Steam Load Shed Events

Fall 2014 DSR Roundtable

Nathan Hunter & Ellen Sweet
Cornell University EHS
At 6:30 AM today, Wednesday, January 29th Utilities crews are investigating the cause of a loss of steam pressure on campus. Steam load shedding has been initiated to reduce steam demand until steam production can be returned to normal. We do not yet have an indication of when this may be.

Steam load shedding means normal levels of steam service will not be available while Utilities crews work to rectify the problem. Building spaces can be expected to cool while load shedding is in effect.

Further advisories will be posted as information becomes available.

Please call Facilities Customer Service with any questions at 255-5322.
At 7:30 AM today, Wednesday, January 29, 2014 a steam generation issue has significantly limited the quantity of steam available to heat buildings on campus. Building spaces, including student housing areas, will cool and air flows will be reduced. Ventilation to non-lab spaces has been shut off. Lab ventilation is at unoccupied levels. Fume hoods will be operational.

Follow up postings will be made when further information becomes available.

Please call Facilities Customer Service at 255-5322 to report any facilities related emergencies.
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Please call Facilities Customer Service at 255-5322 to report any facilities related emergencies.
Cornell Utilities is reporting that at 11:30 AM today, Wednesday, January 29, steam pressure across campus has stabilized at levels needed to restore normal service. The program of steam load shedding that was initiated this morning has now ended. No further Special Conditions posts regarding this incident are expected at this time.

Please call Facilities Customer Service at 255-5322 with any questions.
Cornell Utilities provides steam to the campus community for space heating, hot water and research. Approximately 150 buildings are heated via our district heating system. Steam is produced around the clock, year round.

The steam is produced from varying combinations of combustion turbines with heat recovery steam generators and boilers, which are fueled by natural gas or oil. The equipment used is dependent on the steam demand, operational considerations and production cost.
EXISTING HEAT & ELECTRIC GENERATION SYSTEMS

Combustion Turbine with Heat Recovery Steam Generator
Why Plan?

“Winging it” is not an option!
Comprehensive Emergency Management Program

Prepares us to manage emergencies & planned incidents/events:

– Document incidents management structure
– Document responsibilities, capabilities and strategies
– Prepare us to respond
– Helps identify needs & gaps
Emergency

CALL 911 for any situation that requires IMMEDIATE police, fire, or medical response to preserve life or property.

You can also use any outdoor Blue Light phone (situated throughout campus) or indoor designated emergency phone to report a campus emergency. Just pick up the receiver or press the call button.

The Emergency Action Guide at the left provides instructions on actions to take in emergency situations. Click this Emergency Action Guide link to download a copy to print and keep in a convenient location.

Get notified of campus emergencies without delay
SIGN UP TODAY
What is a Steam Load Shed Event?

• Process developed to control a situation where steam demand is greater than the available steam supply.
• Steam load shedding provides the means to safely and immediately address the situation.
• Without load shedding the entire campus heating system will become non-functional and all spaces will cool down in an uncontrolled manner.
What is a Steam Load Shed Event?

Steam load shedding is most likely to occur instantly, without forewarning.

Example:
A likely scenario is a period of time with very cold outside ambient temperatures (less than 30 degrees) and one or more steam generators fail.
Steam Load Shed Notifications

Central Energy Plant will notify the Energy Management & Control System (EMCS) to initiate steam load shedding.

Seven levels:

- Level 1 reduction will provide the lowest reduction, barely noticeable to most of the campus occupants.
- Level 5, 6, and 7 will require significant changes to the University operating status.

Depending on the severity, Customer Service will distribute notifications via the Building Coordinator and/or Special Conditions list serves.
Special Conditions Information

Current Message(s)

- Judd Falls Rd Reduced to One Lane of Alternating Traffic Oct 13 - 14
- Campus Rd at B Lot Entrance Reduced to One Lane Oct 13 - 15
- Campus Rd Reduced to One Lane Oct 13-14, 2014
- Tree Maintenance Along Forrest Home Dr - Mon, Oct 13, 2014
- Temporary Closure of East Ave Oct 12 - 13, 2014
- Traffic Control Gates Installed on East Ave
- East Avenue Road Closure - Klarman Hall Project - January 8, 2014 until April 19, 2015

* indicates a high-priority posting.

