, accessing, retrieving and processing the OMSI manual's information. Written instructions for installing, accessing and retrieving information from the CD-ROM shall be included. Use the OMSI Table of Contents for the different systems for the CD-ROM indexing. Accessing and retrieving of information must be provided at every level of indexing without scrolling through the entire document.

#### **1.6 SUPPORTING FILES**

After preparation of OMSI Manual CD-ROMS, turn over copies of all supporting files ( word processing documents, Autocad drawing files, spreadsheets, etc. ) to the Government so that the facility user can update the electronic documents as required after Contract completion. Include a printed list of all files including title, type of file, and disk number on which the file is stored. Files may be provided on CD-ROM or on 89 mm ( 3-1/2 inch ) floppy disks.

#### **[1.7 VIDEO TAPE INFORMATION**

Each system or piece of equipment shall be covered in a single tape or set of tapes which shall be identified with a type written label showing the project, equipment or system, and contract number; this same information shall be provided as an introduction on each video tape. When two or more tapes are provided, they shall be as a set in appropriate storage.]

## **PART 2 PRODUCTS**

## **2.1 OMSI MANUAL COMPOSITION**

### **2.1.1 General Requirements**

The Contractor's Architect/Engineer Designer of Record and design team shall develop the OMSI Manual.

#### **2.1.1.1 Manual Description**

The OMSI Manual shall contain detailed as-built information that describes the efficient, economical and safe operation, maintenance, and repair of the facility. The OMSI Manual shall be factual, concise, comprehensive and written to be easily used by operating and maintenance personnel. Descriptive material and theory shall include technical details that are essential for a comprehensive understanding of the operation, maintenance and repair of the actual products, equipment and systems built into the facility. Ensure that changes to products, equipment and systems made during construction are reflected in the Manual.

#### **2.1.1.2 Organization**

Prepare the OMSI Manual in three Parts:

Part I - Facility Information

Part II - Primary Systems Information

Part III - Product Data.

Cross-referencing within or between OMSI manuals shall be specific.

Requirements for each Part are specified below.

#### **2.1.1.3 Sources Of Data**

The primary sources of data required to prepare the OMSI manuals include the design drawings and specifications and the accepted construction submittals. Construction submittals include, but are not limited to, Operational and Maintenance ( O&M ) Data, Manufacturer's Catalog Data, and Shop Drawings. The contractor's construction team furnishes these submittals to comply with the requirements included under the technical sections of these specifications. Remove all extraneous information from any design drawings included in the OMSI manuals. Exact photocopies of design plans are not acceptable. Similarly, include only relevant information from the construction submittals by excluding transmittal sheets, QC certification pages, etc. Assemble and supplement the data with original information to produce an OMSI Manual that describes the efficient, economical and safe operation, maintenance and repair of the facility.

#### **2.1.1.4 Metric Manuals**

Projects designed with metric units of measurement require metric OMSI manuals. Show all measurements and units in metric OMSI manuals in SI ( System International ) metric units exclusively.

## **2.1.2 Format**

### **2.1.2.1 Binders**

Bind the OMSI manuals in durable, hard cover, water and grease resistant binders, which hold 297 by 210 mm sheets. Binders shall have clear pockets located on the front and on the spine that hold printed sheets. Identify each binder on both the cover insert sheet and the spine insert sheet with the following information:

- a. OMSI Manual Part I, II or III with appropriate titles
- b. Building Number
- c. Project Title
- d. Project Number
- e. Activity and Location
- f. Construction Contract Number
- g. Prepared For: Southwest Division Naval Facilities Engineering Command
- h. Prepared By
- i. Volume Number

Each binder is a single volume. Number each volume consecutively. For example, an OMSI Manual composed of 5 binders would have the Part I - Facility Information binder labeled Volume 1 of 5 and the last Part III - Product Data binder would be Volume 5 of 5.

- a. Part I - Facility Information Binder: Bind in a white, post type, loose-leaf binder of appropriate size
- b. Part II - Primary Systems Information Binders: Bind in blue, post type, loose-leaf binders with 75 mm capacity. More than one system may be included in a single binder provided that all sections of each system are included in that binder.
- c. Part III - Product Data Binders: Bind in red, post type, loose-leaf binders with 75 mm capacity.

### **2.1.2.2 Pages, Dividers and Tabs**

Use high quality paper and dividers made of heavy-duty paper with plastic reinforced holes and integrated tabs.

