

(document file name)

(facility name)

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Systems Manual

Prepared for ???

Developed by ???

Date: ????

(document owner name and contact info)

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ACKNOWLEDGEMENTS

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FOREWORD

The systems manual is meant to inform facilities staff, current or potential service contractors, as well as facility occupants and users as to the basis for operating and maintaining a facility's systems. **It is intended to be useful in the day-to-day operations of a facility.** It also forms the basis of transferring important 'corporate memory' information from one party to the next. Information that could be included in a systems manual if available is listed below.

- A general facility description and plot plan with the location of major use areas and equipment identified
- A definition of current facility objectives, functional uses, special services including emergency response and desired level of control including any energy efficiency or load management priorities (design intent)
- Operating standards or procedures for major use and critical space/special needs areas including indoor environmental quality requirements and occupancy requirements and schedules. Include a basic understanding of what not to touch and who is recommended to touch it.
- A description of each major HVAC and lighting system, including designed capabilities, limitations, usage instructions, location, pictures as needed and acceptable performance for each major system, identifying key performance metrics/benchmarks and accountability/follow-up requirements
- Sequence of operation (control) for each major HVAC system, including setpoints, schedules, energy efficiency features and seasonal changeover procedures.
- Identification of overall energy performance trends for each system if known and recommended techniques to aid in verifying performance or troubleshooting problems
- An itemized list of all equipment to be maintained including known maintenance requirements, procedures or best practices
- A list of any necessary training requirements or issues
- A list of pertinent contact references (internal/ external)
- A log of events including dates and relevant issues and contact information: audits or surveys (maintenance, energy, lighting); purchases, replacement of equipment or new installations; building modifications or restacking; maintenance or testing; staff or contract changes; and problems as identified and corrected
- A questionnaire that guides new supervisors in acquiring relevant information from the departing supervisor
- Basic instructions on how a building supervisor should respond to the need to restack space
- A copy of important as-built drawings
- A copy of recent HVAC load calculation and Test, Adjust and Balance (TAB) reports
- The current annual gas & electric usage report
- Relevant information taken from any commissioning report and updates if completed: the problem log and correction plan, pertinent checks and tests, a list of improvements made and sensor calibration data
- A list of relevant documentation identifying responsible party and storage location

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SITE INFORMATION

Facility Description

Location & Directions

(insert description here)

History

The facility was constructed and first occupied in 1969. It included the Office building (Building A), a building housing Maintenance and Operations (Building B) and the Garage/Shop complex (Building C). Building A had a Trane 100 ton absorption chiller with Baltimore Air Coil cooling tower and a hot water heat exchanger to meet office building cooling and heating loads. System controls were pneumatic. Local packaged A/C units provided conditioned air other cooling and heating loads in the facility, except for in the Garage where radiant heaters were used; all of which were controlled by local thermostats and/or by-pass timers.

Operating schedules have swung from a 5 day-a-week, 10-hour day schedule to a 7 day-a-week 14-hour day schedule and back. Numerous organizational and departmental changes and consolidations have occurred in the company since the facility first opened.

A major seismic retrofit project was undertaken in 1999 – 2001 in all three major buildings, which included the replacement of most site cooling and heating equipment and to add DDC controls to Building A's pneumatic control system. See the Events Log and Equipment Inventory tables for a summary of changes and upgrades of building systems as currently known.

The 3 major structures still occupy the site. A substation trailer complex and a hazardous materials storage building were added later. Also on the premises are number of storage sheds, a covered storage area, and various other equipment storage areas and containers.

Site Plot Plan

(insert plot plan or site map here)

Buildings and Floors by Room Number

Office:

OM&C:

Garage/Shop Flr. 1:

Garage/Shop Flr. 2:

Hazardous Storage Building:

Substation Trailer:

Current Facility Requirements

Objectives

Provide a full-service Service Center capability to support Utility Operations system needs. The current goal for this facility is to meet both occupant and customer needs.

Functional Uses/Operational Capabilities

The site is currently occupied by a number of Utility Operations departments, which include Customer Services (Field Services, Field Metering Services); Engineering and Planning (ET&DE, Gas Distribution Operations Engineering); Operations, Maintenance & Construction (Estimating and Mapping, Support Services, Mission Construction M&O, Electrical Control Center); General Services (Fleet Operations); RAS (Account Services); and ISTS. There is a customer service lobby located in the front of the building. Approximately 250 people occupy it on any given day.

Space requirements

Personnel from Area 2 OM&C's Construction M&O and Estimating and Mapping dominate office space requirements. Also present are personnel from OMC's Electrical Control Center and Support Services. Personnel from Customer Services Area 2 Field Services and Meter Reading and personnel from RAS Account Services; Engineering & Planning; ISTS; Electric Transmission & Substation MTC&C; and Fleet Services.

Space in the facility is also provided for set-up and storage of gas & electric system equipment (including sand and gravel bins) and support vehicles; CNG gas fueling station; fuels, flammables, hazardous materials and compressed gas storage; equipment and records storage; telecommunication network systems; warehouse materials storage and shipping and receiving.

Special requirements

Special requirements include a customer service lobby that operates between 6am and 4pm; an automotive garage w/ vehicle lift and wash rack; two CNG gas fueling stations for use by both customer and company vehicles; an electric vehicle charging station; emergency natural gas generators for each major building plus the DO; ice machines; fuels, flammables, hazardous materials and compressed gas storage, three ice machines, telecommunications network servers; and site access security.

Emergency response

This facility is not an emergency command center but it is used as a staging area for gas and electric distribution equipment, vehicles and staff on a regular basis.

Occupancy Requirements, Air Handler & A/C Unit Schedules

The facility is typically occupied from 6:00AM to 5:00PM. Comfort conditions are to be provided during this time. Off-hour and weekend use is to be scheduled on an exception basis. Facility Management staff typically arrive earlier. Staff may arrive earlier, work later, or work on weekends.

Current as of (date)

| UNIT / LOCATION | MON. – FRI. TIME ON | MON. – FRI. TIME OFF | SAT. / SUN. TIME'S | AREA SERVED | NOTES |
|--|---------------------|----------------------|--------------------|--|--------------------------|
| Building A | | | | | |
| AHU1A / 2 nd Flr. Mechanical Room | 06:00 | 17:00 | Not on | NW corner | DDC control |
| AHU2A / 2 nd Flr. Mechanical Room | 06:00 | 16:25 | Not on | NE corner | DDC control |
| AHU3A / 2 nd Flr. Mechanical Room | 06:00 | 16:25 | Not on | SE corner | DDC control |
| AHU4A / 2 nd Flr. Mechanical Room | 06:00 | 16:25 | Not on | SW corner | DDC control |
| Chiller ACCH-1A / Outside NE Mechanical Room | 07:00 | 16:30 | Not on | Bldg A | DDC control |
| Boiler B-1A / NE Mechanical Room | 06:00 | 15:30 | Not on | Bldg A | DDC control |
| Package Unit AC-5A / Roof | Unit on 24/7 | | | Auditorium and Switching Center | Local smart stat control |
| Package Unit AC 5 / Roof | Unit on 24/7 | | | Telecom room | Local smart stat control |
| Package Unit AC-6 / Attic | Unit on 24/7 | | | Server room | Local smart stat control |
| Building B: OM&C | | | | | |
| Package Unit AC-1B / Roof | 06:00 | 16:00 | Not on | West: Restrooms, CR101 and Bull Room | Local smart stat control |
| Package Unit AC-2B / Roof | 06:00 | 16:00 | Not on | Center Rooms | Local smart stat control |
| Package Unit AC-3B / Roof | 06:00 | 16:00 | Not on | East: Recovery Rm, Inspectors Rm, Office and Storage | Local smart stat control |
| Building C: Garage/Shop | | | | | |
| Package Unit: 4 ton / Roof | Unit on 24/7 | | | Telecom Room | Local stat control |
| Package Unit: 2 ton / Roof | 07:00 | 23:30 | Not on | Garage Office | Local smart stat control |

Indoor Environmental Quality Requirements

Provide optimum thermal comfort and indoor air, visual and sound quality over the varying facility activities.

Temperature

The HVAC system is to maintain thermal comfort at all hours of occupancy. When occupied conditioned spaces should be kept between 70°F and 75°F year round to maintain a comfortable atmosphere for occupants and visitors. A setpoint of 72°F is preferred. Office space must be comfortable at the time of morning occupancy. Site Telecom and Server Rooms must be kept between 68°F and 73°F year around.

Lighting

Lighting must be energy efficient, consistent from space to space and standardized to limit inventory but versatile enough to enhance space functionality, which is impacted by varying space use and day and nighttime conditions. Local lighting controls must be easy to operate and occupancy sensors provided where applicable to minimize unnecessary lighting use. Lighting controls must eliminate the current need to turn off the numerous local circuit breakers as a manual lighting sweep.

IAQ

The use of outdoor air for ventilation and cooling should be maximized. Internally generated pollutants including odors from shop activities, break rooms and restrooms, should be exhausted to the out of doors and not returned via the HVAC outdoor air inlets. In high-density occupancy spaces, CO₂ control should be used to improve energy efficiency.

Utility Cost / Energy Savings Goals

The primary energy savings goals for this site is to limit energy use where possible, taking full advantage of economizer function by maximizing the use of outdoor-air for cooling and to limit A/C and lighting function during unoccupied hours, except where needed.

Level of System Control Desired

The HVAC controls system should reliably and efficiently control the HVAC system. Distribution fans and pumps must be controlled off and valves closed when the building is unoccupied. Control system caused failures to provide cooling or heating are unacceptable. Facility personnel must be able to easily ascertain the status of comfort and systems and to make adjustments in setpoints and schedules using control system graphics via onsite or remote terminals or PC's. Web access is preferred to modems. Local-override is necessary for off-hour unscheduled use. Systems controls must be tuned and able to maintain a stable setpoint. The HVAC control system must be able to respond to a change in load or system upset (large crowd) in a timely fashion. The control system must have the capability to implement to a system wide demand response program when implemented. The system should have the capability of monitoring facility energy use and demand during utility billing period window. Obtaining full DDC control of all heating and cooling systems and equipment including small AC units' schedules and setpoints is also desired.

Documentation and Training Needs

The building supervisor, all building mechanics, and representatives of site telecommunications staff and the maintenance contractor must be trained in accessing both manual and DDC HVAC control system information, making adjustments to setpoints and schedule and diagnosing minor system upsets using trend reports. A systems manual must be provided to aid staff in conducting the daily operations and maintenance activities of the various installed systems.

Performance Acceptance Criteria

The primary criterion used to define acceptable performance for this facility is the requirement to limit occupant complaints. The HVAC system should not be forced out of service more than 1 or 2 times per month. Occupied conditioned spaces should be kept between 70°F and 75°F year round and hot and cold drafts minimized. HVAC generated noise should not interfere with

office or meeting room function. The number of comfort complaints from building users needs to be less than 1 per month. The HVAC control system much function properly, providing easily understood graphical information that allows staff to ascertain the status of comfort and systems in the facility. Office lights are off when rooms or building are unoccupied.

