Going Live:

Utilizing NIMS to Transfer Electric Power to New Construction in an Intensive and Acute Care Setting
More than 100 years ago, future Fort Worth mayor John Peter Smith deeded five acres of land at what is now 1500 South Main Street to provide a place where individuals from Fort Worth and Tarrant County “could have the best of medical care.”
Executive Overview

- Licensed for 573 beds
- Only Level 1 Trauma Center in Tarrant County and Psychiatric Emergency Center in Tarrant County
- Teaching Hospital –
  - 11 residency and fellowship programs including Emergency Medicine Residency Program
  - 50 affiliation agreements with undergraduate programs
- Over 113,000 ED patient visits in 2015, an average of over 300 visits per day
- Over 10,000 surgical procedures annually
- Urban campus with aging facilities on two sides of a street
Operational Drivers

Identified Need for cardiac catheterization and angiography equipment replacement and location, location, location

Renovate?

Master Facility Plan?

Do Nothing?

New Building?
New Building
DECISIONS

» SPEND 2.5 MILLION FOR NEW POWER PLANT

» CONSIDER A POWER TRANSFER TO NEW CONSTRUCTION
Challenge to Construction

• The electrical service to the new Pavilion East Expansion project is fed from the existing Pavilion
• Four individual “branches” of power in use:
  › Equipment Branch
  › Life Safety Branch
  › Normal Power Branch
  › Critical Power Branch
Goals

- Maintain Patient Safety and Services
Goals

- Safe working environment for the Construction Team
Goals

• Risk to Construction Team
  » OSHA reported electrocutions as the 2\textsuperscript{nd} leading cause resulting in death to construction workers in 2014.
Goals

• Perform power transfer without damage to facilities
Electric Slide

Main Distribution Panel

Sub Panel
Sub Panel
Sub Panel

Distribution Panel

Sub Panel
Sub Panel
Sub Panel

Distribution Panel

Main Distribution Panel
Electric Slide

Main Distribution Panel

- Sub Panel
- Sub Panel
- Sub Panel

Distribution Panel

- Sub Panel
- Sub Panel
- Sub Panel

New Breaker

Distribution Panel

- Sub Panel
- Sub Panel
- Sub Panel
Behind the Scenes
Affected Areas: HVAC units
• Affected Areas:
  » Egress lighting (corridors, stairwells, etc)
  » Fire Alarm Panel
  » Nurse Call
  » IT Closets
  » Med Gas Alarm Panels
Life Safety Branch

• Contractor to:
  » Provide temporary lighting in stairwells
  » Provide alternate feed to fire alarm panel
  » Provide alternate feeds to items as required by JPS

• JPS to:
  » Provide notification that lighting in various areas may be temporarily affected
• **Affected Areas:**
  » Lighting
  » Red Plugs

• **Contractor to:**
  » Successfully transfer power
  » Maintain schedule for power transfers

• **JPS to:**
  » Provide notification that lighting in various areas may be temporarily affected *(particularly restrooms)*
  » Transfer all necessary equipment into **WHITE** plugs

• **Measured all affected panels to ensure available loads are sufficient**
Normal Power Branch (White Plugs)

• Affected Areas:
  » Lighting
  » White Plugs

• Contractor to:
  » Successfully transfer power
  » Maintain schedule for power transfers

• JPS to:
  » Provide notification that lighting in various areas may be temporarily affected
  » Transfer all necessary equipment into RED plugs

• Measured all affected panels to ensure available loads are sufficient
Communications

• Bi-weekly Meetings Scheduled in Advance
• Weekly Meetings Scheduled for Core Members
• Verbal & Diagrammatical
Team Decision

• Risk Assessment for Day versus Night Work
• Final Decision - Night Work
  » Least Patient Impact
  » Less Surgery
  » Lower ED & OR Census
  » Least heat load on the building
  » Coolest time with a 24 hour period
  » 0200hrs – 0500hrs
Time 0220 hrs

Critical Power (Panel 2)
Critical Power (Panel 4)

Time 0300 hrs
Critical Power (Panel 5)

Time 0320 hrs
Normal Power COMPLETE

Time 0320 hrs
Multidisciplinary Approach

- Contractor – Project Manager
- Contractor - Superintendent
- Contractor – Asst. Superintendent
- Electrical Cont. – Project Manager
- Electrical Cont. - Superintendent
- Designer - Architect
- Designer – Engineer
- JPS Construction – Director
- JPS Construction – Operations Mgr
- JPS Construction – Project Manager
- JPS Facilities – Director
- JPS Facilities – Plant Manager
- JPS Facilities – Project Manager
- JPS Administration
- JPS Nursing
- JPS Surgery
- JPS ED
- JPS IT
- JPS Respiratory Therapy
- JPS BioMed
- JPS Security
- JPS Pharmacy
- JPS Sterile Processing
- JPS Emergency Management
- JPS Trauma Services
- JPS Safety
- JPS Communications
- JPS Ancillary Services
Applying NIMS
Applying NIMS

