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# Federal Sector Building Automation Success Stories

Tom Lohner; P. E. - TENG Solutions





**Body Shop:  
Building  
Strategies**

- Overview of TENG Approach
- GSA Federal Complex – R5
- Bolling Federal Building – R6
- Addabbo Federal Building – R2
- CDC Atlanta Campuses
- Conclusion



# TENG Approach



Body Shop:  
Building  
Strategies

- Design Focused – Design / Build
- Manufacturer / Vendor Independent
- Un-Biased
- Utilize Open Standards & Protocols
- Offer Best in Class Software and System Integration Middleware



Body Shop:  
Building  
Strategies

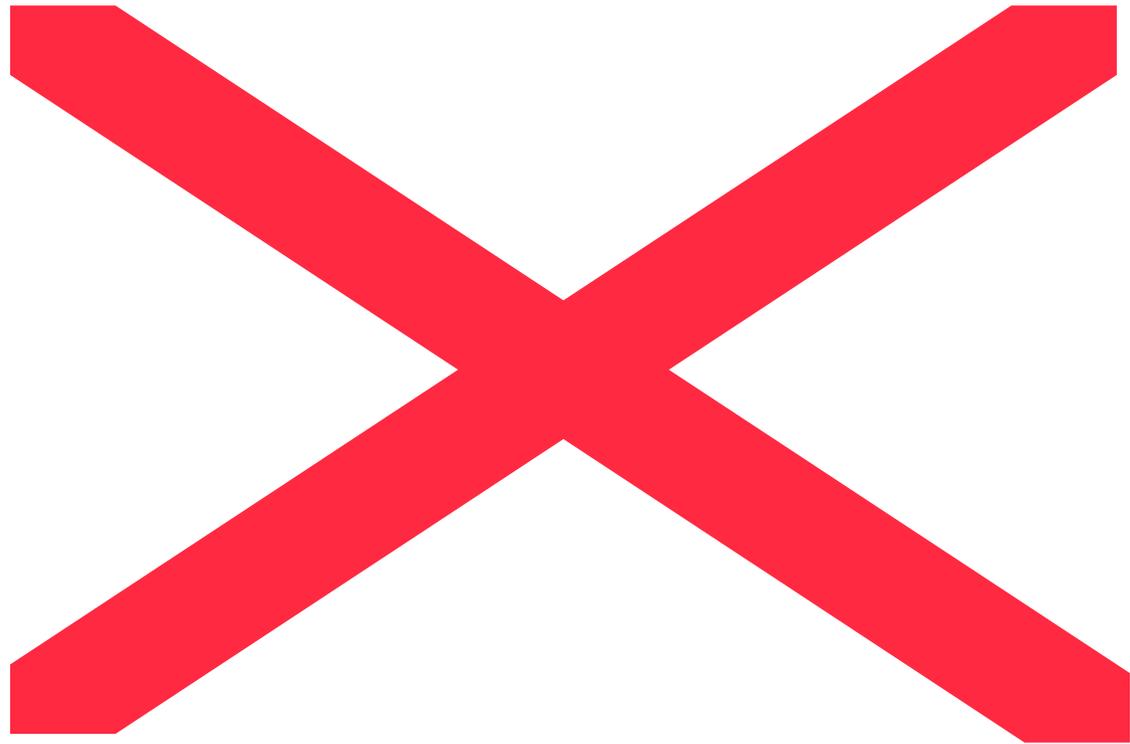
- Design – Build Using FSS
  - Schedule 84
  - Schedule 871
  - Equipment, Hardware & Software Costs Based on FSS Unit Prices
- Offer all Technology Design Services
  - EMS, System Integration, Security, Voice – Data, Network Engineering, Lighting Design & Control, Power Monitoring
- Sub-contract Trades
  - Customer Input Welcomed
  - Teng Provides Enterprise Network Software Programing & Integration