SITE CONTACT INFORMATION

Current as (date)

| Function / Title | Name | PG&E Department or Company | Contact Information: Address Phone number Corporate ID or E-mail address |
|---|-------------|---------------------------------------|---|
| Facilities | | | |
| Area 2 Building Superintendent | | | |
| Lead Bldg Mechanic | | | |
| Lead Bldg Mechanic | | | |
| Energy Management Program Manager | | | |
| | | | |
| Occupants/Users | | | |
| <u>Building access contact:</u> Operating Clerk | | | |
| <u>Dept. director, managers or lead(s)</u> | | | |
| G&E Service Supervisor | | | |
| Superintendent | | | |
| Supervisor | | | |
| Compliance Supervisor | | | |
| Construction Supervisor | | | |
| Estimating Manager | | | |
| Estimating Supervisor | | | |
| Mapping Supervisor | | | |
| T/R Supervisor Construction | | | |
| Distribution Supervisor | | | |
| Distribution Operation Supervisor | | | |
| Support Services Supervisor | | | |
| Sr. Gas Distribution Engineer | | | |
| MR & OS Supervisor | | | |
| Maintenance Supervisor | | | |
| Garage | | | |
| Fleet | | | |
| Safety Program Chair | | | |
| | | | |
| | | | |

| Contractors/Outside Resources | Contact Name | Company | Contact Information: Address Phone number E-mail address | Vendor # Contract # |
|--|---------------------|----------------|---|--------------------------------|
| Doors - overhead | | | | |
| Door repair | | | | |
| Electrical gates | | | | |
| Electrician | | | | |
| Fencing & Gates | | | | |
| Fire extinguisher service | | | | |
| Fire alarm – monitoring and maintenance | | | | |
| Fire alarm | | | | |
| Fuel maintenance | | | | |
| Generator service | | | | |
| HVAC DDC/Pneumatic Controls Installation | | | | |
| HVAC – equipment supplier | | | | |
| HVAC – equipment supplier | | | | |
| HVAC – equipment supplier | | | | |
| HVAC – equipment supplier | | | | |
| HVAC – equipment supplier | | | | |
| HVAC – maintenance | | | | |
| HVAC - mechanical | | | | |
| HVAC - water treatment service | | | | |
| Janitorial service | | | | |
| Janitorial supply | | | | |
| Landscaping | | | | |
| Locksmith | | | | |
| Moving service | | | | |
| Pest Control | | | | |
| Plumbing | | | | |
| Security | | | | |
| | | | | |

| Who helped design and build this facility? | Name | Company | Contact Information: Address Phone number E-mail address |
|--|-------------|----------------|---|
| Architect | | | |
| Mechanical engineer | | | |
| Installation contractor | | | |
| Lighting | | | |
| | | | |
| Retrofit Projects | | | |
| <u>Remodel 1988 – Bld. B</u> | | | |
| Architect | | | |
| | | | |
| <u>Seismic Retrofit 1999-2001 Bldg A, B & C:</u> | | | |
| Architecture / Mechanical Design | | | |
| Structural Eng. | | | |
| General Contractor | | | |
| Controls Contractor | | | |
| | | | |
| <u>Scotopic Lighting Project 2003</u> | | | |
| Project manager | | | |
| Installation contractor | | | |

BASIC O&M

Expectations

In order to operate and maintain the systems at this site, facility personnel need to have a working understanding of each of these systems. Facility personnel must be able to easily ascertain the status of comfort and systems, diagnosis minor system upsets and to make adjustments in setpoints and schedules via onsite or remote access to applicable controls. They must also be aware of critical maintenance requirements. Contractors hired must also have full understanding of the operating and maintenance issues of systems for which they are responsible. Site personnel and contractors working on these systems are expected to document actions taken and changes made.

General Site Operating Procedures

Operating schedules have swung from a 5 day-a-week, 10-hour day schedule to a 7 day-a-week 14-hour day schedule and back. Numerous organizational and departmental changes and consolidations have occurred in the company since the facility first opened. Today, most occupants are expected to arrive after 6:00 AM and depart before 6:00 PM, year around except for the Switching Center, which is occupied, 24/7 seven days a week and the Garage, which may stay open until 11:30 PM on weekdays. Comfort conditions are to be provided during this time. Off-hour and weekend use for all other spaces are to be scheduled on an exception basis. When occupied, conditioned spaces should be kept between 70°F and 75°F year round to maintain a comfortable atmosphere for occupants and visitors.

Comfort conditions in the Office Building are met by 4 Trane air-handlers, recently retrofitted with variable frequency drives via 20 single duct VAV (variable air volume) terminal units with re-heat coils supported by a 70-ton Trane air-cooled rotary chiller and a 1440 MBH Bryan fire-tube boiler. A combination DDC (direct digital controls) and pneumatic HVAC control system from KMC controls the plant and air distributions systems via input from zone thermostats. Comfort conditions in the Auditorium and Switching Office is provided 24/7 by a rooftop mounted packaged A/C unit under control of a local thermostat. Space conditions in the telecom room and server room are met 24/7 by separate packaged A/C units under control of a local thermostat.

Comfort conditions in the other buildings are served by a number of independently controlled packaged A/C units, split heat pump units, and fan heating units, which may be operated by local thermostats and/or time clocks.

Primary site energy use reduction strategies include maximizing the use of air handler economizers and resetting cooling supply air temperature setpoints as load indicated by zone temperature dictates.

The following is the recommended operation procedures and seasonal setpoints for those units controlled by independent local zone thermostats.

Independent Zone Thermostats

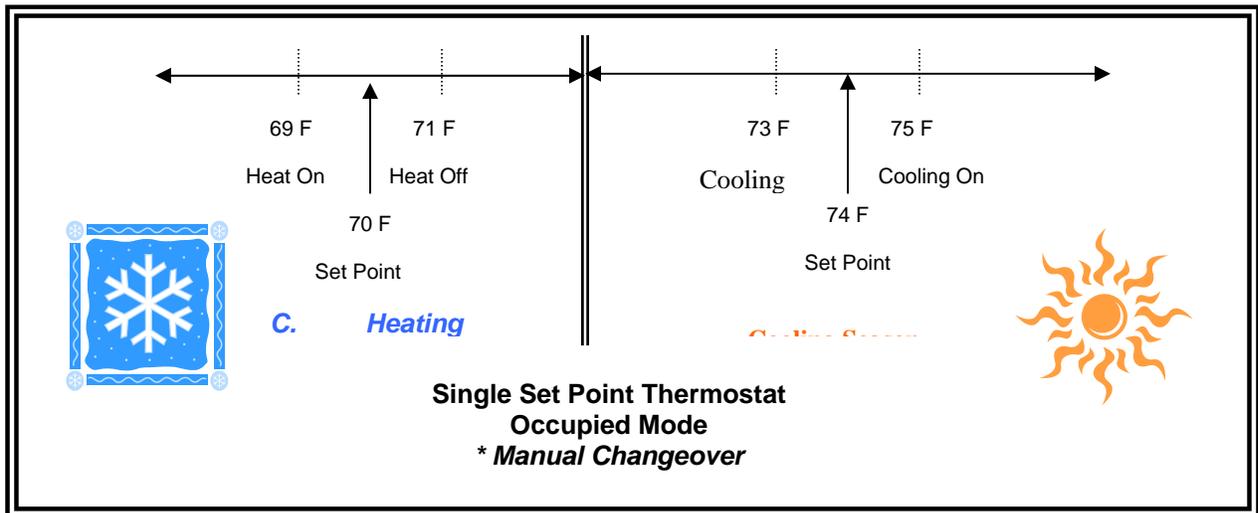
Wherever possible commercial-grade, programmable, dual-set point thermostats with automatic mode change over should be used. Fans should be set to run continuously during occupied periods to meet minimum ventilation requirements. Existing thermostats should be checked and calibrated using manufacturer's instructions and an accurate and reliable temperature standard. Thermostats that are inaccurate, that go out of adjustment frequently, or that can no longer be calibrated should be replaced.

Suggested Seasonal Set Points

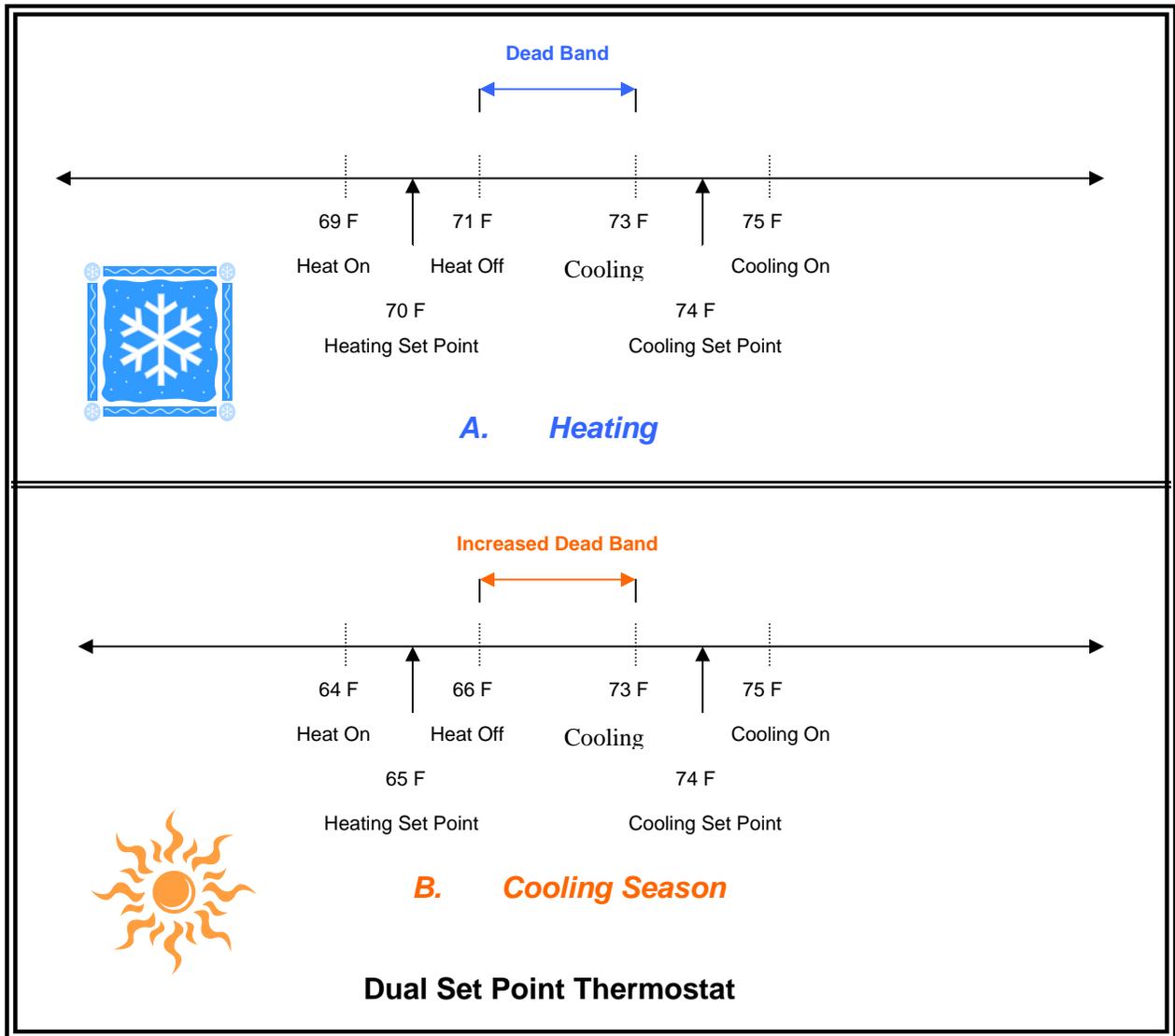
- Operating at the ideal set point achieves employee comfort in the most energy efficient manner.
- The following table shows suggested set points for typical thermostats.
- In setting the zone heating set point consider the temperature rise that will occur once people, lighting, and office equipment become active.
- A zone heating set point set too high initially may result in the activation of mechanical cooling prematurely, wasting energy. This is especially true if the heating/cooling dead band is too small.
- A zone cooling set point set too low may not take full advantage of "free cooling" provided by the economizer.
- Visual diagrams follow on the next page to show what action occurs at the various stages of temperature control.

| | <u>Heating Season</u> | | | | <u>Cooling Season</u> | | | |
|-------------------|-----------------------|------|----------------|------|-----------------------|------|----------------|------|
| Set Points | Single Set Point* | | Dual Set Point | | Single Set Point* | | Dual Set Point | |
| | SP | Diff | SP | Diff | SP | Diff | SP | Diff |
| Occupied | | | | | | | | |
| Zone Heating | 70 F | 2 F | 70 F | 2 F | | | 65 F | 2 F |
| Zone Cooling | | | 74 F | 2 F | 74 F | 2 F | 74 F | 2 F |
| Unoccupied | | | | | | | | |
| Zone Heating | 65 F | 2 F | 65 F | 2 F | | | 65 F | 2 F |
| Zone Cooling | | | 80 F | 2 F | 80 F | 2 F | 80 F | 2 F |