- HCC
  - Incident Command: VP of Operations
    - Oversight
  - Operations Chief: Construction Project Manager
    - Mitigation, Specialized Teams
  - Logistics: Facilities Director
    - Support Groups
  - HCC Chief: EM Director
    - Safety functions
Applying NIMS

• Adherence to NIMS principles
  » Appropriate personnel assigned in HCC
    › Multidisciplinary needs
  » Appropriate personnel in Remote Groups
    › Approval Group - safety sweeps
    › Contractor Group - transfer and generator functions
    › Appropriate personnel in Plant Ops - power switches
**Electrical Power Transfer**

**Battle Rhythm**

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>1 hour prior to event</td>
<td>All personnel report into work</td>
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<tr>
<td>1 hour prior to event</td>
<td>Briefing</td>
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<tr>
<td>1 hour prior to event</td>
<td>Last minute preparations</td>
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<tr>
<td>15-20 minutes prior to event</td>
<td>Approval team and others in position</td>
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<tr>
<td>5 minutes prior to event</td>
<td>Radio silence</td>
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<tr>
<td>0 time</td>
<td>Event starts</td>
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<tr>
<td>0-2.5 minutes after power cut</td>
<td>Assess impacts</td>
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<td>3-20 minutes</td>
<td>Power interruption</td>
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<tr>
<td>After last power transition</td>
<td>Electrical work performed</td>
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<tr>
<td>After last power transition</td>
<td>Debrief</td>
</tr>
<tr>
<td>After last power transition</td>
<td>Demobilize</td>
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</tbody>
</table>

The above schedule will be repeated for each power transfer session for all four branches of power.
Daily Briefing Agenda

- Sign in reminder – include cell phone
- Current Branch being transferred
- Estimated time of completion
- Last minute changes
  » Schedule change for plays
- Radio etiquette
  » Command on HICS OPS
  » Approval Group on HICS CMD
- Safety message
- Weather
- Debrief at end
- Message from Ops Chief
- Message from IC
East Pavilion Electrical Switch Over Algorithm