*Teng's Design Build  
Approach Permits*

**Integrated and Intelligent Buildings!**

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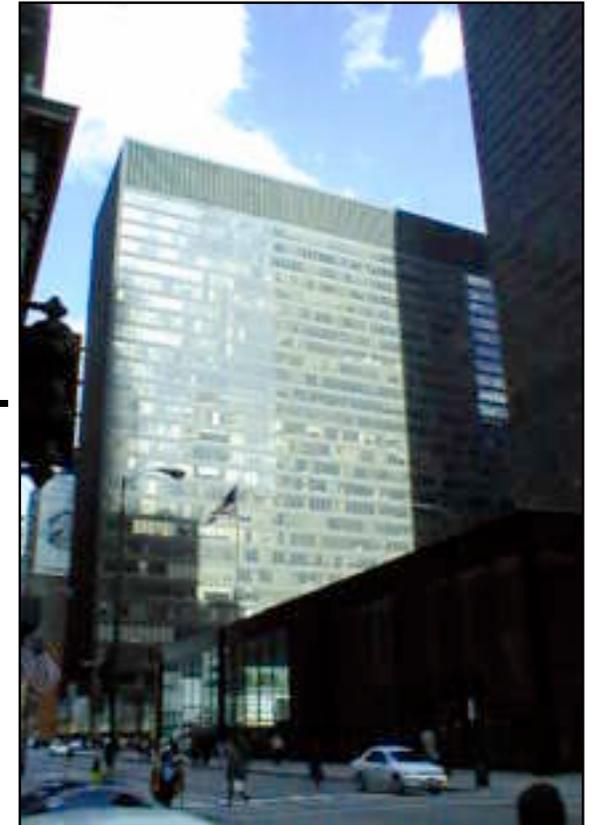
Case Studies





# GSA Federal Complex - Region 5

- **2003 Realcomm DIGI Award – Most Integrated Building**
- **Migration to LonWorks began in 1996**
- **HVAC, Lighting, Power, Security**
- **2000+ Control Products, 15,000+ points**
- **Based on EIA Standard 709.1 (LonTalk)**
- **Over 2.5 Million Sq. Ft. (3 facilities)**
- **6 Different Contractors, 14 Manufacturers, 6 Construction Phases**
- **Tridium Niagara on GSA WAN**



*Chicago, Illinois*



# Challenges

- LON versus BACnet
- New Technology (1996 – 2001)
- Locating Qualified Contractors
- Integrate and Monitor on GSA Network
- Education
  - All Stake Holders



# Life Cycle Cost (LCC) Savings

- **6 Phase - Competitive Bid Cost Savings**
  - **\$8,000,000+ over 7 years**
- **Energy Savings**
  - \$12,000/day Utility Costs
  - 20% Savings - \$2400/day - \$876,000/year
    - ***Achieved Presidential Mandate 1 Year Ahead of Schedule***
- **Competitive Bidding of Additions & Upgrades**
  - Conservative Estimate (20 – 30% of Installed Cost)

## LCC Savings (con't)

- Manpower
  - \$4800/Day Direct Labor (10 x \$20 x 24)
  - 20% More Efficient - \$960/day - \$350,400/year
- Service Contracts
  - Savings - \$100,000+/Year
- Software
  - Savings - \$50,000+/Year
- Conservative (4 year basis) Total Savings:
  - **\$10,907,200**



# Bolling Federal Building Modernization – Region 6

- 1.0 Million SF; 3 Phase Project
- Kansas City, MO
- Upgrade / Replace Interiors, MEP & BAS
- Phase 1 & 2 Complete
- Design of Phase 3 started



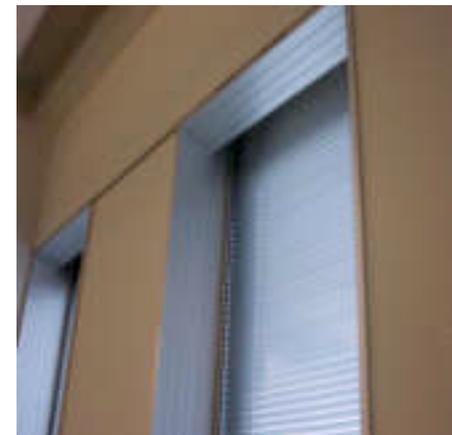


# Challenges

- Migration from Legacy - Seimens System 600 to Open
- DALI Lighting Control
- Maintain Competition – All Phases
- Incorporate Lessons Learned From Prior Phases
- Install Enterprise GUI on GSA WAN

