|  | **Systems Manual Outline** |  | |  | |  | |
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| **Section** | **Description** | **Prepared by** | | | | | | |
| **Cx Agent** | **Contractor** | | **NCA** | | **Designer** | |
| **Index of Systems Manuals** | Table of Contents/Index of Systems Manuals | X |  | |  | |  | |
|  |  |  |  | |  | |  | |
| **Design Narrative** | Final Version | X |  | |  | |  | |
|  |  |  |  | |  | |  | |
| **Facility Data:** |  |  |  | |  | |  | |
| Floor plans (11x17) | Uncluttered floor plans that include only room numbers, type or function of space, and overall all facility dimensions. |  |  | |  | | X | |
| Utility Connection and Cutoff Plans | Provide utility site and floor plans that indicate the exterior and main interior connection and cutoff points for all utilities. |  |  | |  | | X | |
| Extended Warranty Information | List all warranties for products, equipment, components and sub-components whose duration exceeds one year. |  | X | |  | |  | |
| Equipment Listing | A table that lists major equipment shown on design equipment schedules, item descriptions, locations, model numbers, name/address/phone of manufacturer, supplier, contractor, sub-contractor. |  | X | |  | |  | |
| HVAC Filters | Table that lists the quantity, type, size, and location of each HVAC filter. |  | X | |  | |  | |
| Supply inventory Requirements | List of maintenance and repair supplies (spare parts, fuels, lubricants) required to ensure continued operation without unreasonable delays. Identify and list parts and supplies that have long purchase lead times. Give special attention to facilities at remote locations. |  | X | |  | |  | |
| As-built drawing list | List of all as-built or record drawings and specifications. Include drawing number and title. Identify where the drawings and specifications will be stored and filed. |  |  | |  | | X | |
| Recommended Operational Record-keeping procedures, forms, logs, rationale for each | Sample blank forms, logs, etc. with basic instructions for use | X |  | |  | |  | |

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| **System Information** |  |  |  |  |  |
| System Description | Narrative system description, including function, capacity, major components, etc. |  |  |  | X |
| System Schematics, one-line diagrams, flow diagrams, etc. | Flow diagram indicating system liquid, air, or gas flow during normal conditions. |  |  |  | X |
| Diagrammatic Plans | Floor plans indicating location of equipment and configuration of the system installation. |  |  |  | X |
| Safety Information | List of all personnel hazards and equipment safety precautions |  | X |  |  |
| Valve List | List of all valves associated with system. Show valve type, identification number, function, location and normal operating position |  | X |  |  |
| Start-up and Shut-down procedures | Step-by-step procedures to bring systems from shutdown to operational configurations and from operating to shutdown status. |  |  |  | X |
| Operating procedures/sequences for Normal, abnormal, and emergency modes | Discussion of the normal operation and control of the system. Emergency operating instructions in the event of equipment malfunctions, fire, explosions, spills, or other contingencies. |  |  |  | X |
| Operating instructions for integrated systems | Discussion of operating procedures for multiple, integrated systems. |  |  |  | X |
| Ongoing Optimization Guide | Procedures for analyzing and maintaining optimal system operations | X |  |  |  |

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| **Cx Agent** | **Contractor** | **NCA** | **Designer** |
| **Preventive Maintenance** |  |  |  |  |  |
| Preventive Maintenance Plan and Schedule | PM Plan using manufacturer's recommendations and sound engineering practice. Include major pieces of equipment. Provide a check sheet that details maintenance tasks and associated frequencies. Provide an annual schedule indicating when maintenance tasks should be performed such that work is spread as evenly as possible throughout the year. |  | X |  |  |
| Preventive Maintenance procedures | Provide Task Card for each individual maintenance task identified on the PM Plan and Schedule. Include all major pieces of equipment. Include Lock out/Tag out precautions, required skill level, number of personnel needed, frequency, special tools, parts needed, and the estimated time required to complete the task. |  | X |  |  |

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| **Repair** |  |  |  |  |  |
| Troubleshooting Guides and Diagnostic Techniques | Step-by-step procedures for diagnosing, isolating, and correcting system malfunctions. State indications or symptoms of trouble; sequential instructions, including check and tests to be performed and conditions to be south, to determine the cause; and remedial measures to return 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 the system's components can be referenced. |  | X |  |  |
| Repair Procedures | Repair instructions required to restore equipment to proper operating condition and standards. |  | X |  |  |
| Removal and Replacement Instructions | Provide or refer to the manufacturer's data for the instructions for the removal and replacement of equipment components. |  | X |  |  |
| Schedule for calibrating sensors and actuators | Table of DDC sensors and actuators that require calibration with recommendations for calibration frequency. |  | X |  |  |
| Parts and Recommended Spares | Listing of recommended critical spare and long lead parts and spares. |  | X |  |  |

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| **Manufacturer's Data** |  |  |  |  |  |
| Operation and Maintenance Data | O&M data package per the technical specifications |  | X |  |  |
| Manufacturer's Equipment Information | Drawings, illustrations and product data furnished for the equipment and systems components. |  | X |  |  |
|  |  |  |  |  |  |
| **Training Materials** | Training plans, materials, and other data used during contractors and systems training. |  | X |  |  |
|  |  |  |  |  |  |
| **Commissioning Report** | Copy of the Final Commissioning Report. | X |  |  |  |