1 GENERAL

1.1 Prepare and provide Operation and Maintenance (O & M) Manuals.

1.2 The manual will be used by Owner's maintenance technicians to familiarize themselves with the facility, its components and systems and to permit extraction of detailed technical and maintenance information of individual products and systems.

1.3 The manual will be used by the Owner to provide original design criteria when contemplating renovations.

1.4 The manual will be used for training purposes and will be used by the Commissioning team to determine whether design criteria have been met.

2 CONTENTS

2.1 Prepare complete manual in English.

2.2 Provide vinyl binders. Hard covered, 3-ring, loose leaf, with spline pocket. Acceptable Material: 'Vu-Thru'. 3 ring, model No. 13632 to 13645. Clearly identify contents of each binder on spline.

2.3 Use 210 x 297 mm paper for text and 297 mm high paper for drawings, diagrams and charts. Fold as required to match standard paper size. Final submission to be on 10M/20 lbs. white bond paper. Provide page numbering at right and left margin for two sided reproduction. Drawings, charts, lists and diagrams to be single sided reproduction.

2.4 Provide hard paper tab divider sheets for each section. Protect tabs with celluloid covers.

2.5 Provide typewritten lists and notes.

2.6 Ensure drawings, diagrams and manufacturers literature is clear and legible. Extract information on materials or systems pertinent to project or clearly highlight manufacturers data sheets to exclude extraneous information.

2.7 Divide the manual into individual sections, in "Uniformat II' format, coordinated with this technical specification and contained within as many binders as necessary to hold all data without overloading any one binder.

2.8 Include the following minimum information in each section:

2.8.1 General Introduction:

2.8.2 Project Title.

2.8.3 Names and addresses of Design Builder, Prime Consultant, Sub-Consultants, Sub-Contractors.

2.8.4 General description of. Building, Purpose, Location, Hours of operation.

2.8.5 Site drawing in reduced scale.

2.9 Architectural and Structural:

2.9.1 System Descriptions including: Design intent, Design criteria and loads,

2.9.2 Capacities, Capabilities and Limitations.

2.9.3 Reduced floor plans and elevations.

2.9.4 Schedules for: Finishes, Doors and Windows, Hardware and Keys.

2.9.5 List of spare parts, maintenance material, and special tools as specified.

2.9.6 List of suppliers.

2.9.7 Applicable Warranties and Guarantees.

2.9.8 Applicable approvals and certificates.

2.9.9 Applicable Manufacturer Data sheets, Shop drawings and manufacturer recommended maintenance instructions.

2.10 Mechanical:

2.10.1 System Descriptions including: Design intent, Criteria and Loads, Capacities, Capabilities and Limitations.

2.10.2 System Operating sequences in normal and emergency modes.

2.10.3 Standard Operating Procedures (SOP) for: "start-up", "shut-down" and "change-over", making specific reference to valves, buttons, controls and switches. Include any specifics for actions to be taken in the event of power outages, mechanical failures or operational difficulties.

2.10.4 Detailed flow diagrams indicating: Design Conditions where applicable, Valve charts, equipment schedules, control I/O lists and control logic diagrams.

2.10.5 Individual reduced floor plans detailing each of the systems and sub-systems such as: Domestic water, Sanitary sewer, Storm drain, Ducting and hot water heating.

2.10.6 List of spare parts, maintenance material, and special tools as specified.

2.10.7 List of Suppliers.

2.10.8 Applicable Warranties and Guarantees.

2.10.9 Applicable approvals and certificates.

2.10.10 Manufacturer Data sheets, Shop drawings and manufacturer recommended maintenance procedures.

2.11 Electrical:

2.11.1 System Descriptions including: Design intent, Criteria and Loads, Capacities, Capabilities and Limitations.

2.11.2 System Operating sequences in normal and emergency modes.

2.11.3 Standard Operating Procedures for: "start-up", "shut-down" and "changeover", making specific reference to valves, buttons, controls and switches. Include any specifics for actions to be taken in the event of power outages, mechanical failures or operational difficulties.

2.11.4 Detailed system and sub-system drawings, line and riser diagrams, details and schedules as applicable.

2.11.5 Individual reduced floor plans detailing each of the systems and sub-systems.

2.11.6 List of spare parts, maintenance material, and special tools as specified.

2.11.7 List of suppliers.

2.11.8 Applicable Warranties and Guarantees.

2.11.9 Applicable approvals and certificates.

2.11.10 Applicable Manufacturer Data sheets, Shop drawings and manufacturer recommended maintenance instructions.

2.11.11 Use logical sequencing test numbering system for identification of each section, system, subsystem, drawings, charts, diagrams and schedules.

3 SUBMISSIONS

3.1 Submit first draft of each section as part of the Design Development phase. Provide 3 hard copies of first draft. As a minimum, include for all systems the following: System Description, Operating sequences, Standard Operating Procedures and Drawings, diagrams and schedules. Owner will review and approve first draft.

3.2 After approval of first draft, prepare second draft incorporating all comments. Submit second draft as a part of Construction Document submission. Provide in the following format: 3 complete hard copies and one disk copy. Provide 3.5" disks. Provide text in WordPerfect 6.1 or MS Word 97 and drawings in AutoCAD version 14. Owner will review and approve second draft.

3.3 After approval of second draft, prepare final manual incorporating all comments. Provide 7 hard copies plus 3 disk copies. Provide final manual prior to commencing commissioning activities.

3.4 Update manual to reflect final AS-BUILT conditions. Submit complete set of Manuals to Owner prior to application for Interim Certificate of Completion. Manuals will be reviewed and will be returned if found incomplete or incorrect.