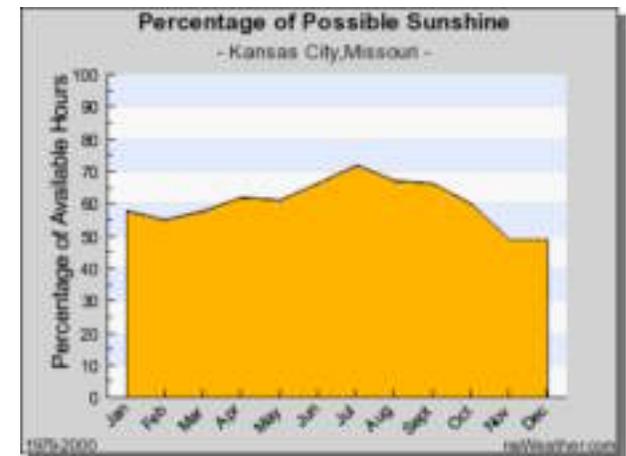
- Phase 1
  - Siebe (I/A Series – LONMARK)
  - Tridium Niagara
  - Wattstopper
- Phase 2
  - Honeywell (Excel 5 an 10 LONMARK)
  - Tridium
  - Starfield – DALI
- Phase 3 ?

- Perimeter Lighting Control
- Interior On/off - Phase 1
- Interior Dimming - Phase 2
- Automated Sun Control - Phase 3



