IE 4466: Senior Design
El Paso Electric

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El Paso Electric

Background

• Has served the *El Paso del Norte* area since 1901
• Generation, transmission and distribution of electricity from west Texas (Van Horn), to southern New Mexico (Hatch)
• Approximately, 20 buildings and more than 200 substations.
Sub-System Scope - Maintenance

Management

Jesse Arredondo
Manager – Facilities Services

Tools

Computerized Maintenance Management System (CMMS):
Maintenance Connection
Mobil Devices and computers

People

Preventive Maintenance Procedures

Maintenance Team:
Vacancy, Supervisor Joe Armendariz, Planner Technicians

Processes

Stakeholders

EP Electric Employees
Raw Material Suppliers

Customers

Technicians
EPE Employees
System Analysis

- Maintenance
  - General Maintenance
    - Remplacement of Parts
    - Furniture Request
    - Setting up Assets
    - Plumbing
  - Heating, Ventilation, and Air Conditioning (HVAC)
    - Air Handlers
    - Chillers
    - Split System
Computerized Maintenance Management System (CMMS) Software

- Centralizes maintenance information and facilitates the processes of maintenance operations.
- Helps optimize the utilization and availability of physical equipment (assets)
- Resource and labor management
- Asset registry/history
- Work order management
- Scheduling
- Materials and inventory management
Technician Day

• **The technician:**
  • Meets with the facilities team at Hawkins in the morning (online or in-person) to review daily schedule, safety issues, and general business.
  • Receives the call of the Facility Services Planner to check the PM Work Order
  • Goes to the asset location and performs daily PM tasks
  • Opens the CMMS Application on his mobile device to check the maintenance steps
  • Closes any electrical or water supply to the asset Lock Out Tag Out (LOTO)
  • Checks each step covered on the app until all the steps are completed.
Project Requirements

The Preventive Maintenance (PM) Manuals shall

• contain as step 0 the need to close any electric or water supply connected to the asset before the maintenance starts (LOTO) if required.

• contain at most ten steps, excluding the step 0 and final step. In case that the procedure requires multiple steps, depending on the Planner perspective, this requirement can be disregarded.

• contain as final step that the technician cleans up the workspace once the maintenance is performed before the technician leaves.

• shall be examined and approved by either the Support Services Supervisor or the Facility Services Planner
# PM List

<table>
<thead>
<tr>
<th>ASSET</th>
<th>BRAND</th>
<th>MODEL</th>
<th>Number of Assets</th>
<th>Priority</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Units:</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Package/RTU</td>
<td>Trane</td>
<td>TCH060F4RGA06D001</td>
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<td>Priority 1</td>
<td>46</td>
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<tr>
<td>Split (Condenser, Evaporator Coil, &amp; Furnace)</td>
<td>Trane</td>
<td>4TWR403O1000AA</td>
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<td>Priority 2</td>
<td>6</td>
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<tr>
<td>Mini Split (Condenser &amp; Air Handler)</td>
<td>Daikin</td>
<td>FTXB18AXVJU</td>
<td></td>
<td>Priority 3</td>
<td>23</td>
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<tr>
<td>Wall Pack</td>
<td>Bard</td>
<td>W48A2-A15</td>
<td></td>
<td>Total</td>
<td>75</td>
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<tr>
<td>Liebert Units (Fan Coil &amp; Condensing Unit)</td>
<td>Liebert</td>
<td>MCL110E8ADG759</td>
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<tr>
<td>Window Units</td>
<td>Sea Breeze</td>
<td>WH252ZRC</td>
<td></td>
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<tr>
<td>PTAC</td>
<td>Friedrich</td>
<td>PDF12K3SG-A</td>
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<tr>
<td>Elevators</td>
<td>Otis</td>
<td></td>
<td>Draft</td>
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<tr>
<td>Geda</td>
<td></td>
<td></td>
<td>Approved</td>
<td></td>
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<tr>
<td>Wheel Chair Lifts</td>
<td></td>
<td></td>
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</tbody>
</table>

**Fire Protection (certifications/testing):**

<table>
<thead>
<tr>
<th>ASSET</th>
<th>BRAND</th>
<th>MODEL</th>
<th></th>
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<tbody>
<tr>
<td>Fire Hydrants</td>
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<tr>
<td>Fire Pumps</td>
<td>FAIRBANKS/PENTAIR</td>
<td>6&quot;1824BF</td>
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<tr>
<td>Exit Signs/Emergency Lights</td>
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<tr>
<td>Clean Agent Fire Suppression</td>
<td>Ecaro</td>
<td>Ecaro-25</td>
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</table>
PM Samples

Wall Pack
Source of Maintenance Manuals
# PM Sample

**Checkpoints:**

1. Block out Power supply (LOTO).
2. Clean all dirt, lint, and grease from the combustion air opening (UDAP) and venter assembly.
3. Clean all dirt, lint, and grease from the fan blade, fan guard, and motor.
4. Check the heat exchanger both internally and externally.
5. Check the burner for scale, dust, or lint accumulation. Clean if needed.
6. Check the vent or vent/combustion air system for soundness. Clean openings.
7. Check any gas leaks.
8. Check for Carbon Monoxide.
9. Replace Filters if needed.
10. Check the wiring for any damaged wire. Replace damaged wiring.
11. Clean up work area
   11.1 Comments and Feedback
   11.2 Close Workorder

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## Furnace PM Frequency: Semiannual

<table>
<thead>
<tr>
<th>Maintenance Period</th>
<th>Weekly</th>
<th>Fortnightly</th>
<th>Monthly</th>
<th>2 Monthly</th>
<th>3 Monthly</th>
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<tr>
<td>4 Monthly</td>
<td>X</td>
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## Tools Required

<table>
<thead>
<tr>
<th>Tool Required</th>
<th>Quantity</th>
<th>Tool Location</th>
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</table>

### Preventive Maintenance

- **YES**
- **NO**

- Block out Electricity.
- Clean all dirt, lint, and grease from the combustion air opening (UDAP) and venter assembly.
- Clean all dirt, lint, and grease from the fan blade, fan guard, and motor.
- Check the heat exchanger both internally and externally.
- Check the burner for scale, dust, or lint accumulation. Clean if needed.
- Check the vent or vent/combustion air system for soundness. Clean openings.
- Replace any parts that do not appear sound.
- Check the wiring for any damaged wire. Replace damaged wiring.
- Clean up the work area

Prepared by:
Prepared on:
PM:

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**Maintenance Checklist Updated 2/10/2022**
Progress

- Established contact with a Management team representative and his Maintenance team
- **Eleven** visits to the Hawkins Facility to perform update or kickoff sessions
- Documentation of 66 Preventive Maintenance Manuals
- 62 Preventive Maintenance Manual Approved
What did we learn?

• The documentation of Preventive Maintenance Manuals on the Facilities Engineering field

• Understanding the resilience and commitment value to support a small but meaningful subsystem (PM manuals) to reach success on the whole system (Maintenance Connection, CMMS System)

• Understanding of the importance of keeping historical data for decision making