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**Judd Falls Rd Reduced to One Lane of Alternating Traffic Oct 13 - 14**

The East Campus Storm Sewer Project will have contractors installing curbing on the east side of Judd Falls Road between Rt. 366 and Campus Road. Lane closures will begin 7am Monday, October 13; work may extend to Tuesday, October 14.

Signage and flaggers will be in place to direct traffic.

*Posted 4 days ago.*

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**Campus Rd at B Lot Entrance Reduced to One Lane Oct 13 - 15**

A small section of Campus Road at the intersection of Tower Road, near the B lot entrance, will be reduced to one lane Oct 13 - 15.
Steam Load Shed Levels

LEVEL 1
This reduction level is expected to address short time periods (less than two hours) of steam generation limitations. Most non-residential facilities will see a slight reduction in room temperature and air flow. Unoccupied research spaces will also see this reduction in room temperature and air flow, but if motion sensors identify occupants in the space, temperatures and air flow are kept normal. This will have a negligible impact to occupants.

LEVEL 2  Notice Sent to Facility Coordinators
This reduction level is expected to address longer periods of steam generation limitations. In addition to the actions taken in Level 1, air handling systems in Atrium/Hallways, Office/Classroom/Auditoriums will reduce outside air supply and general exhaust systems are shut off. Occupants may notice cooler space temperatures.
Steam Load Shed Levels

LEVEL 3
In addition to the actions taken in Level 1 and 2, central air handling and heating systems set points will be lowered slightly. Some zones may not meet temperature and airflow set points. Occupants will experience cooler space temperatures.

LEVEL 4  Special Conditions Notice Sent
In addition to the actions taken in load shed Levels 1 - 3, many air systems will only be supplied recirculated air. Atrium/Hallways, Office/Classroom/Auditoriums, and other non-critical outside air ventilation systems will be shut off. Occupants will experience significant cooling of spaces. To help conserve building heat, it is recommended that fume hoods be closed. Dining facility exhaust hoods should be shut down when feasible.
Steam Load Shed Levels

LEVEL 5
In addition to the actions taken in load shed Levels 1 - 4, temperature set points for all non-residential spaces will drop to 60 degrees. Some spaces may not maintain temperature set points and will become colder. Outside air usage will decrease to minimum values to reduce the need to heat outside air and to contain heat that is present. All lab air exchange rates will be set to minimal values, typically 3 or 4 air exchanges per hour. Facilities will become significantly colder. Fume hoods should be closed to conserve building heat. Hazardous material use should stop due to the reduction in air exchange rates. Dining facility exhaust hoods should be shut down when feasible.

LEVEL 6
In addition to the actions taken in load shed levels 1 - 5, all residential spaces will be set to control to 65 degrees. Residential facilities will experience significant cooling. Other campus facilities will become significantly colder. Fume hoods should be closed to conserve building heat. Hazardous material use should stop due to the reduction in air exchange rates. Dining facility exhaust hoods should be shut down when feasible.
Steam Load Shed Levels

LEVEL 7
This reduction level is the most severe reduction and is performed manually to address complete loss of steam. Priority is to protect people, research, animals, plants, and assets. **Residential facilities will experience significant cooling. Other campus facilities will become significantly colder.** Fume hoods must be closed to conserve building heat and hazardous material use must stop as exhaust and supply air will be shut down. **Dining facility exhaust hoods must be shut down.**
Laboratory Specific Implications

- Lowering fume hood sashes is always good practice.
- Load shed levels 1 and 2 an open sash keeps the lab in occupied mode.
- At level 4 the University focus is to maintain building infrastructure. Hood exhaust requirements are maintained.
- At Level 5, fume hoods exhaust requirements are **not** maintained.
<table>
<thead>
<tr>
<th>CONTROL POINT</th>
<th>LOAD SHED 1</th>
<th>LOAD SHED 2</th>
<th>LOAD SHED 3</th>
<th>LOAD SHED 4</th>
<th>LOAD SHED 5</th>
<th>LOAD SHED 6</th>
</tr>
</thead>
<tbody>
<tr>
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<td>STEAM</td>
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</tbody>
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### ZONE CONTROL

