<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Change – Replace, Add, and Delete Pages</th>
<th>Authorized for Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Initial Release for CHPRC LLE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Deleted section 1.06.A.1.b.3) and updated data compilation formatting criteria in section 1.04.C.2.C.7R</td>
<td>9/7/10</td>
</tr>
</tbody>
</table>

Approved for Construction

ISSUED BY

DOCUMENT CONTROL

Date: 9/4/2010
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Detailed information for the preparation, submission, and Buyer’s Technical Representative (BTR) review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for BTR’s review.

B. Final Data: BTR-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

D. BTR: Buyer’s Technical Representative

1.03 SEQUENCING AND SCHEDULING

A. Equipment and System Data:

1. Preliminary Data:
   a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by BTR.
   b. Submit prior to shipment date.

2. Final Data: Submit Instructional Manual Formatted data not less than 30 days prior to installation of equipment or system equipment or system field functional testing. Submit Compilation Formatted and Electronic Media Formatted data prior to Substantial Completion of Project.

B. Materials and Finishes Data:

1. Preliminary Data: Submit at least 15 days prior to request for final inspection.

2. Final Data: Submit within 10 days after final inspection.

1.04 DATA FORMAT

A. Prepare preliminary and final data in the form of an instructional manual. Prepare final data in data compilation format on electronic media.
B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
   a. Project title.
   b. Designate applicable system, equipment, material, or finish.
   c. Identity of separate structure as applicable.
   d. Identify volume number if more than one volume.
   e. Identity of general subject matter covered in manual. Identity of equipment number and Specification section.

4. Spine:
   a. Project title.
   b. Identify volume number if more than one volume.

5. Title Page:
   a. Manufacturer name, address, and telephone number.
   b. Manufacturer, Subcontractor, Supplier or installer, name, address, and telephone number, as appropriate.
   1) Identify area of responsibility of each.
   2) Provide name and telephone number of local source of supply for parts and replacement.

6. Table of Contents:
   a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
   b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

8. Text: Manufacturer’s printed data, or neatly typewritten.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all BTR-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
   a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
   b. Cover: Identify each volume with typed or printed title “OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___”, and list:
1) Project title.
2) Equipment supplier's name, address, and telephone number.
3) If entire volume covers equipment or system provided by one supplier include the following:
   a) Identity of general subject matter covered in manual.
   b) Identity of equipment number and Specification section.

c. Provide each volume with title page and typed table of contents.

d. Table of contents neatly typewritten, arranged in a systematic order:
   1) Include list of each product, indexed to content of each volume.
   2) Designate system or equipment for which it is intended.
   3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

c. Section Dividers:
   1) Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
   2) Fly-Leaf:
      a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
      b) List with Each Product:
         (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
         (2) Identify area of responsibility of each.
         (3) Provide local source of supply for parts and replacement.
      c) Identity of separate structure as applicable.

f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

D. Electronic Media Format:

1. Portable Document Format (PDF):
   a. After all preliminary data has been found to be acceptable to BTR, submit Operation and Maintenance data in PDF format on CD.
   b. Files to be exact duplicates of BTR-accepted preliminary data. Arrange by specification number and name.
   c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.

1.05 SUBMITTALS

A. For Information Only Submittals:

1. Data Outline: Submit a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
   a. Submit for BTR's review.
3. Final Data: Submit in format specified herein.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content For Each Unit (or Common Units) and System:

1. Product Data:
   a. Include only those sheets that are pertinent to specific product.
   b. Clearly annotate each sheet to:
      1) Identify specific product or part installed.
      2) Identify data applicable to installation.
   c. Function, normal operating characteristics, and limiting conditions.
   d. Performance curves, engineering data, nameplate data, and tests.
   e. Complete nomenclature and commercial number of replaceable parts.
   f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
   g. Spare parts ordering instructions.
   h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).