Thermostat Operational Diagram for SINGLE SET POINT Thermostat



Thermostat Operational Diagram for DUAL SET POINT Thermostat



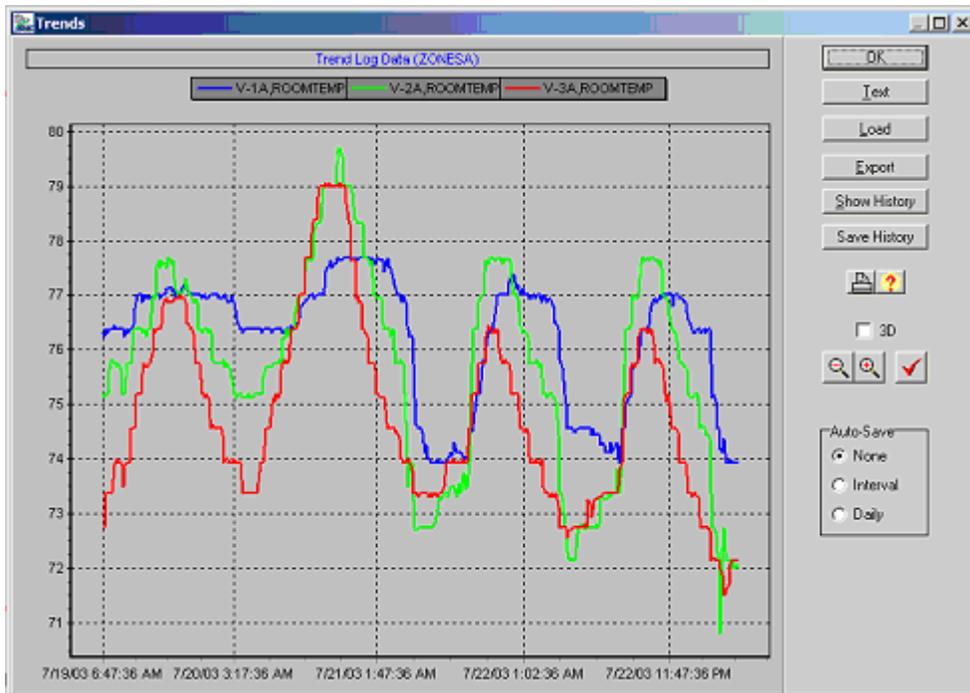
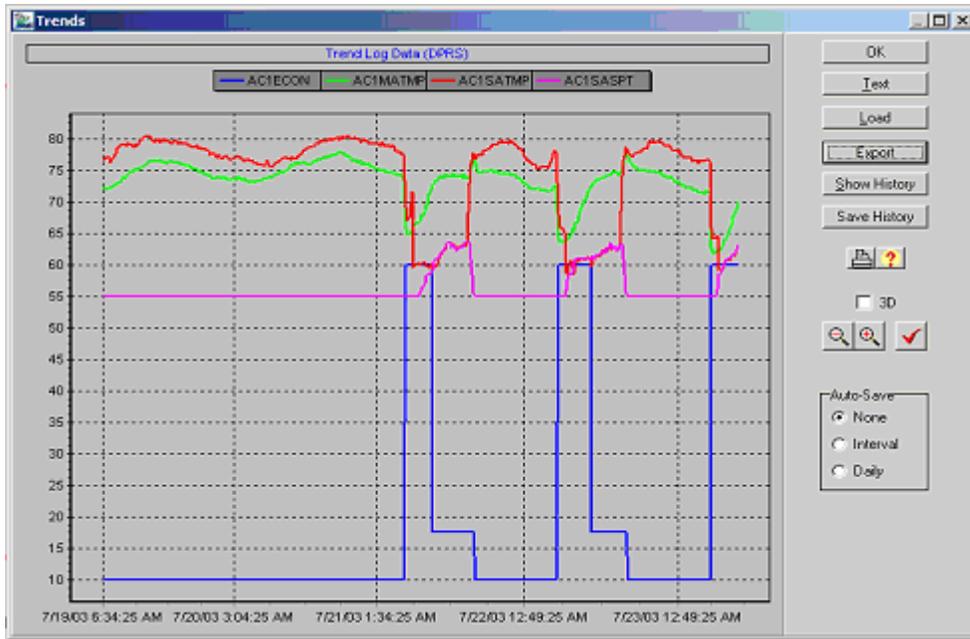
Basic Troubleshooting

The most basic issue to be concerned with is that comfort conditions are being provided to the space. In the Office building, the DDC system provides information from the plant down to the zone level is now available to be viewed to give some understanding of space conditions and system control. Alarms or enunciated events are programmed to give some indication that the desired tolerances are no longer being met or that equipment is under fault or has failed. Every effort is made not to program these alarms in such a fashion as to prompt nuisance alarms. Depending upon the type of alarm, action will need to be taken to determine the root cause such as why a piece of equipment is in fault or to remedy the situation to improve performance such as with the Filter Dirty Alarm. Most equipment is equipped with internal safeties such that immediate action is not necessarily required to protect the equipment from permanent damage. But safeties do fail, so prudence warrants that particular attention is paid to Chilled Water Supply Temperature Lo and Hot water Supply Temperature Hi.

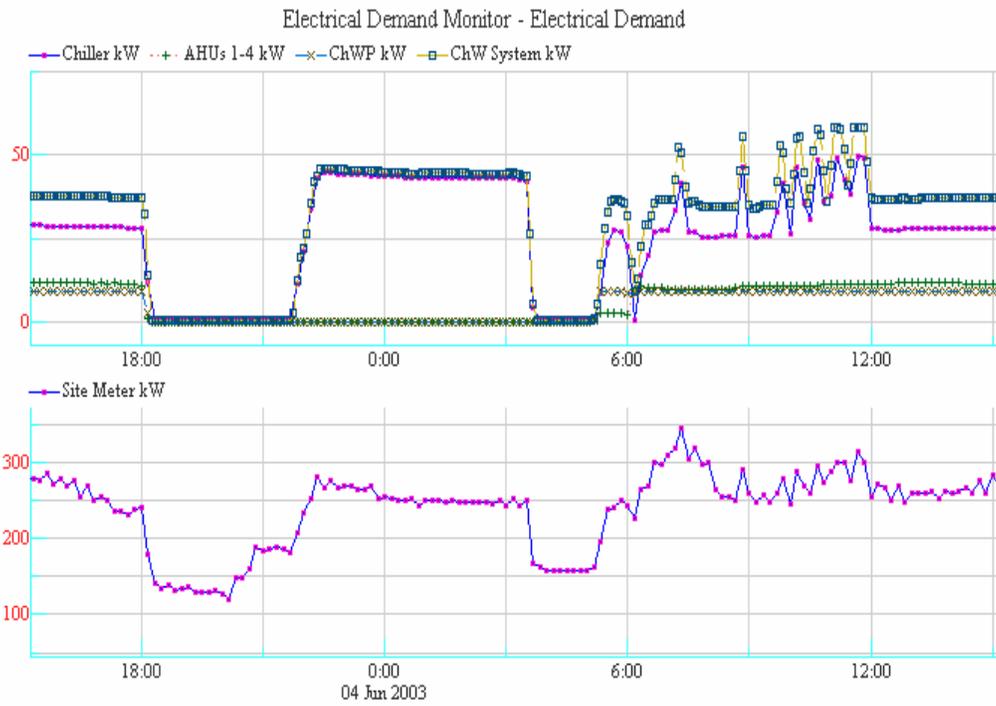
DDC points can be trended and assembled into trend reports to help verify that systems and equipment is being scheduled properly (1 & 2), setpoints are being met (3-6), operation is energy efficient (7-9) and that systems and equipment are not cycling unnecessarily (1-9), which tends to lead to unstable control. Examples of recommended trend reports include the following:

1. AHU1A Supply Fan Status, AHU2A Supply Fan Status, Return Fan 1A Status, Exhaust Fan 1A Status vs. time
2. Chilled Water Pump P-2 Status, Chilled Water Pump P-3 Status, Chiller Enable vs. Time
3. AHU# Supply Duct Pressures and Building Pressure vs. Time
4. Chilled Water Temperature and Setpoint vs. Time
5. Hot Water Temperature and Setpoint vs. Time
6. Zone temperature and Setpoint vs. Time
7. AHU# Outside, Return, Mixed and Supply Air Temps vs. Time
8. AHU# Outside Air Damper %, Mixed and Supply Air Temps, Supply Air Setpoint vs. Time
9. AHU# Mixed and Supply Air Temps, Chilled Water Valve %, Supply Air Setpoint vs. Time

Examples of three trend reports are provided below:



Electric Demand Monitor



Recommended Maintenance Requirements / Best Practices for Critical Equipment and Systems

- A qualified electrician should check all primary electrical connections to see that they are properly tightened and that no corrosion exists. Problem connections should be remedied as soon as possible. Motors should be inspected for excessive heat; if evidence of over heating is found, check phase to phase voltages and current on each phase and neutral and have a qualified HVAC technician look for system related causes. Replace motor if necessary.
- Rotating elements should be inspected for excessive noise or vibration as the equipment may be miss-aligned or out of balance; lube bearings, balance or realign shaft as required
- Confirm on at least semi-annual basis that control sequence logic, scheduling of equipment, setpoints and alarms are functioning as intended, making sure that system programming is not allowed to degrade, that the system clock is correct and that valve and damper actuators are operating properly. Special attention should be paid to known comfort complaints, economizer function, and that control loops remained tuned. Document in the maintenance log any adjustments or changes to the program.
- Back-up the controls program on CD at least on an annual basis.
- Document in the Systems Manual Events Log any issues found that impact safety, energy use or comfort and any actions taken and notify the Building Superintendent.
- See Major equipment section for recommended maintenance requirements for specific equipment.

Site Events Log

An events log identifies pertinent information regarding any audits or surveys; purchases, replacement, upgrades or new installations of equipment or systems; building modifications or restacking; maintenance or testing (by staff or contractor); staff or contract changes; and customer complaints or problems when identified and corrected. It is most useful when it is kept updated. Add additional rows or columns as needed.

Current as of (date)

| Issue: | Description (type / equipment or system / location, if applicable): | Date (mm/yyyy): | Contact Information: Project manager/ vendor/ party responsible Department/ company Phone/ e-mail (if needed) |
|--|--|------------------------|--|
| Initial Occupancy | | | |
| | | | |
| Addition, replacement or retrofit of major equipment or system | Project #: Facility Improvements, Seismic Retrofit of Bldgs A, B & C | 1999-2001 | |
| Addition, replacement or retrofit of major equipment or system | Project #: Facility Improvements (2 of 2), Seismic Retrofit of Bldgs A, B & C | 1999-2001 | |
| Building modifications/ additions completed | Project #: Replace two roof top AC units at Bldg C | 2001 | |
| Building modifications/ additions completed | Project #: Mech. Sys. Component Replacement in HVAC system due to age and deterioration (Bldgs A, B & C) | 2001 | |
| Building modifications/ additions completed | Project #: Install lighting and power at storage | 2001 | |
| Building modifications/ additions completed | Project #: Install emergency generator | 1999 | |
| Building modifications/ additions completed | Project #: Replace space heater, Hot Stick Rm Bldg B | 2001 | |
| | | | |
| QA activities including audits, surveys, inspections, tests, calibrations, and reviews | Energy using equipment inventory | 1/2003 | |
| QA activities including audits, surveys, inspections, tests, calibrations, and reviews | Maintenance audit | | |
| QA activities including audits, surveys, inspections, tests, calibrations, and reviews | Building C A/C-1 and EF-1, 2 &3 TAB air balance test | 1/01 | |
| QA activities including audits, surveys, | HVAC control sensor calibration | | |

| | | | |
|--|---|-------|--|
| inspections, tests, calibrations, and reviews | | | |
| QA activities including audits, surveys, inspections, tests, calibrations, and reviews | New HVAC load calculations | | |
| | | | |
| Personnel changes | New maintenance contractor/contractor personnel | | |
| | | | |
| Personnel changes | Arrival of new building supervisor | 06/01 | |
| Personnel changes | Arrival of new building supervisor | 07/03 | |
| Personnel changes | Arrival of new building mechanic | | |
| Personnel changes | Departure of a building supervisor | 06/01 | |
| Personnel changes | Departure of a building supervisor | 07/03 | |
| Personnel changes | Departure of a building mechanic | | |
| | | | |
| Problem identified | | | |
| Problem resolved | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

MAJOR HVAC SYSTEMS AND EQUIPMENT

Site Equipment Summary

This section describes the major HVAC and lighting energy using systems at a typical Service Center. Systems included are:

- Chilled water system, rooftop A/C or heat-pump units
- Boiler, hot water system
- Air handling units, air distribution systems, exhaust fans, etc
- HVAC control systems
- Lighting controls
- Other

The following systems and equipment have been identified in the equipment inventory as being on site.