- a. Part I - Facility Information Divider: Use white tabs to identify the major items.
- b. Part II - Primary Systems Information Dividers: Use blue tabs with bold type to identify the system titles. Use

dividers with white tabs to identify the different sections under each system and the major topics under each section.

c. Part III - Product Data Dividers: Use white tabs to show the systems. Use dividers with colored tabs to identify the different sections ( i.e. Record of Material, Written Warranties, etc. ) under each system. Use colored non-tab dividers to separate large equipment groupings such as valves, pumps, and chillers to separate the O&M data within each system's section.

#### **2.1.2.3 Oversize Sheets**

Insert oversized sheets into the binders as single foldout sheets. Oversized sheets are defined as submittals, instruction sheets, drawings, etc., larger than 297 by 210 mm, but not exceeding 275 by 425 mm. Oversized sheets shall be folded to expose the sheet's title block. Submittals or drawings exceeding 275 by 425 mm, which cannot be reduced, shall be inserted in labeled, clear plastic pockets.

#### **2.1.2.4 Preface**

Insert a Preface as the first page in each volume. The Preface shall read as indicated below. No tab sheet is required with the Preface page.

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## **PREFACE**

### **INTRODUCTION**

Operation and Maintenance Support Information (OMSI) was prepared for this project to help you operate, maintain, and repair the facility over its life cycle. OMSI manuals provide a comprehensive, organized library of as-built materials, equipment and systems. Use the OMSI manuals as the first step in solving your operation, maintenance or repair problems. Your comments or suggestions are welcome and should be forwarded to:

Commander  
Southwest Division Naval Facilities Engineering Command  
Attn: Code 03CN  
1220 Pacific Highway  
San Diego, California 92132  
Telephone 619-532-3295

### **CONTENTS**

#### OMSI Part I - Facility Information:

This portion of the OMSI manuals contains Basic User Information needed on a daily basis by the owner or tenant of the facility. Examples include: General Facility and System Descriptions, Utility Connection and Cut-off Plans, Safety Hazards, Warranty Information. Part I - Facility Information also provides the information you need to quickly prepare Maintenance Service Contracts and Performance Work Statements for O&M and Custodial Service Contracts. Examples of this information include: area totals for floor coverings, wall and ceiling surfaces; number, types, and sizes of lighting fixtures, bathroom fixtures, windows and HVAC filters.

#### OMSI Part II - Primary Systems Information:

This portion of the OMSI manuals provides detailed operation, preventive maintenance, repair, and manufacturer's data for each system selected. This information includes items such as normal and emergency operating procedures, flow diagrams, PM requirements, spare parts, troubleshooting, repair procedures, and warranty provisions. You can expect better Preventive Maintenance, faster repairs, and reduced down time by using information in this part of the OMSI manuals.

#### OMSI Part III - Product Data:

This portion of the OMSI manuals consists of construction contractor submittals for as-built materials and equipment such as manufacturer's catalog data, shop drawings, test data, and Operation and Maintenance Data not included in Part II. Part III is organized by systems. For example, if you wanted to find information about sprinkler system alarm valves, you would look under the tab for the sprinkler system. This allows you to quickly identify the exact product installed, part

number, manufacturer, etc. Part III also includes architectural product information for items such as ceiling tile, carpeting, plumbing, and lighting fixtures. This information will keep your facility looking sharp for many years through product-specific maintenance and replacement of its architectural features.

## **UPDATING**

The OMSI manuals must reflect the facility's existing components; therefore, you must continually update the manuals. When equipment or components are replaced, add pertinent new information to each manual set. Be sure to update all sections of the OMSI manuals that reference the replaced item. Purge all information on the replaced item to prevent confusion. You have been provided with copies of the electronic files used to produce these manuals. It is strongly recommended that these files be updated so that both the printed manuals and the electronic manuals are kept up-to-date together.

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### **2.1.2.5 Table of Contents**

Provide a Master Table of Contents for the entire set of OMSI manuals. Place a Master Table of Contents after the Preface page in each volume. Provide a specific Table of Contents for Part I, Facility Information; for each system in Part II, Primary Systems Information; and for each system and equipment grouping in Part III, Product Data.

### **2.1.3 OMSI Part I-Facility Information**

#### **2.1.3.1 General Facility and Systems Descriptions**

Describe the function of the facility. Detail the overall dimensions of the facility, number of floors, foundation type, expected number of occupants, and facility category code. List and generally describe all the facility systems addressed in Part II, Primary Systems Information and any special building features ( such as cranes, elevators, and generators ). Include photographs, marked up and labeled to show key operating components and the overall facility appearance.

