

Project Objective: Move the functions of all existing motor controllers currently located in the two Penthouse Motor Control Centers (MCC's) to locations that are near-to the equipment being controlled. Then disassemble and remove the two MCC's.

<u>TASK</u>	<u>TASK DESCRIPTION</u>
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| 1.   | Objective: Mobilization  |
| 1.a. | Order & deliver motor controllers.   |
| 1.b. | Order & deliver new panelboards.   |
| 1.c. | Order & deliver new tap boxes and lugs.  |
| 2.   | Objective: install new functioning motor controllers at each affected HVAC or other miscellaneous equipment item which will require one. Some selected units already have functioning local controllers, which will remain in place. |

At each unit:

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| 2.a.   | Near the existing disconnecting device, provide and install a new motor controller either mounted to the wall or to a new free-standing, floor-mounted steel-strut framework.  |
| 2.b.   | Install one (1) new 3/4" conduit with #18AWG, 8-conductor cable from the existing JCI cabinet to connect to the new controller.  |
| 2.c.   | Where applicable, install new 3/4" conduit with appropriate fire alarm system safety control wiring and new control modules to connect to the new controller.  |
| 2.d.   | Introduce new j-boxes into the existing feeder raceway at a location near-to the new controller and also at a location above the existing MCC which feeds the unit.  |
| 2.d.1. | At the MCC, lock-out/tag-out the feeder to unit.   |
| 2.d.2. | Without damaging the existing feeder conductors, disconnect them from the existing controller in the MCC and from the existing disconnect device near the unit.  |
| 2.d.3. | At an existing intermediate pull or junction box, pull the existing conductors back from the MCC and from the existing disconnect device. If no intermediate box exists, then temporarily remove the existing feeder conductors. |
| 2.d.4. | Cut new j-boxes into the existing raceway near-to the new controller at the unit and above the existing MCC.   |
| 2.e.   | Reinstall the feeder conductors into the modified raceway system.  |
| 2.e.1. | At the MCC, terminate the reinstalled feeder conductors to the load side of the existing overcurrent protective device (OCPD) instead of to the existing controller.   |

- 2.e.2. At the HVAC unit, terminate the reinstalled feeder conductors to the line side of the new controller. If necessary, splice new conductors to the reinstalled ones in the new j-box and extend the new spliced conductors on to terminate to the new controller.
- 2.e.3. At the HVAC unit, provide a new motor feeder from the load side of the new controller to connect to the existing motor. Remove the pre-existing disconnect device.
- 2.f. Restore temporary operation of the selected HVAC unit using the new permanent controller, new permanent JCI connections, and the temporary feed from the existing MCC.
- 2.f.1. Once JCI has completed their connections and programming, re-energize the circuit by closing the OCPD at the MCC to restore operation. Remove the pre-existing control wiring from between the JCI cabinet and the MCC.

Repeat above process (2.a through 2.f.1) for each affected unit. When complete, all pre-existing controllers in both MCC's will have been by-passed, and all pre-existing control wiring, including fire alarm safety connections, will have been removed from both MCC's. "