Building A: Office

- a. (1) Chilled water system – (1) rotary chiller (2) dedicated chilled water pumps
- b. (1) Hot water system – (1) hot water boiler each with (2) dedicated constant speed circulating water pump
- c. (4) Built-up air handling units, each w/ a supply fan controlled by a variable frequency drive
- d. (2) Major return fans, each controlled by a variable frequency drive
- e. (20) Air distribution system terminal units
- f. (1) Major exhaust fan
- g. (3) Packaged, split or wall mount A/C units
- h. HVAC controls: DDC/pneumatic controls are used on equipment served by chilled water and hot water systems; local smart thermostats w/ night setback are used on packaged units
- i. Lighting controls: motion detector occupancy sensors are used throughout the building and time clocks on perimeter lighting
- j. Other special systems or equipment
 - (2) Air compressors
 - (1) Air dryer
 - (2) Emergency generators
 - (1) Fire panel
 - (1) Ice machine
 - (1) Water heater

Building B: OM&C Building

- a. (3) Packaged H/C units with local smart thermostats w/ night setback
- b. (3) Exhaust fans
- c. HVAC Controls: local smart thermostats w/ night setback or local stat with twist timers
- d. Lighting controls: wall switches throughout the building with occupancy sensors in restrooms; time clocks on perimeter lighting

- e. Other special systems or equipment
 - (1) Emergency generator
 - (1) Fire panel
 - (2) Ice machines
 - (1) Water heater

Building C: Garage/Shop

- a. (2) Packaged H/C units
- b. (7) Heat fans
- c. (16) Exhaust fans
- d. Other special systems or equipment
 - (1) Air compressor
 - (1) Emergency generator
 - (1) Ice machine
 - (1) Water heater

Building E: Substation Trailer

- a. (2) Heat pump package units

Yard

- a. Other special systems or equipment
 - (1) Electric gate

A detailed list by building of equipment on site and specific maintenance notes are found in the Site Equipment Inventory Tables.

The following discussion documents the systems that are part of Buildings A, B & C HVAC seismic retrofit project. It is recommended that additional systems be included as able.

Office Building Air Distribution Systems

Description

Four (3) built-up air-handling units, all located in the second floor mechanical room, provide ventilation and conditioned air to the majority of Office building spaces. The mechanical room includes:

- AHU-1A with outside and return air dampers, a Trane cooling coil and a pneumatically driven chilled water valve and a Trane type 17 supply fan powered by an ABB variable speed drive, providing 7270 CFM of supply air to the majority of the northwest building spaces.
- AHU-2A with outside and return air dampers, a Trane cooling coil and a pneumatically driven chilled water valve and a Trane type 17 supply fan powered by an ABB variable speed drive, providing 6490 CFM of supply air to the majority of the northeast building spaces.
- AHU-3A with outside and return air dampers, a Trane cooling coil and a pneumatically driven chilled water valve and a Trane type 21 supply fan powered by

- an ABB variable speed drive, providing 6220 CFM of supply air to the majority of the southeast building spaces.
- AHU-4A with outside and return air dampers, a Trane cooling coil and a pneumatically driven chilled water valve and a Trane type 21 supply fan powered by an ABB variable speed drive, providing 6420 CFM of supply air to the majority of the southwest building spaces.
- Two return fans, RF-1A and RF-2A, each with an ABB variable speed drive, serve the north and south areas respectively.
- A Trane exhaust fan with relief dampers.



As off June 2000, a KMC direct digital control (DDC) system using electronic/pneumatic chilled water and damper actuators maintains control of each built-up air-handler. Conditioned air is scheduled 6:00 AM to 5:00 PM, Monday through Friday - except holidays. Each air handler is started individually in warm-up mode before entering occupied mode. Comfort conditions are defined as 70 to 75°F. Comfort conditions can be provided during off hours on an override basis by rescheduling the required air handler.

A 10 nominal ton packaged A/C unit, AC-5A, installed in 1999 with gas heating and electric cooling, but no economizer, located in the attic under local thermostat control provides conditioned air to the Auditorium/ Switch Center (Dispatch Office) 24 hours a day, 7 days a week under control of a local smart thermostat. Comfort conditions are defined as 70 to 75°F.

A rooftop mounted Trane package A/C unit, AC-5, provides conditioned air to the Telecom Room. A rooftop mounted Carrier heat pump package unit, AC-6, provides conditioned air to Server Room. These rooms are provided constant 68° F to 70°F conditions, 24 hours a day under control of local thermostats.

Sequences

Typical of AHU 1A through 4A

Air handler supply and return fans are started and stopped based on programmed schedule. If failure occurs as sensed by a current switch, an alarm is enunciated at the operator workstation and the Netview interface.

The supply air fan VFD is modulated to maintain a supply air duct pressure setpoint of 0.8 inches of water (adjustable), as sensed by static pressure sensor located 2/3 down the supply air duct. The setpoints as of 9/25/03 are as follows: AH1A 1.5, AH2A 3.5, AH3A 2.0, AH4A 2.0.

Return Fan R-1A VFD and Return Fan R-2A VFD are modulated to maintain the building static pressure setpoint of 0.02 inches of water (adjustable), as sensed by Building Static Pressure sensor.

During morning warm-up the outside air damper is closed and the discharge air damper is opened and all VAV re-heating coil valves are opened until the return air temperature reaches a setpoint of 72°F. Once return air temperature setpoint is reached, as sensed by the Return Air Temperature sensor, occupied mode is turned on. If during occupied mode the outside air temperature drops below the chiller lockout setpoint of 58°F (adjustable), the chilled water valve is closed.

During occupied mode when outside air temperature, as sensed by the Outdoor Air Temperature sensor, is less than the economizer setpoint of 69°F (adjustable) the outside air damper is modulated between 10% open and 100% open and the discharge air damper is modulated between a 100% open and 100% closed, respectively, to maintain a mixed air temperature, as sensed by the Mixed Air Temperature sensor, that is equal to supply air temperature setpoint. Once the outside air damper is fully open the chilled water valve is modulated from 0% to 100% to meet supply air temperature setpoint.

During occupied hours when outside air temperature is greater than the economizer setpoint of 69°F (adjustable) the outside air damper is set to 20% and chilled water valve is modulated from 0% to 100% to meet supply air temperature setpoint.

The supply air temperature setpoint is modulated based on a Hi/Lo zone temperature reset strategy to maintain supply air temperature as sensed by the Supply Air Temperature sensor.

The supply air fan is interlocked with fire alarm system duct smoke detector and will shut down in the event of smoke being detected.

VAV Terminal Units w/ Reheat (Typical of 1 through 20)

During morning warm-up mode all reheat coil valves open until return air temperature reaches 72°F. During occupied mode, the terminal damper is modulated to maintain zone temperature as sensed by the zone thermostat. If the zone temperature falls below setpoint, the terminal damper is modulated to minimum position. If zone temperature is still below setpoint, the terminal re-heat valve is opened until setpoint is met. Once setpoint is met the re-heat valve is closed and the terminal damper begins modulating again. During unoccupied periods the re-heat valve is closed.

Terminal Unit Schedule

| Zone # | Description |
|--------|-----------------------|
| V-1A | Open Office 107 SW |
| V-2A | Open Office 107 NW |
| V-3A | Office 102 |
| V-4A | Open Office 107 South |
| V-5A | Office 104 |
| V-6A | Open Office 107 NE |
| V-7A | Cafeteria |
| V-8A | MGR Office 125 |
| V-9A | Open Office 132 |
| V-10A | Office 136 |
| V-11A | Office 133 |
| V-12A | HR Receiving Office |
| V-13A | Open Office 130 SE |
| V-14A | Open Office 130 North |
| V-15A | Open Office 130 West |
| V-16A | Office 116 |
| V-17A | Conf 112 |
| V-18A | Reproduction 109 |
| V-19A | Lobby 110 |
| V-20A | New Conference Room |

(Insert relevant test and balance data here)

Maintenance Requirements

The primary maintenance requirements for air handlers are to change their filters as needed and to clean their coils at least on an annual basis; being certain that filters seal properly. On at least a semi-annual basis:

- Inspect the condensate drain pan for proper operation and clean if necessary
- Inspect coil valves for corrosion and leaks
- Check damper and valve actuator operation over their entire range, making certain that the minimum outside air damper position is being maintained and that valves and dampers open and close as required; lubricate pneumatic actuators and linkages as per the manufacturer’s recommendation
- Check fan belts for tightness and wear; replace if necessary

- Inspect rotating elements for excessive noise or vibration as the fan may be miss-aligned or out of balance; lube bearings, balance or realign shaft as required
- Inspect motors for excessive heat; if evidence of over heating is found check current on each phase; replace the motor if necessary
- Document in the maintenance log the current data points and setpoints if applicable for each air handler: building static pressure, filter differential pressure, duct static pressure, supply fan speed, and outdoor air damper position

The primary maintenance requirements for a package unit is to:

- Inspect the unit for general soundness
- Change filters as needed
- Lube bearings if required
- Check fan belts for tightness and wear - being aware of excessive vibration as the fan may be miss-aligned or out of balance
- Check that the system is adequately charged
- Make sure the thermostat clock and programming is correct
- If the unit is equipped with an economizer, the damper and linkage should be tested.

This should all be done on at least a semi-annual basis. The cooling coil should be inspected and cleaned in early spring. If the unit has a heating coil, it should be inspected and cleaned and the crankcase heater tested in early fall.

The primary maintenance requirements for terminal units are to inspect for improper damper actuator function (loose linkages, minimum position, noise, inadequate or excessive air flow). Problem terminal units probably will not meet comfort conditions. Ducts and re-heat coil valves should also be checked for leaks. Check zone thermostat calibration at least bi-annually.

Document in the Systems Manual Events Log any issues found that impact safety, energy use or comfort and any actions taken and notify the Building Superintendent

Trends Log Points

AHU's (Typical of AHU1A through AHU4A, except as noted)

| Point Name (Label) | Description |
|----------------------------|--|
| AC#OATMP | AC-# Outside Air Temperature, °F |
| BLDGSTC | Building Static Pressure, inches of water |
| AC#OCC | AC-# Occupied, off/on |
| AC#MATMP | AC-# Mixed Air Temperature, °F |
| AC1RATMP or AC3RATMP | AC-1 Return Air Temperature, °F |
| AC#SATMP | AC-# Supply Air Temperature, °F |
| AC#SASPT | AC-# Supply Air Temperature Setpoint, °F |
| AC#FAN | AC-# Supply Fan Start, off/on |
| AC#FNSPED | AC-# Supply Fan Speed, % |
| AC#SFFLT | AC-# Supply Fan VFD Fault, on/off |
| AC#STATC | AC-# Supply Duct Static Pressure, PSI |
| AC#DS100 | AC-# Duct Static Pressure times 100 |
| AC#STCSP | AC-# Duct Static Pressure Setpoint, inches of water |
| AC#SS100 | AC-# Duct Static Pressure Setpoint times 100 |
| AC#ECON | AC-# Outside Air Damper Position, % open |
| AC#EMIN | AC-# Minimum Outside Air Damper Position, % open |
| AC#CHVLV | AC-# Chilled Water Valve Position, % open |
| AC#DPR | AC-# Air Damper Conv, % |
| AC#FILTR | AC-# Filter Differential Pressure, PSI |
| RFAN1 or RFAN2 | RF-1 Return Fan Start, off/on (RF-1 is used with AHU 1A and 2A; RF-2 is used with AHU3A and 4A) |
| RFAN1SPD or RFAN2SPD | RF-1 Return Fan Speed, % |
| R1FANFLT or R2FANFLT | RF-1 Return Fan VFD Fault, off/on |
| AC#LORM | AC-# Lowest Zone Temperature, °F |
| AC#HIRM | AC-# Highest Zone Temperature, °F |
| AC#RM_HI | AC-# Reset Room High, °F |
| AC#RM_LO | AC-# Reset Room Low, °F |
| AC#SA_HI | AC-# Reset Room High, °F |
| AC#SA_LO | AC-# Reset Room Low, °F |
| AC#AVGRM | AC-# Average Zone Temperature, °F |

Terminal Units (typical of 1 through 20)

| Point Name (Label) | Description |
|--------------------|------------------------------|
| V-#A RoomTemp | Zone #A Room Temperature, °F |

Trend Reports

1. DPRS: AC1ECON, AC1MATMP, AC1SASPT
2. Zone SA: V-1A Room Temp, V-2A Room Temp, V-3A Room Temp
3. Zones_B: V-4A Room Temp, V-18A Room Temp, V-19A Room Temp

Enunciated Events (Typical of AHU 1A through 4A, except as noted)

- AC-#A Filter Dirty
- AC-#A Supply Air Fan VFD Fault
- Return Fan-1 VFD Fault
- Return Fan-2 VFD Fault
- AC-#A Duct Static Pressure High

Office Building Chilled Water System

Description

Chilled water for cooling in the Office Building is provided by a 70 nominal ton Trane air-cooled rotary chiller, ACCH-1A, Model # RTAA0704XL01A3D1BH, located outside the NE Mechanical Room and 2 circulating water pumps, located in the NE Mechanical Room in Building A.