<table>
<thead>
<tr>
<th>NON-RESEARCH SPACES</th>
<th>INDEX SPACE TO UNOCCUPIED MODE</th>
<th>INDEX TEMPERATURE SETPOINT TO 60 °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESEARCH SPACES</td>
<td>INDEX SPACE TO UNOCCUPIED MODE, RESETTABLE TO OCCUPIED MODE</td>
<td>INDEX SPACE AIR CHANGE RATE TO MIN UNOCCUPIED ACPH AND SPACE TEMPERATURE SETPOINT TO 60°F.</td>
</tr>
<tr>
<td>CRITICAL SPACES</td>
<td>UNDER CONTROL</td>
<td></td>
</tr>
<tr>
<td>RESIDENTIAL SPACES</td>
<td>UNDER CONTROL</td>
<td></td>
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</tbody>
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### AIR HANDLING SYSTEM CONTROL

<table>
<thead>
<tr>
<th>MIXED AIR FAN SYSTEMS - ATRIUM/HALLWAY</th>
<th>UNDER CONTROL</th>
<th>INDEX TO 100% RECIRCULATION</th>
<th>INDEX UNIT OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIXED AIR FAN SYSTEMS - OFFICE/CLASSROOM/AUDITORIUM</td>
<td>UNDER CONTROL</td>
<td>INDEX OUTSIDE AIR DAMPER TO MIN POSITION</td>
<td>INDEX TO 100% RECIRCULATION</td>
</tr>
<tr>
<td>MIXED AIR FAN SYSTEMS - CRITICAL</td>
<td>UNDER CONTROL</td>
<td>INDEX DISCHARGE AIR TEMPERATURE TO 55 °F (1)</td>
<td>INDEX OFF</td>
</tr>
<tr>
<td>100% OUTSIDE AIR SYSTEMS - NON CRITICAL</td>
<td>UNDER CONTROL</td>
<td>INDEX DISCHARGE AIR TEMPERATURE TO 55 °F (1)</td>
<td>INDEX OFF</td>
</tr>
<tr>
<td>100% OUTSIDE AIR SYSTEMS - CRITICAL</td>
<td>UNDER CONTROL</td>
<td>INDEX DISCHARGE AIR TEMPERATURE TO 55 °F (1)</td>
<td>INDEX OFF</td>
</tr>
<tr>
<td>LABORATORY MAKE-UP AIR SYSTEMS</td>
<td>UNDER CONTROL</td>
<td>INDEX DISCHARGE AIR TEMPERATURE TO 55 °F (1)</td>
<td>INDEX OFF</td>
</tr>
<tr>
<td>LABORATORY EXHAUST SYSTEMS</td>
<td>UNDER CONTROL</td>
<td>INDEX DISCHARGE AIR TEMPERATURE TO 55 °F (1)</td>
<td>INDEX OFF</td>
</tr>
<tr>
<td>GENERAL EXHAUST SYSTEMS</td>
<td>UNDER CONTROL</td>
<td>INDEX DISCHARGE AIR TEMPERATURE TO 55 °F (1)</td>
<td>INDEX OFF</td>
</tr>
</tbody>
</table>

### HYDRONIC SYSTEM CONTROL

| REHEAT LOOP SYSTEM - NON CRITICAL      | UNDER CONTROL | INDEX LOOP TEMPERATURE TO 140 °F OR MAINTAIN RESET SCHEDULE, WHICHER IS LOWER | CLOSE STEAM VALVE, PUMPS ON |
| REHEAT LOOP SYSTEM - CRITICAL          | UNDER CONTROL | INDEX LOOP TEMPERATURE TO 140 °F OR MAINTAIN RESET SCHEDULE, WHICHER IS LOWER | |
| PERIMETER HEATING LOOP SYSTEM           | UNDER CONTROL | INDEX LOOP TEMPERATURE TO 140 °F OR MAINTAIN RESET SCHEDULE, WHICHER IS LOWER | |
| GLYCOL HEATING LOOP SYSTEM              | UNDER CONTROL | INDEX LOOP TEMPERATURE TO 140 °F OR MAINTAIN RESET SCHEDULE, WHICHER IS LOWER | |
| RADIANT HEATING LOOP SYSTEM             | UNDER CONTROL | INDEX LOOP TEMPERATURE TO 140 °F OR MAINTAIN RESET SCHEDULE, WHICHER IS LOWER | |
Next Steps

• Focus on campus preparedness
  – Communications, expectations
  – Manual procedures for buildings
  – Guidance document can be found on the DSR webpage

• Additional Utilities steam production source project

Questions?

Nate Hunter
nph4@cornell.edu
Ellen Sweet
ems325@cornell.edu