- 3. Objective: remove two (2) MCC cabinet sections from the end of MCC-EHP-1 to establish sufficient space on the wall behind the MCC to install a new permanent panelboard (EHP-1), one to feed emergency power units.
- 3.a. Install a new temporary, 200-Amp, 480V, 3-phase, 3-wire power panel with 200A Main Circuit Breaker in available space south of MCC EHP-1.
- 3.b. Install a new temporary, 200-Amp feeder to the temporary panel.
- 3.b.1. During an outage of the MCC, install temporary MC cables with (3-#3/0 AWG, 1-#6 AWG EGC) to connect to the existing unused, top-feed, main lug set at the top of Section 4 of the MCC. Route the new feeder cable across above the MCC to feed the new temporary panel. The tap connection to the existing MCC buss shall comply with NEC 240.21 (B)(2). Provide chase nipple through the top of the MCC as required.
- 3.c. Transfer over-current protection duties from Sections 6 & 7 of the MCC to the temporary panel in preparation for the removal of these cabinet sections.
- 3.c.1. At MCC EHP-1, Sections 6 & 7 will be removed. The OCP's for the following units will be affected: 1-RF-1, 1-SF-2, 1-RF-2, and the feeder to existing Panel EHP-1 (to be renamed EHP-2).
- 3.c.2. During outages of each individual affected unit, install temporary MC cable motor feeders from the temporary panel to route to the respective junction boxes that were installed above (See 2.d). The temporary motor feeders shall be spliced to pre-existing motor feeders inside the new j-boxes. These temporary feeders will now be protected with circuit breakers in the temporary panel thus allowing removal of the raceways that previously connected between the j-boxes and the tops of the MCC's. When all of the units fed by Sections 6 & 7 have new temporary feeders, all existing raceways and conductors will have been disconnected and removed from these sections, which will then be ready for removal.
- 3.d. Remove Sections 6 & 7 from the MCC.

- 3.d.1. During an outage of the MCC, disconnect the bus-splice between cabinet Sections 5 & 6. Remove all bolts connecting cabinet Section 5 to Section 6. Remove bolts tying the MCC sections to the wall. Remove Sections 6 & 7. Restore power to the MCC.
- 4. Objective: install a new permanent 400-Amp, 480-V panelboard to provide necessary over-current protection for all of the HVAC units and other miscellaneous equipment fed from MCC EHP-1. Remove existing MCC EHP-1.
  - 4.a. In the space on the wall that was created by removing Sections 6 & 7, install the new permanent power panel.
  - 4.b. Provide temporary feeder for the new permanent power panel.
    - 4.b.1. During an outage of the MCC, install a new temporary feeder (3-500kCMIL, 1-#3AWG EGC) to connect to the existing unused, top-feed, main lug set at the top of Section 4 of the MCC. Route the new feeder in FNMC across above the MCC to temporarily feed the new permanent panel. The tap connection to the existing MCC buss shall comply with NEC 240.21 (B)(2). Provide chase nipple through the top of the MCC as required.
  - 4.c. Provide permanent feeders for each affected unit from the new power panels.
    - 4.c.1 During outages of each individual affected unit, install permanent motor feeders in conduit from the new permanent panel to route to the respective junction boxes that were installed above (See 2.d). The permanent motor feeders shall be spliced to preexisting motor feeders inside the j-boxes. These feeders can now be protected using circuit breakers in the new permanent panel thus allowing removal of the raceways that previously connected between the j-boxes and the tops of the MCC. When all of the units have new permanent feeders (including those that were temporarily fed from the temporary panel), all remaining existing raceways and conductors will have been disconnected and removed from the MCC. All remaining cabinet sections will then be ready for removal.
  - 4.d. Remove all remaining MCC cabinets. Provide permanent feeder to the new permanent power panel.
    - 4.d.1. During an outage of the MCC, disconnect and remove the temporary panelboard feeders from the MCC. Remove the temporary power panel and associated temporary motor feeders. Disconnect the existing MCC feeders from the MCC Main Lugs at the base of the MCC. Remove all remaining MCC Cabinets. Install the new tap box, equipped with 400-Amp power distribution blocks in place of the removed MCC cabinets. Connect the existing feeders to the new distribution blocks. Install new permanent feeder (3-600kCMIL, 1-#3AWG EGC) in 3"C from the new distribution blocks in the new tap boxes to connect to and to feed the new permanent panel. Restore Power.
- 5. Objective: remove three (3) MCC cabinet sections from the end of MCC NHP-1 to establish sufficient space on the wall behind the MCC to install a new permanent panelboard (NHP-1) to feed normal power HVAC units.
  - 5.a. Relocate the temporary panel used in 3.a. above to a new location just south of MCC NHP-1 on the wall where MCC EHP-1 was removed.