Maintenance Requirements

See chiller and chilled water pump O&M manuals for recommended maintenance requirements. The following are minimum recommended maintenance activities to be done on at least a semi-annual basis:

- Inspect chilled water pump seals for leaks and shaft coupling and motor for heat and vibration
- Inspect piping system, flanged connections and valves for leaks
- Monitor and record pertinent operating conditions in the maintenance log

The following are minimum recommended maintenance activities to be done on an annual basis:

- Inspect that equipment mounting and piping assemblies are secure

- Inspect condenser fan assembly; remove any debris
- Inspect moisture indicator for evidence of moisture
- Have a sample of compressor oil fully analyzed
- Check for proper oil level
- Check for proper refrigerant charge
- Check superheat setting
- Check head pressure control setting
- Check leaving water temperature; adjust if necessary
- Check chiller amp readings
- Test freeze cutout control
- Record information as found in the maintenance log

Sequences

Chiller ACCH-1A is currently scheduled from 7:00 AM to 5:30PM Monday through Friday except Holidays via the DDC controller. If scheduled and outdoor air temperature is above 58°F, a chilled water pump is enabled and then the chiller after the pump has run for a minimum of 1 minute (adjustable). The chiller should run if its factory supplied flow switch, which is wired to the manufacturer’s control panel senses flow. If an enabled pump does not run when required, the other pump is enabled and an alarm is enunciated. Chilled Water Pump P-2 and Chilled Water Pump P-3 alternate operation on a weekly basis (adjustable). At the end of the scheduled period or if during the scheduled period the outdoor air temperature falls below 58°F, the chiller is disabled first and then the chilled water pump after the pump has run for at least 1 additional minute (adjustable).

The chiller’s chilled water setpoint, as sensed by the DDC system’s Chilled Water Supply Temperature sensor, is reset from 50°F to 45°F as outside air temperature, as sensed by the DDC system’s Outdoor Air Temperature sensor, rises from 50°F to 80°F. If the DDC system’s Chilled Water Supply Temperature sensor exceeds 59°F or falls below 40°F while the chiller is on an alarm is enunciated at the operator workstation and the Netview interface.

Trend Log Points

| Point Name (Label) | Description |
|--------------------|--|
| OATEMP | Outside Air Temperature, °F |
| CHWP2SS | CHWP 2 Chilled Water Pump Start/Stop, off/on |
| CHWP2STS | CHWP 2 Chilled Water Pump Status, off/on |
| CHWP3SS | CHWP 3 Chilled Water Pump Start/Stop, off/on |
| CHWP3STS | CHWP 3 Chilled Water Pump Status, off/on |
| CHWSTMP | Chilled Water Supply Temperature, °F |
| CHLRENAB | Chiller Enable, off/on |
| CHLRRSET | Chiller Reset, Volts |
| CHILSEQ | Chiller Sequence Enable. off/on |

Enunciated Events

Chilled Water Pump P-2 Failure

Chilled Water Pump P-3 Failure

Chilled Water Supply Temperature Lo - Disabled

Chilled Water Supply Temperature Hi - Disabled

Office Building Hot Water System

Description

Hot water for heating in the Office Building is provided by a 1440 MBH Bryan flexible tube boiler, Model #CL180-W-FDG and 2 circulating water pumps, located in the NE Mechanical Room in Building A.

Maintenance Requirements

See hot water circulating pump and boiler O&M manuals for maintenance requirements. The following are recommended annual maintenance activities:

- Inspect hot water pump seals for leaks and shaft coupling and motor for heat and vibration.
- Inspect piping system, flanged connections and valves for leaks
- Inspect insulation on boiler and piping for proper installation and condition
- Open tube section and check to see that all tubes are clear
- Run boiler through a cycle: observe pre and post venturation cycles; observe ignition to determine that there is no fuel build-up before ignition; watch flame modulate to be sure air/fuel mixture is in proportion; check the outside surface for hot spots; inspect the fire box and flame, look for soot or over heating
- Service/lubricate dampers and linkages
- Service/lubricate fuel supply linkage
- Clean combustion air openings
- Blowdown the collected solids
- Check controls and wiring

During late summer conduct the following:

- Inspect the boiler. Is the boiler airtight? Are there any leaks or loose parts? Check for both air and water leaks; inspect flue, stack and bonnet; repair as necessary; check for combustion uniformity; then adjust fuel – air mixture using a combustion analyzer
- Clean heat transfer surfaces, e.g. brush tubes
- Renew any gaskets that have started to deteriorate
- Test the relief valve
- Check gas pressure
- Check flame safety circuits; clean terminals and replace grounds if necessary.

Record pertinent operating conditions and adjustments an/or repairs made in the maintenance log

Sequences

Boiler B-1A is currently scheduled from 6:00 AM to 3:30 PM Monday through Friday except holidays via the DDC controller. If scheduled and outdoor air temperature is below 78°F as sensed by the DDC system's Outdoor Air Temperature sensor, a hot water pump is enabled and then the boiler is enabled. The boiler runs if the boiler's safeties, including its flow switch and supply temp sensor, are OK. If an enabled pump does not run when required, the other pump is enabled and an alarm is enunciated. Hot Water Pump P1-1 and Hot Water Pump P1-2 alternate operation on a weekly basis (adjustable). At the end of the scheduled period or if during the

scheduled period the outdoor air temperature rises above 78°F, the boiler is disabled first and then the hot water pump.

The boiler’s hot water setpoint is reset from 190°F to 160°F as outside air temperature rises from 30°F to 60°F to achieve the correct hot water supply temperature as sensed by the boiler’s hot water supply temperature sensor. If the DDC system’s strap-on Hot Water Supply Temperature sensor exceeds 200°F or falls below 110°F while the boiler is on an alarm is enunciated. Note that these alarm limits are currently not programmed.

Trend Log Points

| Point Name (Label) | Description |
|--------------------|--|
| OATEMP | Outside Air Temperature, °F |
| HWP1 | HWP1-1 Hot Water Pump Start/Stop, off/on |
| HWP1STS | HWP1-1 Hot Water Pump Status, off/on |
| HWP2 | HWP1-1 Hot Water Pump Start/Stop, off/on |
| HWP2STS | HWP1-2 Hot Water Pump Status, off/on |
| HWSUPTMP | Hot Water Supply Temperature, °F |
| BLRRSET | Boiler Reset, off/on |
| BOILSEQ | Boiler Sequence Enable, off/on |
| HWLEAD | Hot Water Lead Pump Sequence, off/on |
| 1_LEAD | HWP1-1 Pump 1 in the Lead, off/on |
| 2_LEAD | HWP1-2 Pump 2 in the Lead, off/on |

Enunciated Events

- Hot Water Pump 1-1 Failure
- Hot Water Pump 1-2 Failure
- Hot Water Supply Temperature Lo - Disabled
- Hot Water Supply Temperature Hi - Disabled

Office Building HVAC Controls

The HVAC chilled water, heating hot water and air distribution systems in the Office Building area controlled by a combination direct digital control / pneumatic system with a Windows front-end, manufactured by Kreuter Manufacturing Company of New Park, Indiana. Dampers and valve actuators are pneumatically controlled. Connective Corporation of Pleasanton installed this system, under contract to Monterey Mechanical. Current conditions, schedules, setpoints and trend data are available via the controls workstation pictured below. Very few trend logs are currently programmed. Current conditions, schedules and setpoints are also available via the KMC Controls Netview LCD viewer located next to the workstation. A KM Digital/ Win Control Manual and as-built drawings are located in the cabinet above the viewer.

Hardware installed as part of the installation project includes:

- 1 KMC operator interface/workstation
- 4 Hawkeye command relay/current switches
- 5 KMC DDC controllers w/ clock
- 4 KMC DDC controllers w/o clock
- 4 Mamac differential pressure sensors
- 1 Mamac building static pressure sensor
- 4 Mamac duct static pressure sensors
- 4 Mamac damper electronic to pneumatic transducer
- 1 Kele universal resistance transducer
- 1 KMC duct ionization smoke detector
- 4 KMC duct averaging temperature sensor
- 6 KMC duct temperature probes
- 1 KMC outside temperature sensor
- 1 KMC insertion temperature sensor w/ well
- 1 KMC strap-on temperature sensor
- 20 KMC room temperature sensors
- 20 KMC VAV controllers
- 20 KMC reheat valve and electronic actuators
- An assortment of enclosures, power supplies, transformers, relays, fuse blocks and cable

The following parameter sets are included in the viewer:

Group 2 Page 1 of 3:

- AHU1A
- AHU2A
- AHU2A (3A)
- AHU2A (4A)
- Boiler
- Chiller

Group 2 Page 2 of 3:

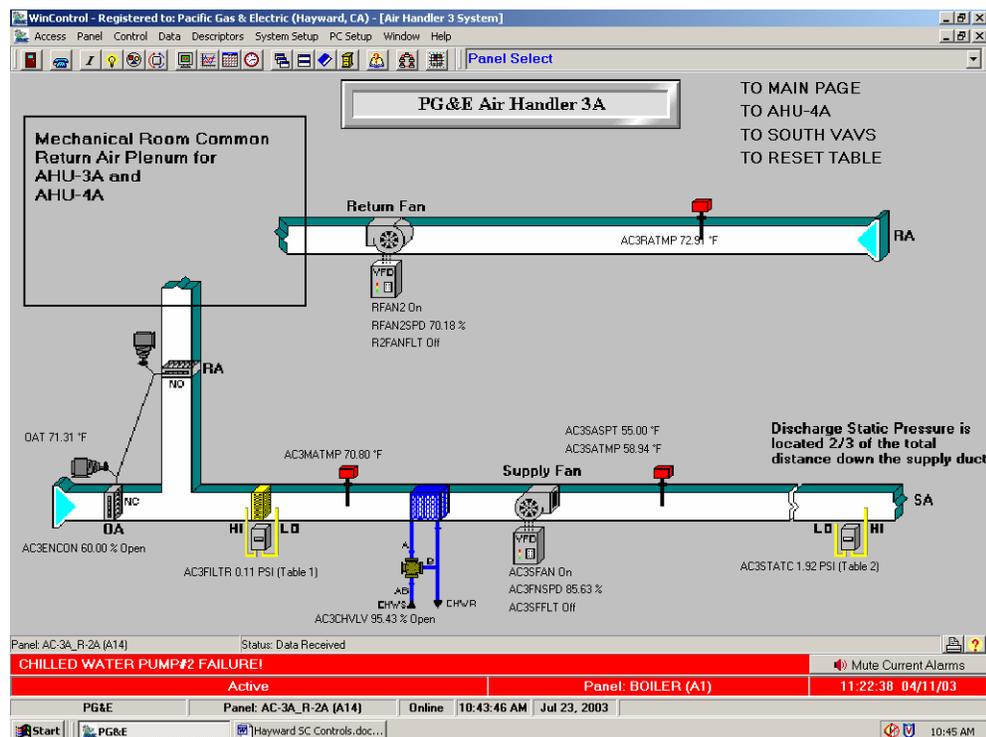
- North 1 (15)
- AC-1 Occupied
- Sched Northwest 1A
- Boiler Schedule

Chiller Schedule
Group 2 Page 3 of 3:
Sched Northeast 2A
Sched Southwest 3A
Sched Southeast 4A

The following is a copy of the controls systems main page on the workstation.

(insert picture of DDC workstation and graphic here)

The following is an example of an air handler graphic:



Local smart thermostats control local A/C units, AC-5, AC-5A and AC-6.

Maintenance Requirements

- Confirm on at least semi-annual basis that control sequence logic, scheduling of equipment, setpoints and alarms are functioning as intended, making sure that system programming is not allowed to degrade, that the system clock is correct and that valve and damper actuators are operating properly. Special attention should be paid to known comfort complaints, economizer function, and that control loops remained tuned. Document in the maintenance log any adjustments or changes to the program.
- Check the pneumatic control air system pneumatic lines for oil contamination; check operating pressure, moisture trap, oil filter and PRV on at least a semi-annual basis. Clean or replace as necessary.
- Back-up the controls program on CD at least on an annual basis.
- Calibration of system sensors should be verified on at least an annual basis.
- Program holidays and update operating schedules on at least an annual basis.

Any issues found that impact safety, energy use or comfort must be documented in the Systems Manual Events Log and the Building Superintendent notified.

As-built Drawings (if electronic copy not available; insert hardcopy)

OM&C Building HVAC Systems

Description

Three (3) roof mounted 4-ton Carrier package A/C units with natural gas heating, electric cooling and R-22 refrigerant, each under control of local thermostats with night setback, provide conditioned air from 6:00 AM to 4:00P M, Monday through Friday. Two (2) units have economizers and each unit is interlocked with a separate ½ hp exhaust fan. .

Maintenance Requirements

The primary maintenance requirements for a package unit is to:

- Inspect the unit for general soundness
- Change filters as needed
- Lube bearings if required
- Check fan belts for tightness and wear - being aware of excessive vibration as the fan may be miss-aligned or out of balance
- Check that the system is adequately charged
- Make sure the thermostat clock and programming is correct
- If the unit is equipped with an economizer, the damper and linkage should be tested.