#### **2.1.3.2 Basis of Design**

Include the Basis of Design in narrative form that shows the basic design scope of work, assumptions and intentions of the design.

#### **2.1.3.3 Safety Hazards**

List all residual hazards identified in the "Requirements Hazard Analysis". Provide recommended safeguards for each identified hazard.

#### **2.1.3.4 Floor Plans**

Provide uncluttered, legible 275 by 425 mm floor plans. Exact copies of the design drawings are not acceptable. Include room numbers, type or function of spaces, and overall facility dimensions on the floor plans. Do not include construction instructions, references, or frame numbers.

#### **2.1.3.5 Site Plans and Utility Connection and Cutoff Plans**

Provide uncluttered, legible 275 by 425 mm site and floor plans. On the utility site plans and floor plans indicate the main interior and exterior connection and cutoff points for all utilities. Include sufficient information to enable someone unfamiliar with the facility to locate the connection and cutoff points. Indicate the room number, panel number, circuit breaker, valve number, etc., for each connection and cutoff point, and what that connection or cutoff point controls. Do not include items such as contour lines, elevations, and subsurface information on the site plans. These plans shall be in addition to the "Floor Plans" required above.

#### **2.1.3.6 Extended Warranty Information**

List all warranties for products, equipment, components, and subcomponents whose duration exceeds one year. Cross-reference the list to the warranty copies included in Part II, Primary Systems Information or in Part III, Product Data. For each warranty listed indicate duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.

#### **[2.1.3.7 Equipment Inventory**

Provide an equipment inventory that includes item descriptions, locations, model numbers and the names, addresses, and telephone numbers of the manufacturers, suppliers, contractors, and subcontractors. Limit the equipment inventory to major components such as shown on the design drawings equipment schedules.]

#### **[2.1.3.8 HVAC Filters**

Provide a table that lists the quantity, type, size, and location of each HVAC filter.]

#### **[2.1.3.9 Floor Coverings**

Provide a table that lists by room number ( including corridors and common spaces ), the type of space, type of floor covering and area of floor. The table shall include a facility summary of the total area for each type of space and floor covering.]

#### **[2.1.3.10 Wall Surfaces**

Provide a table that lists by room number ( including corridors and common spaces ), the type of wall surface, and area of wall surface. The table shall include a facility summary of the total area for each type of wall surface.]

#### **[2.1.3.11 Ceiling Surfaces**

Provide a table that lists by room number ( including corridors and common spaces ), the type of ceiling surface, and area of ceiling

surface. The table shall include a facility summary of the total area for each type of ceiling surface.]

**[2.1.3.12 Windows**

Provide a table that lists by room number ( including corridors and common spaces ), the type of window, window size, number of each size and type, and special features. The table shall include a facility summary of the total number for each type and size of window.]

**[2.1.3.13 Lighting Fixtures**

Provide a table that lists by room number ( including corridors and common spaces ), the type of lighting fixture, number of lighting fixtures, type of bulbs or tubes, and number of bulbs and tubes. The table shall include a facility summary of the total number of fixtures of each type and number of bulbs or tubes of each type.]

**[2.1.3.14 Bathroom And Plumbing Fixtures**

Provide a table that lists by room number, the number and type of plumbing and bathroom plumbing fixtures ( e.g., sinks, water closets, urinals, showers and drinking fountains ).]

**[2.1.3.15 Roofing**

Provide the total area of each type of roof surface and system. Provide the name of the roofing product and system; manufacturer's, supplier's, and installer's names, addresses, and phone numbers. For each type of roof, provide a recommended inspection, maintenance and repair schedule that details checkpoints, frequencies, and prohibited practices. List roof structural load limits.]

**[2.1.3.16 Supply Inventory Requirements**

Provide a list of maintenance and repair supplies ( e.g., spare parts, fuels, lubricants, etc. ) required to ensure continued operation without unreasonable delays. Identify and list parts and supplies that have long lead purchase time. Give special consideration to facilities at remote locations.]

**[2.1.3.17 As-Built Drawing List**

Provide a list of the as-built drawings. Include NAVFAC drawing number and title. Identify where the drawings and project specifications will be filed.]

**[2.1.3.18 Training Requirements**

Provide a list of recommended training related to the operation, maintenance and repair of each installed system that is available from the manufacturer or other source. Provide the name, address, and phone number of point of contact. The training requirements shall pertain only to systems addressed in Part II, Primary Systems Information.]