- 5.b. Install a temporary, 200-Amp feeder to the temporary panel.
- 5.b.1. During an outage of the MCC, install temporary MC cables with (3-#3/0 AWG, 1-#6 AWG EGC) to connect to the existing unused, top-feed, main lug set at the top of Section 4 of the MCC. Route the new feeder cable across above the MCC to feed the new temporary panel. The tap connection to the existing MCC buss shall comply with NEC 240.21 (B)(2). Provide chase nipple through the top of the MCC as required.
- 5.c. Transfer over-current protection duties from Sections 1, 2, & 3 of the MCC to the temporary panel in preparation for the removal of these cabinet sections.
- 5.c.1. At MCC NHP-1, Sections 1, 2, & 3 will be removed. The OCP's for the following units will be affected: 1-AHU-3 temperature control panel, 1-EF-9, SF-3 control power, 1-RF-4, 1-RF-6, 1-SF-5, 1-RF-5, 1-EF-2, and 1-SF-7.
- 5.c.2. During outages of each individual affected unit, install temporary MC cable motor feeders from the temporary panel to route to the respective junction boxes that were installed above (See 2.d). The temporary motor feeders shall be spliced to pre-existing motor feeders inside the new j-boxes. These temporary feeders will now be protected with circuit breakers in the temporary panel thus allowing removal of the raceways that previously connected between the j-boxes and the tops of the MCC's. When all of the units fed by Sections 1, 2 & 3 have new temporary feeders, all existing raceways and conductors will have been disconnected and removed from these sections, which will then be ready for removal.
- 5.d. Remove Sections 1, 2 & 3 from the MCC.
- 5.d.1. During an outage of the MCC, disconnect the bus-splice between cabinet Sections 3 & 4. Remove all bolts connecting cabinet Section 3 to Section 4. Remove bolts tying the MCC sections to the wall. Remove Sections 1, 2 & 3. Restore power to the MCC.
- 6. Objective: install a new permanent 400-Amp, 480-V panelboard to provide necessary over-current protection for all of the HVAC units and other miscellaneous equipment fed from MCC NHP-1. Remove existing MCC NHP-1.
- 6.a. In the space on the wall that was created by removing Sections 1, 2, & 3, install the new permanent power panel.
- 6.b. Provide temporary feeder for the new permanent power panel.
- 6.b.1 "During an outage of the MCC, install a new temporary feeder (3-500kCMIL, 1-#3AWG EGC) to connect to the existing unused, top-feed, main lug set at the top of Section 4 of the MCC. Route the new feeder in FNMC across above the MCC to temporarily feed the new permanent panel. The tap connection to the existing MCC buss shall comply with NEC 240.21. Provide chase nipple through the top of the MCC as required.
- 6.c. Provide permanent feeders for each affected unit from the new power panels.
- 6.c.3. During outages of each individual affected unit, install permanent motor feeders in conduit from the new permanent panel to route to the respective junction boxes that were installed above (See 2.d). The permanent motor feeders shall be spliced to preexisting motor feeders inside the

j-boxes. These feeders can now be protected using circuit breakers in the new permanent panel thus allowing removal of the raceways that previously connected between the j-boxes and the tops of the MCC. When all of the units have new permanent feeders (including those that were temporarily fed from the temporary panel), all remaining existing raceways and conductors will have been disconnected and removed from the MCC. All remaining cabinet sections will then be ready for removal.

- 6.d. Remove all remaining MCC cabinets. Provide permanent feeder to the new permanent power panel.
- 6.d.1. During an outage of the MCC, disconnect and remove the temporary panelboard feeders from the MCC. Remove the temporary power panel and associated temporary motor feeders. Disconnect the existing MCC feeders from the MCC Main Lugs at the base of the MCC. Remove all remaining MCC Cabinets. Install the new tap box, equipped with 400-Amp power distribution blocks in place of the removed MCC cabinets. Connect the existing feeders to the new distribution blocks. Install new permanent feeders (3-600kCMIL, 1-#3AWG EGC) in 3" C from the new distribution blocks in the new tap boxes to connect to and to feed the new permanent panel. Restore Power."