This should all be done on at least a semi-annual basis. The cooling coil should be inspected and cleaned in early spring. If the unit has a heating coil, it should be inspected and cleaned and the crankcase heater tested in early fall.

Garage/Shop Building HVAC Systems

Description

Two (2) roof mounted Carrier small packaged A/C units (4 and 2 tons) with natural gas heating, electric cooling and R-22 refrigerant, each under control of a night setback local thermostat, provide conditioned air to shop office space from 7:00 AM to 11:30 PM, Monday through Friday. A 4-ton A/C unit provides conditioned air to the Communications Room 24/7.

Five (5) 250 MBTU Reznor Heat Fans mounted in the high bay under control of local twist timers and thermostats provide heating in the garage. Two (2) 250 MBTU Reznor Heat Fans mounted on the roof provide heating in the shop. Sixteen (16) small horsepower exhaust fans provided local service throughout the garage and shop.

Maintenance Requirements

The primary maintenance requirements for a package unit is to:

- Inspect the unit for general soundness
- Change filters as needed
- Lube bearings if required
- Check fan belts for tightness and wear - being aware of excessive vibration as the fan may be miss-aligned or out of balance
- Check that the system is adequately charged
- Make sure the thermostat clock and programming is correct
- If the unit is equipped with an economizer, the damper and linkage should be tested.

This should all be done on at least a semi-annual basis. The cooling coil should be inspected and cleaned in early spring. If the unit has a heating coil, it should be inspected and cleaned and the crankcase heater tested in early fall.

Lighting Controls

Lighting in Buildings A, B and C was retrofitted as part of the 1999-2000 seismic retrofit project.

- The janitor is required to turn off lights at night. Switches are marked indicating which are to be left on.
- Some rooms, such as bathrooms have occupancy sensors.
- Dimmable ballasts are not used.
- Yard lighting is on photocells.
- Outside building perimeter security lighting is on time clocks.

SITE EQUIPMENT INVENTORY AND MAINTENANCE NOTES*Current as of (date)*

| Building A: Office (#xxx1) | | | | | | |
|--|---|--|---------------------|----------------------------|-----------------|---|
| <u>Equip ID</u> | <u>Equipment Type/ Name</u> | <u>Location / Area Served</u> | <u>Manufacturer</u> | <u>Model</u> | <u>Serial #</u> | <u>Description / Maintenance Notes</u> |
| 29070093 29070092 29070003 | Boiler: Hot water | NE Mechanical Room/ Building A | BRYAN | CL180-W-FDG | | Flexible tube Forced draft gas 1440 MBH output Ordered in 1991 Manual Available: http://www.bryanboilers.com/io/I&OForcedDraftWaterBoilers.pdf |
| 29070091 29070090 | Chiller: Rotary | Outside Northeast Mechanical Room / Building A | TRANE | RTAA0704XL01A3D1BH | | 70 Nominal Tons Series R Air Cooled. R-22 Refrigerant, Trane Oil #151, 460 volts, 3 phase, 60 Hz, 235 amps |
| 29070072 29070075 29070052 29070078 | Package Unit: A/C / AC-5 | ROOF / Telecom Room | TRANE | TYC024G100AA | | 24 MBH ARI Rating 800 CFM EER 10.5; SEER 12 w/o economizer |
| 29070073 29070076 | Package Unit: Gas Heating – Electric Cooling / AC5A | ATTIC / Auditorium and Switching Center (DO) | CARRIER | 48HJD012 | | 10 nom. tons, 82% eff., w/o economizer, R22, 2 compressors, 4 burners, Belt type A length 51", Filter Size: (4) 20x20x2 inch |
| 29070074 29070077 29070080 | Package Unit: Heat Pump / AC-6 | ROOF / Server Room | CARRIER | 50QQ30541 | | Manual Available R-22, Operating Charge 8 lbs 0 oz Filter Size: (2) 15x20 inch |
| 29070060 29070068 29070064 29070057 29070055 29070054 | Air Handling Unit/ AHU-1A | 2 nd Flr. Mech Room | TRANE | CLIMATE CHANGER TYPE 17 | | w/ 10 hp horizontal discharge supply air fan and 30" x 81" x 6 row coil Filters: Koch (2) DM-601 and (3) DM-602 |

| | | | | | | |
|--|--|--|----------------|---------------------------------------|--|---|
| 29070069 29070065 29070056 | Air Handling Unit/ AHU-2A | 2 nd Flr. Mech Room | TRANE | CLIMATE CHANGER TYPE 17 | | w/ 10 hp horizontal discharge supply air fan and 30" x 81" x 6 row coil Filters: Koch (2) DM-601 and (3) DM-602 |
| 29070062 29070058 29070059 29070070 29070066 | Air Handling Unit/ AHU-3A | 2 nd Flr. Mech Room | TRANE | CLIMATE CHANGER TYPE 21 | | w/ 10 hp horizontal discharge supply air fan and 30" x 96" x 6 row coil Filters: Koch (3) DM-601 and (3) DM-602 |
| 29070071 29070063 29070067 | Air Handling Unit/ AHU-4A | 2 nd Flr. Mech Room | TRANE | CLIMATE CHANGER TYPE 21 | | w/ 15 hp horizontal discharge supply air fan and 30" x 96" x 6 row coil Filters: Koch (3) DM-601 and (3) DM-602 |
| 29070081 29070083 | Fan, Return Air / RF-1A | 2 nd Flr. Mech Room | TRANE | #44-AFSW3141 | | centrifugal fan w/ 3 hp motor |
| 29070084 29070082 | Fan, Return Air / RF-2A | 2 nd Flr. Mech Room | TRANE | #49 | | centrifugal fan w/ 3 hp motor |
| 29070085 29070086 29070087 29070088 29070089 | Fan, Exhaust Air / EF-1A | 2 nd Flr. Mech Room | TRANE | 16K3 | | |
| | Centrifugal Pump / ChWP-2A | NE Mechanical Room / Bldg A | PACO | 17-25951 | | 5 hp |
| | Centrifugal Pump / ChWP-3A | NE Mechanical Room / Bldg A | PACO | | | 5 hp |
| | Centrifugal Pump / HWP-1-1A | NE Mechanical Room / Bldg A | Bell & Gossett | Series 1510 | | 1 ½ hp |
| | Centrifugal Pump / HWP-1-2A | NE Mechanical Room / Bldg A | Bell & Gossett | Series 1510 | | 1 ½ hp |
| | Variable Frequency Drive / RF1A-VFD | 2 nd Flr. Mech Room / Return fan for south side of building | ABB | Type: ACH401600432, Code: 64078861 | | 4 hp, Manual bypass, Manual available, Intec Solutions 1-888-66-intec. |
| | Variable Frequency Drive / RF2A-VFD | 2 nd Flr. Mech Room / Return fan for north side of building | ABB | Type: ACH401600432, Code: 64078861 | | 4 hp, Manual bypass, Manual available, Intec Solutions 1-888-66-intec. |

| | | | | | | |
|----------------------|---------------------------------------|---|-----------|------------------------------------|--|---|
| | Variable Frequency Drive / AHU-1A-VFD | 2 nd Flr. Mech Room / Supply fan for NW corner of building | ABB | Type: ACH401600932, Code: 64078909 | | 10 hp, Manual bypass, Manual available, Intec Solutions 1-888-66-intec. |
| | Variable Frequency Drive / AHU-2A-VFD | 2 nd Flr. Mech Room / Supply fan for NE corner of building | ABB | Type: ACH401600932, Code: 64078909 | | 10 hp, Manual bypass, Manual available, Intec Solutions 1-888-66-intec. |
| | Variable Frequency Drive / AHU-3A-VFD | 2 nd Flr. Mech Room / Supply fan for SE corner of building | ABB | Type: ACH401600932, Code: 64078909 | | 10 hp, Manual bypass, Manual available, Intec Solutions 1-888-66-intec. |
| | Variable Frequency Drive / AHU-4A-VFD | 2 nd Flr. Mech Room / Supply fan for SW corner of building | ABB | Type: ACH401601132, Code: 64078917 | | 15 hp, Manual bypass, Manual available, Intec Solutions 1-888-66-intec. |
| 29070094 29070095 | Air Compressor | NE Mechanical Room / ? | Quincy | M-QT53 | | Manual Available |
| 29070001 | Air Compressor | NE Mechanical Room / ? | Honeywell | WP220B1007 | | |
| 29070096 | Air Dryer | NE Mechanical Room | SPEEDAIRE | 3Z528A | | |
| | Water Heater | NE Mechanical Room / Bldg A | | | | 50 Gal., Natural Gas |
| 29070008 | Generator | ? | Kohler | 50RZ72 | | 50 kW Serves D.O. |
| | Generator | Outside N.E. Corner of Bldg A | Sierra | 100DSJ | | 100 kW |
| 29070009 | Fire Panel | Bldg A | Kidde | KAS200 | | |

| Building B: OM&C Bldg. (#xxx2) | | | | | | |
|--|---|--|---------------------|--------------|-----------------|--|
| <u>Equip ID</u> | <u>Equipment Type/ Name</u> | <u>Location / Area Served</u> | <u>Manufacturer</u> | <u>Model</u> | <u>Serial #</u> | <u>Description / Maintenance Notes</u> |
| 29070097 29070098 29070099 | Package Unit: Gas Heat/ Electric Cool / AC-1B | ROOF / West | CARRIER | 48HD007640 | | 4 nominal tons, 1 scroll compressor w/ economizer |
| 29070100 29070101 29070102 | Package Unit: Gas Heat/ Electric Cool / AC-2B | ROOF / Center | CARRIER | 48HD007640 | | 4 nominal tons, 1 scroll compressor w/ economizer |
| 29070103 29070104 29070105 29070053 | Package Unit: Gas Heat/ Electric Cool/ AC-3B | ROOF / East: Recovery Room, Inspectors Room, Office & Storage | CARRIER | 48HJE007631 | | 4 nominal tons, 1 scroll compressor, 460V / 3PH / 60Hz 77.3 MBH cooling / 115MBH heating 2100 SA CFM EER 11.0; AFUE 81 w/o economizer Installed 1999 |
| | Exhaust Fan / EF-1B | | Greenheck | GB84X0D | | ½ hp |
| | Exhaust Fan / EF-2B | | Greenheck | GB74X0D | | ½ hp |
| | Exhaust Fan / EF-3B | | Pend | DX06B | | 1/4 hp, 125 CFM 120V / 1 PH / 60 Hz |
| 29070010 | Fire Panel | Bldg. B | Pyrotronics | CP400 | | |
| 29070111 29070110 29070109 | Ice Machine | SOUTH | HOSHIZAKI | KM500MAE | | |
| 29070106 29070107 29070108 | Ice Machine | NORTH | HOSHIZAKI | KM500MAE | | Manual Available |
| 29070007 | Generator | | Generac | 97A01516-S | | 100 kW, 480V 225 Gal Diesel Manual Available |
| | Water heater | | | | | 50 gal natural gas |

| Building C: Garage/Shop (#xxx3) | | | | | | |
|--|--------------------------------------|-----------------------------------|---------------------|----------------|-----------------|---|
| <u>Equip ID</u> | <u>Equipment Type/ Name</u> | <u>Location / Area Served</u> | <u>Manufacturer</u> | <u>Model</u> | <u>Serial #</u> | <u>Description / Maintenance Notes</u> |
| 29070112 29070113 29070114 | Package Unit: Gas Heat/Electric Cool | ROOF / Garage Office | CARRIER | 48GS-024206301 | | 2 tons, R-22, 1 scroll compressor, w/o economizer Info from web: 208/230 V, 1 PH, 60 Hz |
| 29070115 29070116 29070051 29070117 | Package Unit: Gas Heat/Electric Cool | ROOF / Telecom Room | CARRIER | 48GX-048115301 | | 4 tons, R-22, 1 scroll compressor, w/o economizer Info from web: 208/230 V, 1 PH, 60 Hz |
| | Heat Fan | Roof / Shop | Reznor | | | 250,000 Btu Natural gas |
| | Heat Fan | Roof / Shop | Reznor | | | 250,000 Btu Natural gas |
| | Heat Fan | Inside high bay | Reznor | | | 250,000 Btu Natural gas Controlled by twist timer and stat |
| | Heat Fan | Inside high bay | Reznor | | | 250,000 Btu Natural gas Controlled by twist timer and stat |
| | Heat Fan | Inside high bay | Reznor | | | 250,000 Btu Natural gas Controlled by twist timer and stat |
| | Heat Fan | Inside high bay | Reznor | | | 250,000 Btu Natural gas Controlled by twist timer and stat |
| | Heat Fan | Inside high bay | Reznor | | | 250,000 Btu Natural gas Controlled by twist timer and stat |

| | | | | | | |
|----------|----------------|--|---------|------------|--|---|
| | Exhaust Fan | | | | | 16 units, ~1/2 hp ea. |
| 29070006 | Generator | | Generac | 96A06483-S | | 75kW Diesel 480V Manual available |
| | Air Compressor | | Curtis | 11L96010AP | | 15 hp recip. |
| | Ice Machine | | | | | |
| | Water Heater | | | | | 84 gal, Natural gas |

| Building E: Substation Trailer (#Txx1) | | | | | | |
|---|---------------------------------|-----------------------------------|---------------------|--------------|-----------------|--|
| <u>Equip ID</u> | <u>Equipment Type/ Name</u> | <u>Location / Area Served</u> | <u>Manufacturer</u> | <u>Model</u> | <u>Serial #</u> | <u>Description / Maintenance Notes</u> |
| 29070119 | Package Unit: Heat Pump | SUBSTATION TRAILER | MARVAIR | | | |
| 29070118 | Package Unit: Heat Pump | SUBSTATION TRAILER | MARVAIR | | | |

| Yard | | | | | | |
|-----------------|---------------------------------|---------------------------------------|---------------------|--------------|-----------------|--|
| <u>Equip ID</u> | <u>Equipment Type/ Name</u> | <u>Location / Area Served</u> | <u>Manufacturer</u> | <u>Model</u> | <u>Serial #</u> | <u>Description / Maintenance Notes</u> |
| 29070024 | Gate, Automatic | Main entrance/exit; EE Parking Lot | | | | |
| | | | | | | |