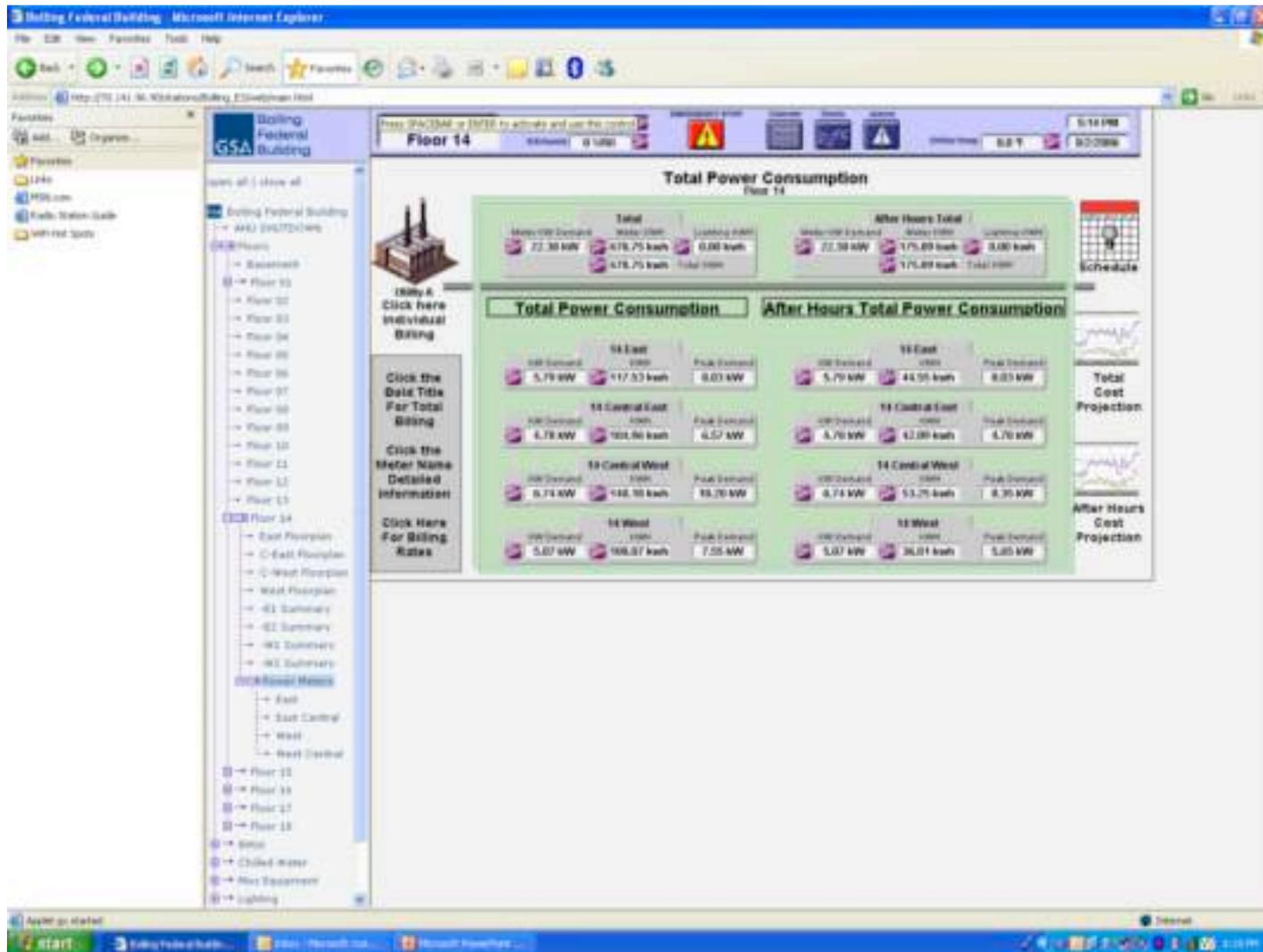
# Automated Sun-blinds

- Upper 1/3 Concave Up
- Functions as Mini-light Shelves
- Entire Blind Closes during Un-occupied Mode





# Tenant Sub-metering & Billing





# Tenant Utility Cost Projections

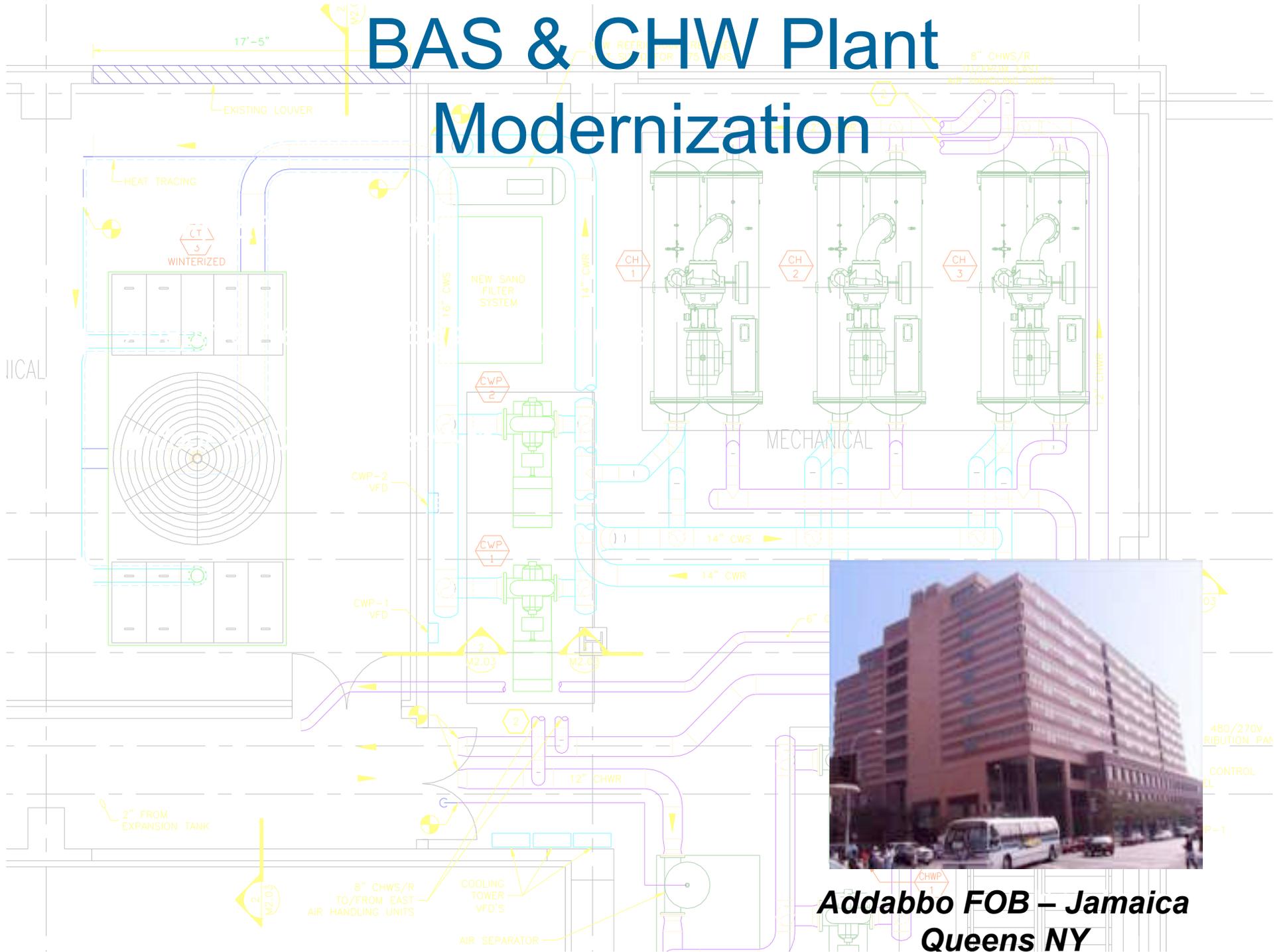
The screenshot shows a web browser window displaying a utility cost projection tool. The browser's address bar shows the URL: `http://70.140.86.80/Utilities/Building_23/Utilities.html`. The page title is "Building Federal Building - Microsoft Internet Explorer".