**[2.1.3.19 Skill Matrix**

Provide a matrix by system and skill that identifies productive hours required to maintain the facility's systems addressed in Part II, Primary Systems Information. An example of the format follows.

	Hours	System 1	System 2	System 3	Total/Skill
Skill 1					
Skill 2					
Skill 3					
Skill 4					
Total/System]					

**2.1.4 OMSI Part II - Primary Systems Information**

Prepare the information required for Part II, Primary Systems Information using a systems approach. This approach requires that consideration be given to the entire system ( that is, the interfaces of equipment, connections and material flow within the system ). Include the following systems:

- a. HVAC System and Controls
- b. Domestic Water Heating System
- c. Fire Alarm System
- d. Fire Suppression System
- e. Elevators
- f. Emergency Power Systems
- g. Compressed Air Systems ( Shop or breathing air )
- h. Industrial Ventilation
- i. Ship Utility Hook ups
- j. Aircraft Fuel Systems
- k. Wastewater Treatment Systems

Use Notes, Cautions and Warnings throughout Part II, Primary Systems Information to emphasize important and critical instructions and procedures. Place Notes, Cautions and Warnings immediately before the applicable instructions or procedures. Notes, Cautions and Warnings are defined as follows:

Note: Highlights an essential operating or maintenance procedure, condition or statement.

Caution: Highlights an operating or maintenance procedure, practice, or condition, statement, etc., that, if not strictly observed, could result in damage to or destruction

of equipment, loss of mission effectiveness, or health hazards to personnel.

Warning: Highlights an operating or maintenance procedure, practice, condition, or statement, etc., that, if not strictly observed, could result in injury to or death of personnel.

#### **2.1.4.1 Operation**

a. System Description: Provide a detailed discussion of the system composition and operation. Include technical details that are essential for an understanding of the system.

b. Start-Up and Shutdown Procedures: Provide step by step instructions to bring systems from static to operational configurations and from operating to shutdown status.

c. Normal Operating Instructions: Provide a discussion of the normal operation and control of the system. Address operating norms ( e.g., temperatures, pressures, and flow rates ) expected at each zone or phase of the system. Supplement the discussion with control and wiring diagrams and data.

d. Emergency Operating Instructions: Provide emergency operating procedures in the event of equipment malfunctions. Provide shutdown instructions for fires, explosions, spills, or other contingencies.

e. System Flow Diagrams: Provide a flow diagram indicating system liquid, air ( do not include ductwork ) or gas flow during normal operations. Integrate all system components into the diagram. A compilation of non-integrated, flow diagrams for the individual system components are not acceptable.

f. Diagrammatic Plans: Provide floor plans indicating the location of equipment and configuration of the system installation. Include the configuration of associated piping or wiring. Subordinate structural features to utility features.

g. Environmental Considerations: Provide a listing of the equipment that requires special operation, reporting, testing, analysis or inspection to comply with federal, state or local environmental laws. Examples of possible list items include back flow preventer inspections, underground storage tank testing, hazardous material or waste usage and storage documentation, and air pollution control devices. Each item in the list shall include requirements for environmental operation, reporting, testing, analysis and inspection as well as references to respective implementing regulations, statutes, or policies.

h. Operator Servicing Requirements: Provide instructions for services to be performed by the operator such as lubrication, adjustments, and inspection.

i. Safety Instructions: Provide a list of all personnel hazards and equipment safety precautions including recommended safeguards.

j. Valve List: Provide a list of all valves associated with the system. Show valve type, identification number, function, location and normal operating position.

k. Operating Log: Provide forms, samples, and instructions for keeping necessary operating records.

#### **2.1.4.2 Preventive Maintenance**

a. Preventive Maintenance Plan and Schedule: Provide a Preventive Maintenance ( PM ) plan using manufacturer's recommendations and sound engineering practice. Include all major pieces of equipment. Provide a check sheet that details maintenance tasks and associated frequencies. Also provide an annual schedule indicating when maintenance tasks should be performed such that work is spread as evenly as possible throughout the year.

b. Preventive Maintenance Procedures: Provide a Task Card for each individual maintenance task identified on the PM Plan and Schedule. Include detailed PM procedures, safety instructions and precautions including Lock Out/Tag Out precautions, required skill level, number of personnel needed, frequency, special tools needed, parts needed, and estimated time required to complete the task.

c. Lubrication Schedule: Provide a lubrication schedule indicating types, grades, and capacities of lubricants for specific temperature ranges and applications.

d. Preventive Maintenance Log: Provide a tabular form for recording the accomplishment of PM. Log shall record date PM was performed, findings, action taken, parts used, time required to complete the work, and other data necessary to provide a good historical record of PM activities.