SITE QA PROGRAM

OTHER RESOURCES & DOCUMENTATION

Current Annual Gas & Electricity Usage Report

Site Energy Use For 2002

| Supply | Units | Dec-01 | Jan-02 | Feb-02 | Mar-02 | Apr-02 | May-02 | Jun-02 | Jul-02 | Aug-02 | Sep-02 | Oct-02 | Nov-02 | Totals |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------|-----------|--------|
| SVC CNTR A11 TOU CTL | KWh | 66600 | 57720 | 66600 | 60360 | 59640 | 67080 | 65880 | 69960 | 65760 | 67560 | 74,280.00 | 66,840.00 | 788280 |
| SERVICE CENTER | Therms | 1944 | 1620 | 2487 | 1227 | 674 | 983 | 382 | 235 | 68 | 0 | 622 | 1375 | 11617 |
| GAS PUMPS | KWh | 4080 | 3720 | 5560 | 6040 | 4960 | 6520 | 5200 | 3160 | 3200 | 4440 | 4,560.00 | 4,760.00 | 56200 |
| HAZARD-MAT'L STOP-BLDG | KWh | 188 | 34 | 30 | 45 | 35 | 20 | 35 | 375 | 194 | 203 | 161.00 | 220.00 | 1540 |
| LIGHT# 6632 & 6633 | KWh | 162 | 162 | 162 | 162 | 162 | 162 | 162 | 162 | 162 | 162 | 162.00 | 162.00 | 1944 |

Site Billing For 2002

| Supply | Rate | Dec-01 | Jan-02 | Feb-02 | Mar-02 | Apr-02 | May-02 | Jun-02 | Jul-02 | Aug-02 | Sep-02 | Oct-02 | Nov-02 | CIS Totals |
|---------------------------|-------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|
| SVC CNTR A11 TOU CTL | E19SV | \$7,951.00 | \$6,955.00 | \$7,868.00 | \$7,686.00 | \$7,147.00 | \$10,040.00 | \$11,467.00 | \$12,160.00 | \$11,490.00 | \$11,659.00 | \$13,014.00 | \$9,284.00 | \$116,721.00 |
| SERVICE CENTER | GNR1 | \$1,376.00 | \$1,194.00 | \$1,629.00 | \$719.00 | \$392.00 | \$566.00 | \$216.00 | \$130.00 | \$48.00 | \$49.00 | \$402.00 | \$1,043.00 | \$7,764.00 |
| GAS PUMPS | A1P | \$542.00 | \$495.00 | \$734.00 | \$797.00 | \$656.00 | \$1,181.00 | \$1,078.00 | \$659.00 | \$668.00 | \$922.00 | \$947.00 | \$753.00 | \$9,432.00 |
| HAZARD-MAT'L STOP-BLDG A1 | | \$32.00 | \$12.00 | \$11.00 | \$13.00 | \$12.00 | \$11.00 | \$14.00 | \$84.00 | \$47.00 | \$49.00 | \$40.00 | \$42.00 | \$367.00 |
| LIGHT# 6632 & 6633 | OL1 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$37.00 | \$444.00 |

Current Year's Maintenance Logs

(to be added by building supervisor or mechanic)

Engineering Building Heating/Cooling Load Calculations

(future-add as completed)

HVAC TAB Reports

(add as available)

Important As-built Drawings

(include as desired)

Available Documentation Log

| Item No. | Name/Details | Location | Owner |
|-----------------|--|---|-------------------|
| | Specifications | | |
| | See Building Design & Project Services | | |
| | Drawing Sets | | |
| | 1967 Original E size drawings by architect ???–1967: Architectural A1 to A17, Details D1-1 to D10-5, Electrical E1 to E7, Mechanical M1 to M4, Plumbing P1 to P5, Structural S1-S13, Sight Plan, Sanitary Sewer Plan, Site Prep Data | In vacant cubical North of the building mechanic's cubical | Building mechanic |
| | 1988 Remodel of Building B Project D-size Drawings by company designer and architect ???; approved for construction: Introduction T1, Architectural A1 to A8, Electrical E1 to E4, Mechanical M1-M3 | In vacant cubical North of the building mechanic's cubical | Building mechanic |
| | 1999-2001 Buildings A, B & C Seismic Retrofit Project E-size Drawings | In vacant cubical North of the building mechanic's cubical | Building mechanic |
| | 1999-2001 Buildings A Seismic Retrofit Project B-size HVAC Controls As-built Drawings, p.1 to p.10 by Connective Corp for Monterey Mechanical, dated 5/4/2000: p.1 Title, p.2 Legend, p.3 LAN Riser Layout, p.4 Bill of Material, p.5 Sequence of Operation, p.6 Piping Diagram, p.7 AC-1A (typical), p.8 Terminal Unit Control (typical), p.9 Terminal Unit Schedule, p.10 AC-3, AC-5, AC-5A | In Controls binder stored in cabinet in the vacant cubical North of the building mechanic's cubical | Building mechanic |