All Clear
No inbound critical patients & Contractor Ready

Command Confirms All Clear

Power Switched Off
Wait 5 minutes

Command Performs Roll Call
To determine unanticipated power loss has occurred

No Power Problems

Proceed with Electric Power Transfer Project

Power Problems

Resolved

Troubleshoot Problem

Not Resolved

All Stop Restore Original Power

No All Clear
Inbound critical patients or Contractor Not Ready
Hold Process

Issue Resolved

* Contractor Branch Performs

* JPB Branch
* Refer to Power Loss Troubleshoot Procedure

* Command directs Contractor Branch
## Play book - example

<table>
<thead>
<tr>
<th>Play</th>
<th>Name</th>
<th>Main Panel</th>
<th>Sub-Panel</th>
<th>Items Affected</th>
<th>Areas Affected</th>
<th>Time</th>
<th>Approval Group in place</th>
<th>Complete</th>
<th>Follow up?</th>
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<tbody>
<tr>
<td>1</td>
<td>L-7</td>
<td>HLS1 - (Backfeed #1)</td>
<td>HLS1, LLS1, LSCM1-7</td>
<td>Power</td>
<td>Data Closet P1-5 (backfeed #1) Dampers-Pavilion AHSU's</td>
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<td></td>
<td>Elevator 3 -4 (Sterile Processing to P2) (Backfeed #1)</td>
<td>Elevator</td>
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<td>Egress lighting to Northeast Stairwell (Backfeed #1)</td>
<td>Lighting</td>
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<td></td>
<td>Master Med Gas Alarm Panel, Gas Sensors at Tank Farm (Backfeed #1)</td>
<td>Med Gas Alarm</td>
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<td></td>
<td>Master Fire Alarm Panel, Lighting Control Master Panel, Air Compressor Fire Riser Room 12052, PTS P1 Acute Care (Backfeed #1)</td>
<td>Power</td>
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<tr>
<td>Play - 1</td>
<td>Resource</td>
<td>CHK</td>
<td>Command</td>
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<td>HCC</td>
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<td>Command to Approval Group - Confirm when All Safe to Backfeed Power to Data Closets P1-P5, Service Elevators 3&amp;4, Master Med Gas Alarm Panel, Master Fire Alarm Panel, Gas Sensor Central Plant, Lighting Control Master Panel, Air Comp Fire Riser Rm 12052, P1 Acute Care Pnuematic Tube, Egress Lighting, &amp; Lighting to Northeast Stairwell</td>
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<td>AG</td>
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<td>Stand-by</td>
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<td>Approval Group to Command - All Safe to Backfeed Power to Data Closets P1-P5, Service Elevators 3&amp;4, Master Med Gas Alarm Panel, Master Fire Alarm Panel, Gas Sensor Central Plant, Lighting Control Master Panel, Air Comp Fire Riser Rm 12052, P1 Acute Care Pnuematic Tube, Egress Lighting, &amp; Lighting to Northeast Stairwell</td>
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<td>Command to Executive Group - Confirm when All Safe to power down Pavilion Air Handling Units</td>
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<td>EG</td>
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<td>Stand-by (ER: x7895, OR: x7929, ICU: x7950)</td>
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<td>EG</td>
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<td>Executive Group to Command - All Safe to power down Pavilion Air Handling Units</td>
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<td>HCC</td>
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<td>Command to Plant Ops - Power Down Pavilion Air Handling Units</td>
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<td>PLT</td>
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<td>Stand-by</td>
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<td>PLT</td>
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<td>Plant Ops to Command - Pavilion Air Handling Units are powered down</td>
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<td>HCC</td>
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<td>Command to Contractor - All Safe to backfeed Panel HLS1</td>
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<td>CTR</td>
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<td>Contractor to Command - Backfeeding Panel HLS1</td>
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<td>CTR</td>
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<td>Contractor to Command - Power Restored to Panel HLS1</td>
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<td>Command to Plant Ops - Restore Power to Pavilion Air Handling Units (according to prioritized sequence)</td>
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<td>PLT</td>
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<td>Plant Ops to Command - Restoring Pavilion Air Handling Units</td>
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<td>Command to Executive Group - Restoring Pavilion Air Handling Units</td>
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<td>HCC</td>
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<td>Command to Approval Group - Power restored. Confirm Data Closets P1-P5, Service Elevators 3&amp;4, Master Med Gas Alarm Panel, Master Fire Alarm Panel, Gas Sensor Central Plant, Lighting Control Master Panel, Air Comp Fire Riser Rm 12052, P1 Acute Care Pnuematic Tube, Egress Lighting, &amp; Lighting to Northeast Stairwell has been restored</td>
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<td>HCC</td>
<td></td>
<td>Command to All Groups - Proceed to Play 2 - LS-8</td>
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Power Transfer Debriefing Agenda

• Report from:
  » Contractor Group
  » Approval Group
  » IC
  » Additional groups

• Recommended follow up
• Recommended changes
<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM.01.01.01 EP 1</td>
<td>The hospital’s leaders, including leaders of the medical staff, participate in planning activities prior to developing an Emergency Operations Plan.</td>
</tr>
<tr>
<td>EM.01.01.01 EP 7</td>
<td>The hospital's incident command structure is integrated into and consistent with its community's command structure. Note: The incident command structure used by the hospital should provide for a scalable response to different types of emergencies. Footnote: The National Incident Management System (NIMS) is one of many models for an incident command structure available to health care organizations. The NIMS provides guidelines for common functions and terminology to support clear communications and effective collaboration in an emergency situation.</td>
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<tr>
<td>EM.02.02.01 EP 17</td>
<td>The hospital implements the components of its Emergency Operations Plan that require advance preparation to support communications during an emergency.</td>
</tr>
<tr>
<td>EM.02.02.05 EP 10</td>
<td>The hospital implements the components of its Emergency Operations Plan that require advance preparation to support security and safety during an emergency.</td>
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<tr>
<td>EM.02.02.07 EP 4</td>
<td>The Emergency Operations Plan identifies the individual(s) to whom staff report in the hospital's incident command structure.</td>
</tr>
<tr>
<td>EM.02.02.09 EP 2</td>
<td>As part of its Emergency Operations Plan, the hospital identifies alternative means of providing the following: Electricity.</td>
</tr>
<tr>
<td>EM.02.02.09 EP 8</td>
<td>The hospital implements the components of its Emergency Operations Plan that require advance preparation to provide for utilities during an emergency.</td>
</tr>
</tbody>
</table>
Lessons Learned

• Executive
  » Supplies – box arrived with wrong parts
  » Fatigue – middle of the night for 8 nights

• Construction
  » Life Safety Branch – fire/smoke dampers affects HVAC Units
  » Existing Conditions – arrangement of panel wiring

• NIMS
  » Understanding NIMS – pt. diverted unnecessary
  » Radio dead spots – basement, analog
Successes

» Complex power transfer
  › Zero injuries
  › No power loss to critical areas
  › Multidisciplinary team development
  › All the fish survived
All the fish survived