2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
   a. Format:
      1) Provide reinforced, punched, binder tab; bind in with text.
      2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
      3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
      4) Identify Specification section and product on Drawings and envelopes.
   b. Relations of component parts of equipment and systems.
   c. Control and flow diagrams.
   d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

5. Instructions and Procedures: Within text, as required to supplement product data.
   a. Format:
      1) Organize in consistent format under separate heading for each different procedure.
2) Provide logical sequence of instructions for each procedure.
3) Provide information sheet for Owner’s personnel, including:
   a) Proper procedures in event of failure.
   b) Instances that might affect validity of guarantee or Bond.

b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
c. Operating Procedures:
   1) Startup, break-in, routine, and normal operating instructions.
   2) Test procedures and results of factory tests where required.
   3) Regulation, control, stopping, and emergency instructions.
   4) Description of operation sequence by control manufacturer.
   5) Shutdown instructions for both short and extended duration.
   6) Summer and winter operating instructions, as applicable.
   7) Safety precautions.
   8) Special operating instructions.
d. Maintenance and Overhaul Procedures:
   1) Routine maintenance.
   2) Guide to troubleshooting.
   3) Disassembly, removal, repair, reinstallation, and re-assembly.


B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, nameplate data, and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
   d. Interconnection wiring diagrams, including control and lighting systems.

2. Circuit Directories of Panelboards:

3. Electrical service.

4. Control requirements and interfaces.

5. Communication requirements and interfaces.

6. List of electrical relay settings, and control and alarm contact settings.

7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.

8. As-installed control diagrams by control manufacturer.

9. Operating Procedures:
   a. Routine and normal operating instructions.
   b. Startup and shutdown sequences, normal and emergency.
   c. Safety precautions.
   d. Special operating instructions.

10. Maintenance Procedures:
a. Routine maintenance.
c. Adjustment and checking.
d. List of relay settings, control and alarm contact settings.

11. Manufacturer’s printed operating and maintenance instructions.
12. List of original manufacturer’s spare parts, manufacturer’s current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
   a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
   b. Each Maintenance Summary may take as many pages as required.
   c. Use only 8-1/2-inch by 11-inch size paper.
   d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
   a. Data to be consistent with manufacturer’s Bill of Materials/Parts List furnished in O&M manuals.
   b. “Unit” is the unit of measure for ordering the part.
   c. “Quantity” is the number of units recommended.
   d. “Unit Cost” is the current purchase price.

1.07 DATA FOR MATERIALS AND FINISHES

A. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer’s data, giving full information on products:
   a. Applicable standards.
   b. Chemical composition.
   c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.08 SUPPLEMENTS

A. The supplements listed below, following “End of Section”, are part of this Specification.

1. Forms: Maintenance Summary Form.
PART 2   PRODUCTS (NOT USED)
PART 3   EXECUTION (NOT USED)

END OF SECTION
MAINTENANCE SUMMARY FORM

PROJECT: ___________________________ CONTRACT NO.: __________________

1. EQUIPMENT ITEM ___________________________

2. MANUFACTURER ___________________________

3. EQUIPMENT/TAG NUMBER(S) ___________________________

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) ___________________________

5. NAMEPLATE DATA (hp, voltage, speed, etc.) ___________________________

6. MANUFACTURER'S LOCAL REPRESENTATIVE ___________________________
   a. Name ___________________________ Telephone No. __________________
   b. Address ___________________________

7. MAINTENANCE REQUIREMENTS

<table>
<thead>
<tr>
<th>Maintenance Operation Comments</th>
<th>Frequency</th>
<th>Lubricant (If Applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)</td>
<td>List required frequency of each maintenance operation.</td>
<td>Refer by symbol to lubricant required.</td>
</tr>
</tbody>
</table>
8. LUBRICANT LIST

<table>
<thead>
<tr>
<th>Reference Symbol</th>
<th>Shell</th>
<th>Exxon Mobile</th>
<th>Chevron Texaco</th>
<th>BP Amoco</th>
<th>Or Equal</th>
</tr>
</thead>
<tbody>
<tr>
<td>List symbols used in No. 7 above.</td>
<td>List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Cost</th>
</tr>
</thead>
</table>

Note: Identify parts provided by this Contract with two asterisks.