The main content area is titled "Power Floor 14" and displays a digital electric meter on the left. To the right of the meter, the text "Electric Meter" is displayed. Further right, a summary box titled "14th Floor" provides the following data:

- Date: 2-Aug-2006
- Time: 5:12 PM
- Location: Floor 14 Total Power
- Daily Elec. Use/Cost: 392 KWH, \$39
- Monthly Elec. Use/Cost: 422 KWH, \$42
- Projected Monthly Elec. Use/Cost: 7,450 KWH, \$745

The left sidebar of the web application shows a tree view of the building's structure, including "Basement", "Floor 01" through "Floor 13", "Floor 14" (selected), "Floor 15", "Floor 16", "Floor 17", "Floor 18", "Floor 19", "Floor 20", "Floor 21", "Floor 22", "Floor 23", "Floor 24", "Floor 25", "Floor 26", "Floor 27", "Floor 28", "Floor 29", "Floor 30", "Floor 31", "Floor 32", "Floor 33", "Floor 34", "Floor 35", "Floor 36", "Floor 37", "Floor 38", "Floor 39", "Floor 40", "Floor 41", "Floor 42", "Floor 43", "Floor 44", "Floor 45", "Floor 46", "Floor 47", "Floor 48", "Floor 49", "Floor 50", "Floor 51", "Floor 52", "Floor 53", "Floor 54", "Floor 55", "Floor 56", "Floor 57", "Floor 58", "Floor 59", "Floor 60", "Floor 61", "Floor 62", "Floor 63", "Floor 64", "Floor 65", "Floor 66", "Floor 67", "Floor 68", "Floor 69", "Floor 70", "Floor 71", "Floor 72", "Floor 73", "Floor 74", "Floor 75", "Floor 76", "Floor 77", "Floor 78", "Floor 79", "Floor 80", "Floor 81", "Floor 82", "Floor 83", "Floor 84", "Floor 85", "Floor 86", "Floor 87", "Floor 88", "Floor 89", "Floor 90", "Floor 91", "Floor 92", "Floor 93", "Floor 94", "Floor 95", "Floor 96", "Floor 97", "Floor 98", "Floor 99", "Floor 100".