| Item No. | Name/Details | Location | Owner | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---|-----------|----------------------|-----------|--|--------|------------------------------------|-----------|--|--------|----------------------------|-----------|--|---------|------------------------------|----------|--|---------|-------------|-----------|-----|---------|-----------------------------|-----------|-----|---------|------------------------------|-----------|-----|---------|------------------------|-----------|-----|---------|-----------------------------------|-----------|-----|---------|----------------------|-----------|-----|---------|-----------------------------|-----------|-----|---------|----------------------------|-----------|-----|---------|---------------------------------------|-----------|-----|---------|---------------------------------|-----------|-----|---------|---------------------------------|-----------|------|---------|--------------------------------|-----------|------|---------|-------------------|-----------|-----|--|-------------------|
| Drawings | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1999-2001 Buildings A, B & C Seismic Retrofit Project E-size Drawings Co. designer ???? & consultant ???? <table border="1" data-bbox="282 499 1118 1113"> <thead> <tr> <th>Print No.</th> <th>Document Description</th> <th>Rev. Date</th> <th></th> </tr> </thead> <tbody> <tr><td>376068</td><td>Ramp & Access for switching center</td><td>1/13/2000</td><td></td></tr> <tr><td>410706</td><td>Plans & details-bldgs. A&B</td><td>6/11/1999</td><td></td></tr> <tr><td>4011945</td><td>Handrail replacement bldg. A</td><td>1/3/2000</td><td></td></tr> <tr><td>4021788</td><td>Title sheet</td><td>6/11/1999</td><td>T-1</td></tr> <tr><td>4021789</td><td>(E) bldg. A demolition plan</td><td>6/11/1999</td><td>A-1</td></tr> <tr><td>4021790</td><td>Building A construction plan</td><td>6/11/1999</td><td>A-2</td></tr> <tr><td>4021791</td><td>Building A finish plan</td><td>6/11/1999</td><td>A-3</td></tr> <tr><td>4021792</td><td>Building A reflected ceiling plan</td><td>6/11/1999</td><td>A-4</td></tr> <tr><td>4021793</td><td>Details building A&B</td><td>6/11/1999</td><td>A-5</td></tr> <tr><td>4021794</td><td>Door schedule & details A&B</td><td>6/11/1999</td><td>A-6</td></tr> <tr><td>4021795</td><td>Bldg. B demo. & const plan</td><td>6/11/1999</td><td>A-7</td></tr> <tr><td>4021796</td><td>Bldg. B finish & reflected ceil. Plan</td><td>6/11/1999</td><td>A-8</td></tr> <tr><td>4021797</td><td>(E) bldg. A ramp plan & details</td><td>6/11/1999</td><td>A-9</td></tr> <tr><td>4021798</td><td>Path of travel & parking stalls</td><td>6/11/1999</td><td>A-10</td></tr> <tr><td>4021799</td><td>Floor plan, sections & details</td><td>6/11/1999</td><td>A-11</td></tr> <tr><td>4021801</td><td>Panel layout plan</td><td>6/11/1999</td><td>F-2</td></tr> </tbody> </table> | Print No. | Document Description | Rev. Date | | 376068 | Ramp & Access for switching center | 1/13/2000 | | 410706 | Plans & details-bldgs. A&B | 6/11/1999 | | 4011945 | Handrail replacement bldg. A | 1/3/2000 | | 4021788 | Title sheet | 6/11/1999 | T-1 | 4021789 | (E) bldg. A demolition plan | 6/11/1999 | A-1 | 4021790 | Building A construction plan | 6/11/1999 | A-2 | 4021791 | Building A finish plan | 6/11/1999 | A-3 | 4021792 | Building A reflected ceiling plan | 6/11/1999 | A-4 | 4021793 | Details building A&B | 6/11/1999 | A-5 | 4021794 | Door schedule & details A&B | 6/11/1999 | A-6 | 4021795 | Bldg. B demo. & const plan | 6/11/1999 | A-7 | 4021796 | Bldg. B finish & reflected ceil. Plan | 6/11/1999 | A-8 | 4021797 | (E) bldg. A ramp plan & details | 6/11/1999 | A-9 | 4021798 | Path of travel & parking stalls | 6/11/1999 | A-10 | 4021799 | Floor plan, sections & details | 6/11/1999 | A-11 | 4021801 | Panel layout plan | 6/11/1999 | F-2 | In folders on second shelf of cabinet in front of the clerk's cubical. | Building mechanic |
| Print No. | Document Description | Rev. Date | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 376068 | Ramp & Access for switching center | 1/13/2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 410706 | Plans & details-bldgs. A&B | 6/11/1999 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4011945 | Handrail replacement bldg. A | 1/3/2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021788 | Title sheet | 6/11/1999 | T-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021789 | (E) bldg. A demolition plan | 6/11/1999 | A-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021790 | Building A construction plan | 6/11/1999 | A-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021791 | Building A finish plan | 6/11/1999 | A-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021792 | Building A reflected ceiling plan | 6/11/1999 | A-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021793 | Details building A&B | 6/11/1999 | A-5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021794 | Door schedule & details A&B | 6/11/1999 | A-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021795 | Bldg. B demo. & const plan | 6/11/1999 | A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021796 | Bldg. B finish & reflected ceil. Plan | 6/11/1999 | A-8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021797 | (E) bldg. A ramp plan & details | 6/11/1999 | A-9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021798 | Path of travel & parking stalls | 6/11/1999 | A-10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021799 | Floor plan, sections & details | 6/11/1999 | A-11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4021801 | Panel layout plan | 6/11/1999 | F-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Item No. | Name/Details | Location | Owner | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|---|-----------|----------------------|-------|--|---------|------------------------------|-----------|------|---------|---------------------|-----------|------|---------|----------------------|-----------|--------|---------|-----------------------------|-----------|-----|---------|---------------------------------|-----------|-----|---------|--------------------------------------|-----------|-----|---------|------------------------|-----------|-----|---------|-------------------|-----------|-----|---------|----------------------------------|-----------|-----|---------|--------------------------------------|-----------|-----|---------|-------------------------|-----------|-----|---------|-------------------------|-----------|-----|---------|--------------------------------------|-----------|-----|---------|-------------------------|-----------|-----|---------|---|-----------|-----|---------|--------------------------|-----------|-----|---------|----------------------------|-----------|-----|---------|--|-----------|-----|---------|-------------------------|-----------|-----|---------|--|-----------|-----|---------|--------------------------------|-----------|-----|---------|------------------------------|-----------|------|---------|--------------------------------|-----------|------|---------|---------------------------------|-----------|------|---------|------------------------------------|-----------|------|---------|---------------------------|-----------|------|---------|--|-----------|------|---------|---|-----------|------|---------|------------------------------|-----------|------|---------|------------------------------|-----------|------|--|-------------------|
| | 1999-2001 Buildings A, B & C Seismic Retrofit Project E-size Drawings Co. designer ??? & consultant ??? <table border="1" data-bbox="280 457 1117 1772"> <thead> <tr> <th>Print No.</th> <th>Document Description</th> <th>Rev.#</th> <th></th> </tr> </thead> <tbody> <tr><td>4018704</td><td>Building A fire alarm system</td><td>6/11/1999</td><td>E-12</td></tr> <tr><td>4018712</td><td>Single line diagram</td><td>6/11/1999</td><td>E-10</td></tr> <tr><td>4018713</td><td>Panelboard schedules</td><td>6/11/1999</td><td>E-11.1</td></tr> <tr><td>4018733</td><td>Legend, schedule & title 24</td><td>6/11/1999</td><td>E-1</td></tr> <tr><td>4018734</td><td>Bldg A lighting demolition plan</td><td>6/11/1999</td><td>E-2</td></tr> <tr><td>4018735</td><td>Bldg A lighting & relect. Ceil. Plan</td><td>6/11/1999</td><td>E-3</td></tr> <tr><td>4018736</td><td>Bldg A power & telecom</td><td>6/11/1999</td><td>E-4</td></tr> <tr><td>4018737</td><td>Bldg A power plan</td><td>6/11/1999</td><td>E-5</td></tr> <tr><td>4018738</td><td>Bldg A chiller/fan rm. Pwr. Plan</td><td>6/11/1999</td><td>E-6</td></tr> <tr><td>4018739</td><td>Bldg A sgle.line dia., details/notes</td><td>6/11/1999</td><td>E-7</td></tr> <tr><td>4018740</td><td>Bldg B lighting & Power</td><td>6/11/1999</td><td>E-8</td></tr> <tr><td>4018741</td><td>Bldg C lighting & power</td><td>6/11/1999</td><td>E-9</td></tr> <tr><td>4018724</td><td>Bldg. A & B schedule, notes & legend</td><td>6/11/1999</td><td>M-1</td></tr> <tr><td>4018725</td><td>Bldg. A HVAC floor plan</td><td>2/24/2000</td><td>M-2</td></tr> <tr><td>4018726</td><td>Bldg. A fan room & chiller enclosure plan</td><td>6/11/1999</td><td>M-3</td></tr> <tr><td>4018727</td><td>Building piping diagrams</td><td>6/11/1999</td><td>M-4</td></tr> <tr><td>4018728</td><td>Building A control diagram</td><td>6/11/1999</td><td>M-5</td></tr> <tr><td>4018729</td><td>Bldg. B HVAC plans, sections, controls & details</td><td>6/11/1999</td><td>M-6</td></tr> <tr><td>4018730</td><td>Bldg. A demolition plan</td><td>6/11/1999</td><td>M-7</td></tr> <tr><td>4018731</td><td>Bldg. A & B title 24 certificate of compliance</td><td>6/11/1999</td><td>M-8</td></tr> <tr><td>4018732</td><td>Plans, detail, notes, & legend</td><td>6/11/1999</td><td>P-1</td></tr> <tr><td>4018705</td><td>Plan, lighting, power & HVAC</td><td>6/11/1999</td><td>ME-1</td></tr> <tr><td>4018714</td><td>General notes & specifications</td><td>6/11/1999</td><td>SO.1</td></tr> <tr><td>4018715</td><td>Abbreviations & typical details</td><td>6/11/1999</td><td>SO.2</td></tr> <tr><td>4018716</td><td>Bldg. A foundations & 1st fl. Plan</td><td>6/11/1999</td><td>S2.1</td></tr> <tr><td>4018717</td><td>Bldg. A roof framing plan</td><td>6/11/1999</td><td>S2.2</td></tr> <tr><td>4018718</td><td>Bldg. B foundation, 1st fl. Plan & room framing plan</td><td>6/11/1999</td><td>S2.3</td></tr> <tr><td>4018719</td><td>Bldg. C foundation, & 1st floor & roof framing plan</td><td>6/11/1999</td><td>S2.4</td></tr> <tr><td>4018720</td><td>Bldg. A elevations & details</td><td>6/11/1999</td><td>S3.1</td></tr> <tr><td>4018721</td><td>Bldg. B elevations & details</td><td>6/11/1999</td><td>S3.2</td></tr> </tbody> </table> | Print No. | Document Description | Rev.# | | 4018704 | Building A fire alarm system | 6/11/1999 | E-12 | 4018712 | Single line diagram | 6/11/1999 | E-10 | 4018713 | Panelboard schedules | 6/11/1999 | E-11.1 | 4018733 | Legend, schedule & title 24 | 6/11/1999 | E-1 | 4018734 | Bldg A lighting demolition plan | 6/11/1999 | E-2 | 4018735 | Bldg A lighting & relect. Ceil. Plan | 6/11/1999 | E-3 | 4018736 | Bldg A power & telecom | 6/11/1999 | E-4 | 4018737 | Bldg A power plan | 6/11/1999 | E-5 | 4018738 | Bldg A chiller/fan rm. Pwr. Plan | 6/11/1999 | E-6 | 4018739 | Bldg A sgle.line dia., details/notes | 6/11/1999 | E-7 | 4018740 | Bldg B lighting & Power | 6/11/1999 | E-8 | 4018741 | Bldg C lighting & power | 6/11/1999 | E-9 | 4018724 | Bldg. A & B schedule, notes & legend | 6/11/1999 | M-1 | 4018725 | Bldg. A HVAC floor plan | 2/24/2000 | M-2 | 4018726 | Bldg. A fan room & chiller enclosure plan | 6/11/1999 | M-3 | 4018727 | Building piping diagrams | 6/11/1999 | M-4 | 4018728 | Building A control diagram | 6/11/1999 | M-5 | 4018729 | Bldg. B HVAC plans, sections, controls & details | 6/11/1999 | M-6 | 4018730 | Bldg. A demolition plan | 6/11/1999 | M-7 | 4018731 | Bldg. A & B title 24 certificate of compliance | 6/11/1999 | M-8 | 4018732 | Plans, detail, notes, & legend | 6/11/1999 | P-1 | 4018705 | Plan, lighting, power & HVAC | 6/11/1999 | ME-1 | 4018714 | General notes & specifications | 6/11/1999 | SO.1 | 4018715 | Abbreviations & typical details | 6/11/1999 | SO.2 | 4018716 | Bldg. A foundations & 1st fl. Plan | 6/11/1999 | S2.1 | 4018717 | Bldg. A roof framing plan | 6/11/1999 | S2.2 | 4018718 | Bldg. B foundation, 1st fl. Plan & room framing plan | 6/11/1999 | S2.3 | 4018719 | Bldg. C foundation, & 1st floor & roof framing plan | 6/11/1999 | S2.4 | 4018720 | Bldg. A elevations & details | 6/11/1999 | S3.1 | 4018721 | Bldg. B elevations & details | 6/11/1999 | S3.2 | In folders on second shelf of cabinet in front of the clerk's cubical. | Building mechanic |
| Print No. | Document Description | Rev.# | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018704 | Building A fire alarm system | 6/11/1999 | E-12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018712 | Single line diagram | 6/11/1999 | E-10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018713 | Panelboard schedules | 6/11/1999 | E-11.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018733 | Legend, schedule & title 24 | 6/11/1999 | E-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018734 | Bldg A lighting demolition plan | 6/11/1999 | E-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018735 | Bldg A lighting & relect. Ceil. Plan | 6/11/1999 | E-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018736 | Bldg A power & telecom | 6/11/1999 | E-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018737 | Bldg A power plan | 6/11/1999 | E-5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018738 | Bldg A chiller/fan rm. Pwr. Plan | 6/11/1999 | E-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018739 | Bldg A sgle.line dia., details/notes | 6/11/1999 | E-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018740 | Bldg B lighting & Power | 6/11/1999 | E-8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018741 | Bldg C lighting & power | 6/11/1999 | E-9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 4018727 | Building piping diagrams | 6/11/1999 | M-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 4018729 | Bldg. B HVAC plans, sections, controls & details | 6/11/1999 | M-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018730 | Bldg. A demolition plan | 6/11/1999 | M-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018731 | Bldg. A & B title 24 certificate of compliance | 6/11/1999 | M-8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018732 | Plans, detail, notes, & legend | 6/11/1999 | P-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018705 | Plan, lighting, power & HVAC | 6/11/1999 | ME-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018714 | General notes & specifications | 6/11/1999 | SO.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018715 | Abbreviations & typical details | 6/11/1999 | SO.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018716 | Bldg. A foundations & 1st fl. Plan | 6/11/1999 | S2.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018717 | Bldg. A roof framing plan | 6/11/1999 | S2.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018718 | Bldg. B foundation, 1st fl. Plan & room framing plan | 6/11/1999 | S2.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018719 | Bldg. C foundation, & 1st floor & roof framing plan | 6/11/1999 | S2.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018720 | Bldg. A elevations & details | 6/11/1999 | S3.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4018721 | Bldg. B elevations & details | 6/11/1999 | S3.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Item No. | Name/Details | Location | Owner |
|-----------------|--|--|-------------------|
| | Manuals | | |
| | Quincy Compressor (Climate Control Series Compressor) | Building mechanic's desk drawer, Black Manuals Folder | Building mechanic |
| | Ice Machine Model # KM-500MAE Bldg. B North Side (Modular Crescent Cuber) | Building mechanic's desk drawer, Black Manuals Folder | Building mechanic |
| | Generator (Generac Corporation) | Building mechanic's desk drawer, Black Manuals Folder | Building mechanic |
| | Single Package Heat Pumps Type: 50QQ AC-6 Server Rm. Unit (Carrier) | Building mechanic's desk drawer, Black Manuals Folder | Building mechanic |
| | Boiler Burner Model # R8.1-G Serial # AG776864 (Gordon-Piatt Energy Group Inc.) | Building mechanic's desk drawer, Black Manuals Folder | Building mechanic |
| | Trane Chiller Coils, AC-5, EF3, 3A, 4A Model # RTAA | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | Trane Cooling Coils Bldg. A | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | Centrifugal Pumps Series 1510 and 1510/Universal (Bell & Gossett) | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | VFDs AC Induction Motors (ABB) | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | Single-Package Rooftop Heating/Cooling Units 48HJD005-007 Bld. B (Carrier) | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | Generator Spectrum, Detroit Diesel Operations Model# 100DSJ71 Serial# 654358 | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | Single-Package Rooftop Heating/Cooling Units 48HJF008-012 Bld. A (Carrier) | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |
| | Single Package Gas Heating/Electric Cooling Units 48GS018-060 48GX018-060 (Carrier) | First shelf of cabinet in front of the clerk's cubical. Manuals Folder | Building mechanic |

| Item No. | Name/Details | Location | Owner |
|----------|--|--|------------------------------|
| | Submittals | | |
| | ? | | |
| | | | |
| | Engineering & QA: Surveys, Audits, Logs, Test Plans & Reports | | |
| | Load Calculations, Test Plans Air and Water Balance Report Job # System EF-1, 2, 3 & AC-1 | Second shelf of cabinet in front of clerk's Cubical. Manuals Binder | Building mechanic |
| | Energy Using Equipment Inventory, SC and CSO, January 2003 | EUEI file cabinet in Room 117, ????? | EUEI coordinator |
| | | | |
| | Service Contracts | | |
| | Maintenance contractor service agreement and equipment list submittal, 5/8/2001 | QA rep's electronic file: | QA rep. |
| | Past maintenance contractor service agreement | | Building Supervisor |
| | | | |
| | Intranet/Networked Information | | |
| | Building drawing database | | Co. facilities department |
| | Projects database | | Co. facilities department |
| | | | |
| | Other | | |
| | Site equipment inventory database | | Co. facilities department |
| | 1999 Maintenance Log spreadsheet, from Building Supervisor | QA rep's electronic file: | QA rep. |
| | Gas & Electricity usage reports | | Co. facilities department |
| | | | |