#### **2.1.4.3 Repair**

a. Troubleshooting Guides and Diagnostic Techniques: Provide step by step procedures for isolating the cause of system malfunctions. The procedures shall clearly state indications or symptoms of trouble; the sequential instructions, including checks and tests to be performed and conditions to be sought, to determine the cause; and remedial measures to bring the equipment and system to operating condition. Identify special test equipment required to perform the procedures. Start the troubleshooting guide at the system level and proceed to a level where detailed manufacturer's

troubleshooting procedures for equipment and components can be referenced.

b. Repair Procedures: Provide repair instructions required to restore equipment to proper operating standards. References shall be specific as to location within the OMSI manuals.

c. Removal and Replacement Instructions: Provide or refer to the manufacturer's data for the instructions on the removal and replacement of equipment components. References shall be specific as to location within the OMSI manuals.

#### **2.1.4.4 Manufacturer's Data**

a. Operation and Maintenance Data: Include the O&M Data Package information required for the equipment and systems specified in the technical sections. Incorporate this information into each system discussion under the Operation, Preventive Maintenance and Repair sections of Part II - Primary Systems Information.

b. Manufacturer's Equipment Information: Provide drawings, illustrations and technical data furnished by the manufacturer for the equipment and system components. Organize and index the information for easy reference.

#### **2.1.5 OMSI Part III - Product Data**

##### **2.1.5.1 Record Of Material And Equipment**

Provide a record of materials and equipment used in the facility construction. Include Product Data required in the project specifications. Examples of Product Data include manufacturer's catalog data, instructions, test reports and warranties. Include shop drawings relevant to the operation and maintenance of the facility or system except those used in Part II, Primary Systems Information. Do not include extraneous data ( e.g., transmittal sheets, certifications, welder qualifications, contractor qualifications and certificates of compliance ). Highlight or note submittals that contain information for several parts or model numbers to identify installed material. Product data included in Part III, Product Data shall use metric units if metric OMSI manuals are required. Conversion to metric units is not required for product data that contains only English units.

##### **2.1.5.2 Written Warranties**

Provide copies of extended equipment warranties.

#### **2.2 O&M PROCEDURES VALIDATION**

The operation and maintenance procedures shall be validated at the site in the presence of designated Government representatives during training on the systems listed under Part II. The validation process shall be scheduled and completed at a time mutually agreeable to the Contractor ( system installation contractor ), designated Government

personnel ( including operating personnel ), and the Contracting Officer. Provide the services of personnel that have detailed technical and organizational knowledge of the OMSI manuals, to perform the validation of the OMSI manuals. The purpose of the validation is to present the OMSI manuals to the users and to verify the OMSI manuals' completeness and accuracy.

#### **2.2.1 Presentation**

Present the OMSI manuals to designated Government representatives at the activity site. The presentation shall show how the OMSI manuals are organized, what they contain, how they are referenced and cross-referenced, and how to use them in day-to-day operation, maintenance and repair.

#### **2.2.2 Verification**

Field verify the accuracy and completeness of the OMSI manuals. This includes verifying that the systems and equipment in the OMSI manuals accurately reflect the as-built conditions; verifying that O&M procedures are appropriate for the systems and equipment that they support; and verifying that equipment nomenclature and system configurations are accurate.

#### **2.2.3 Corrections And Changes To The OMSI Manuals**

Make corrections and changes to the manuals recommended as a result of the validation process prior to final acceptance of the manuals. After the validation process, make corrections and changes to the manuals resulting from in service use of the facility at no additional cost to the Government under the warranty clause of the contract. Submit the CD-ROM version of the manual and copies of all supporting files after all corrections have been made.

#### **[2.3 AUDIO-VISUAL RECORDINGS**

The contractor shall provide all equipment, materials, and trained personnel to visually and audibly record ( video tape ) all site operations and maintenance ( O&M ) training sessions for this project. The video technician/trainer shall be employed by a video production company that has been in business for a minimum of 2 years. Videotapes shall be produced in VHS format. Audio shall be adjusted, filtered or otherwise controlled to insure the trainer can be understood at all times.]

### **PART 3 EXECUTION**

Not used.

**END OF SECTION**