# BAS & CHW Plant Modernization



**Addabbo FOB – Jamaica Queens NY**

480/270V  
DISTRIBUTION PAN  
CONTROL  
EL  
P-1



# Challenges

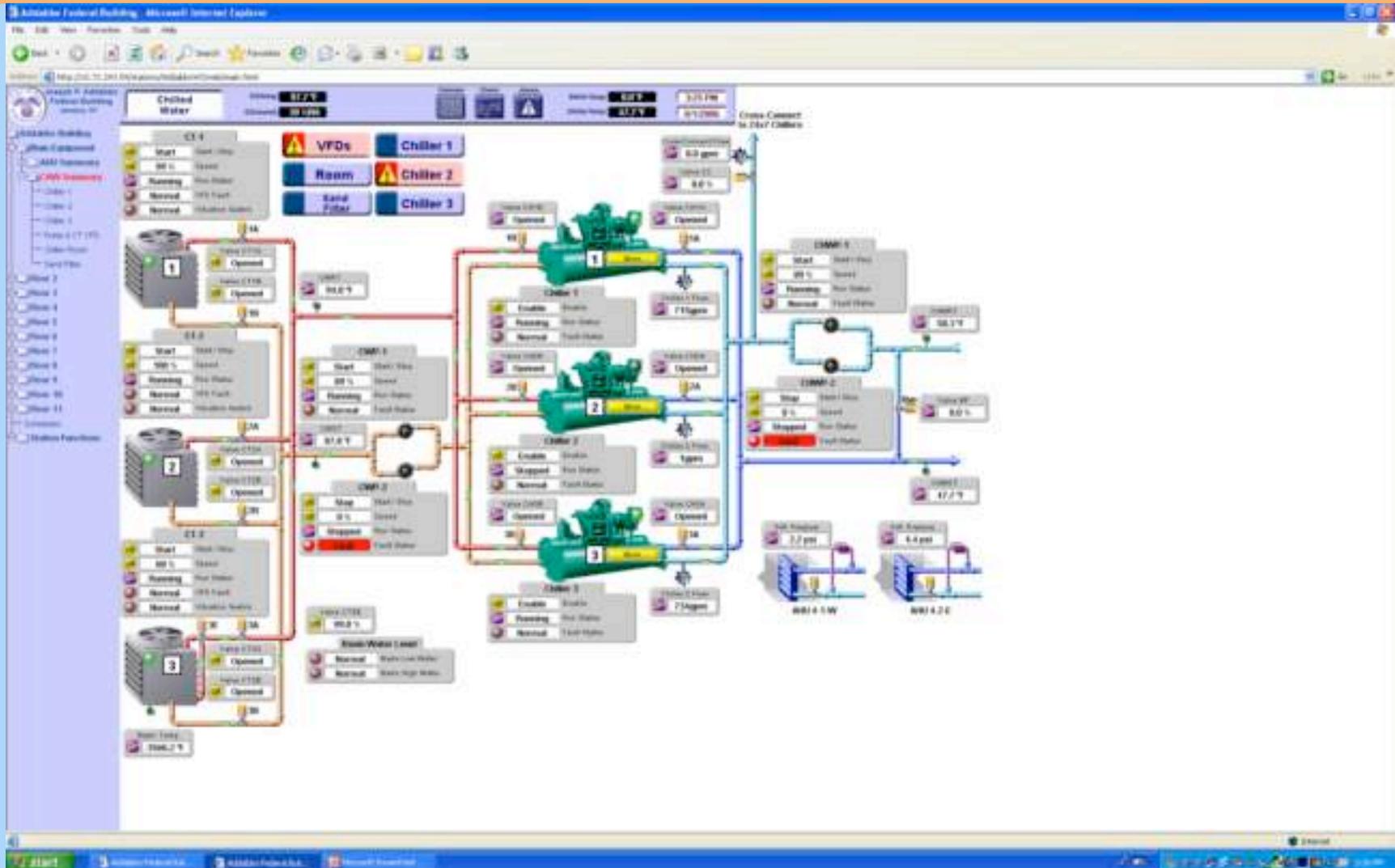
- Migration from Legacy - Seimens System 600 to Open
- Numerous Mechanical System Deficiencies
- Local Service & Maintenance
- Three Phase Implementation

- Phase 1 –
  - Distech VAV & FPB controllers
  - Tridium Niagara
- Phase 2 –
  - Distech AHU and Central Plant Controllers
  - ABB Variable Frequency Drives
  - York Millennium Chillers



# Main Equipment Summary

A screenshot of a web-based building management system (BMS) interface. The browser window title is "Arizona Federal Building - Microsoft Internet Explorer". The address bar shows "http://206.10.201.10/bsm/central/summarymain.html". The interface displays a "Main" view for the "Arizona Building Home". At the top, there are status indicators for "Status: OK" and "Date: 2/21/06". The main content area is organized into a grid of equipment summary buttons for each floor from 11 down to 2, plus an "Emergency" section. Each floor has buttons for "PL [Floor] North Summary", "PL [Floor] South Summary", "AHU [Floor]-[Direction]", and "AHU [Floor]-[Direction]". For example, Floor 11 has "PL 11 North Summary", "PL 11 South Summary", "AHU 11-N", and "AHU 11-S". The "Emergency" section includes "Emergency", "Schedules", "AHU Summary", and "Critical Water". On the right side, there are "Year [Floor]" buttons for each floor, with sub-buttons for "W [Floor]-T" and "E [Floor]-T". A left sidebar contains a tree view for "Arizona Building" with sub-items like "AHU Summary", "CHW Summary", "Cooling", "Heating", "Water", "Water Flow", "Water 2", "Water 3", "Water 4", "Water 5", "Water 6", "Water 7", "Water 8", "Water 9", "Water 10", "Water 11", "Compressor", and "Station Functions". The bottom of the screenshot shows the Windows taskbar with the Start button and several open applications.

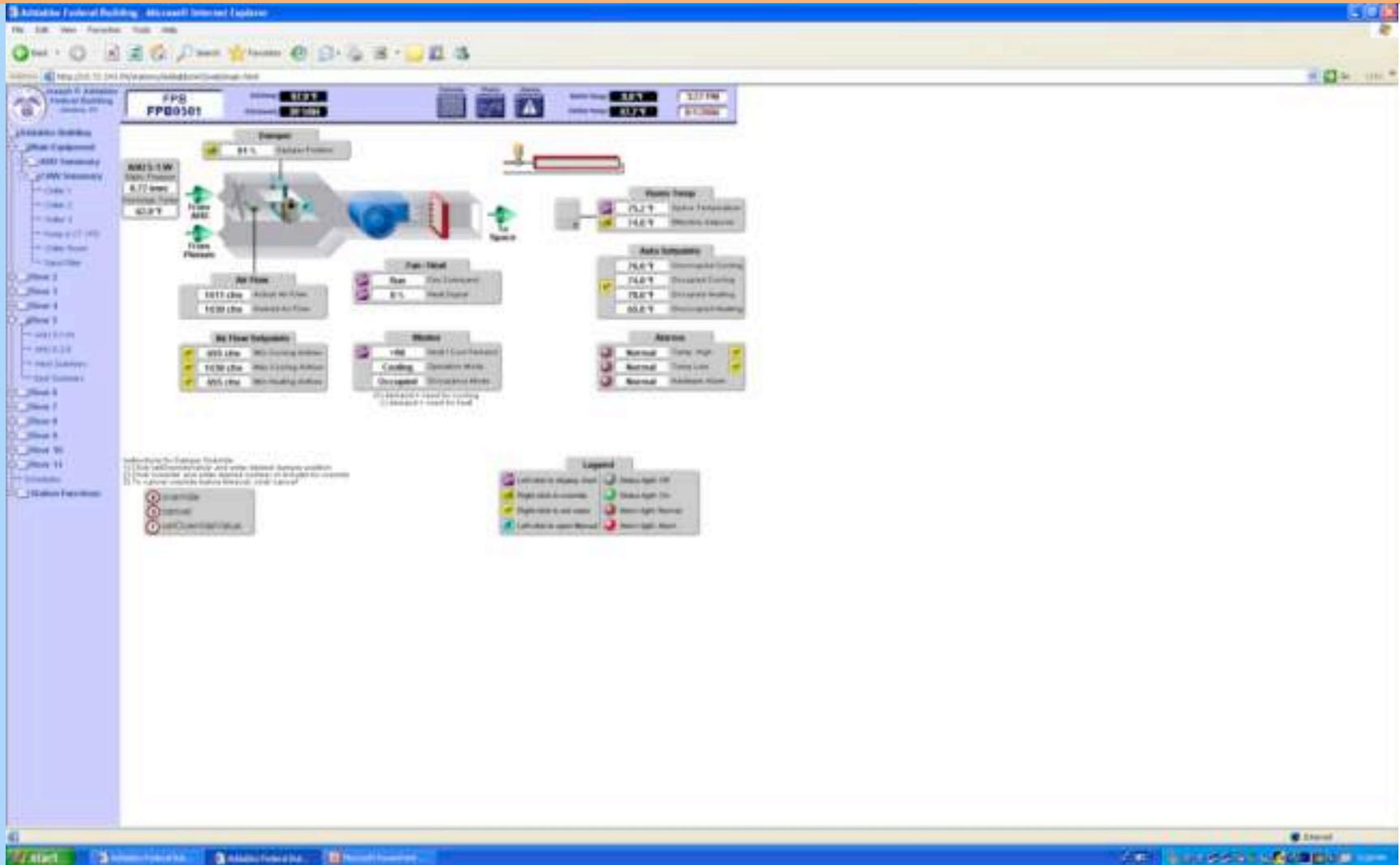


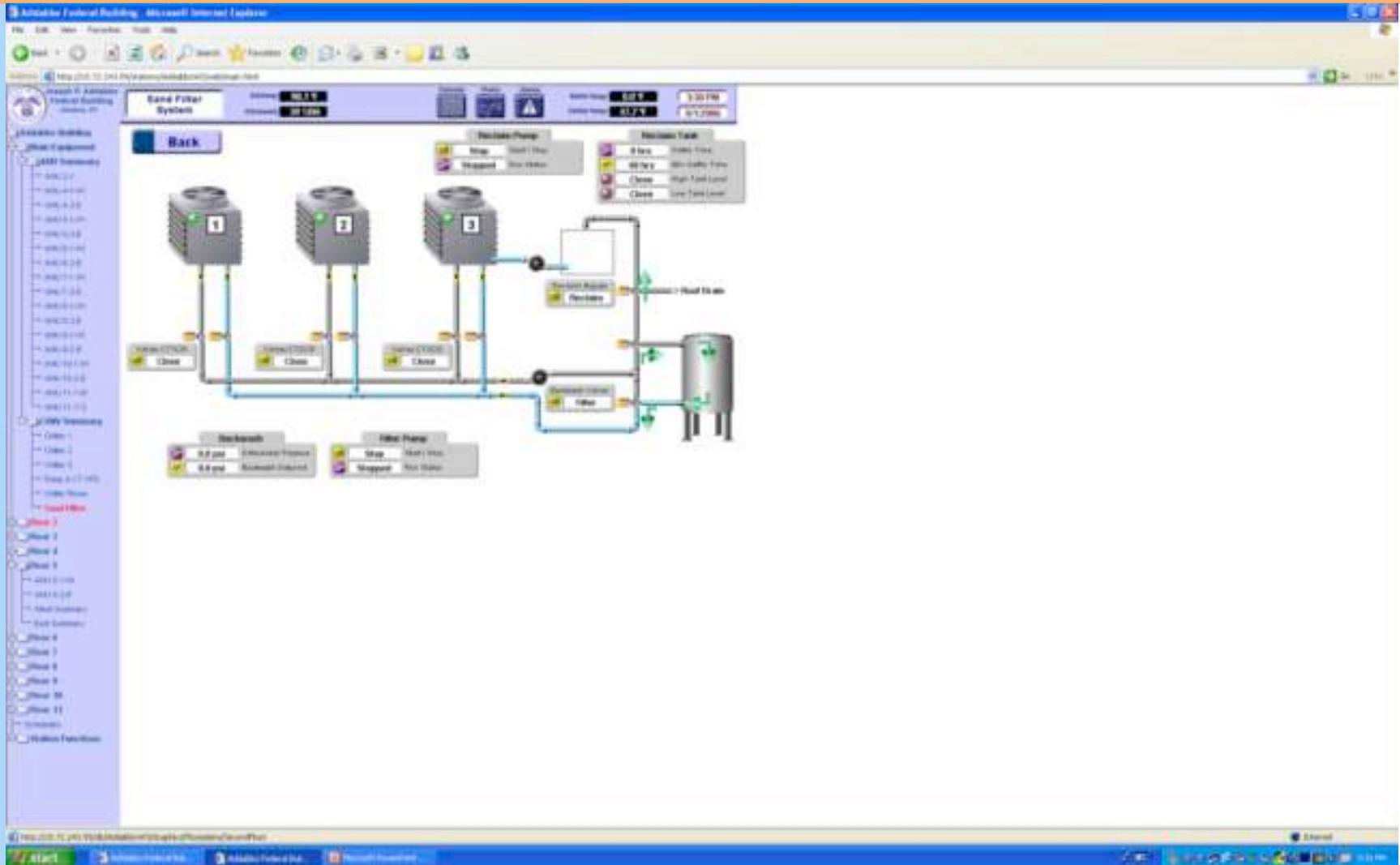


# 5<sup>th</sup> Floor Summary











# Centers for Disease Control and Prevention – Integrated Facility Management System (IFMS)





## IFMS Mission

- Provide Real Time Access and Tracking of Facilities Information by Establishing a Single Corporate Information Enterprise System to Enhance Safety, Operational Efficiency, and Emergency Preparedness While Reducing Facility Lifecycle Costs

# Web Based Information Portal

Global search engine provides access to information across the domains

On-line help easily accessible

Centralized filter provides the ability to filter queried information

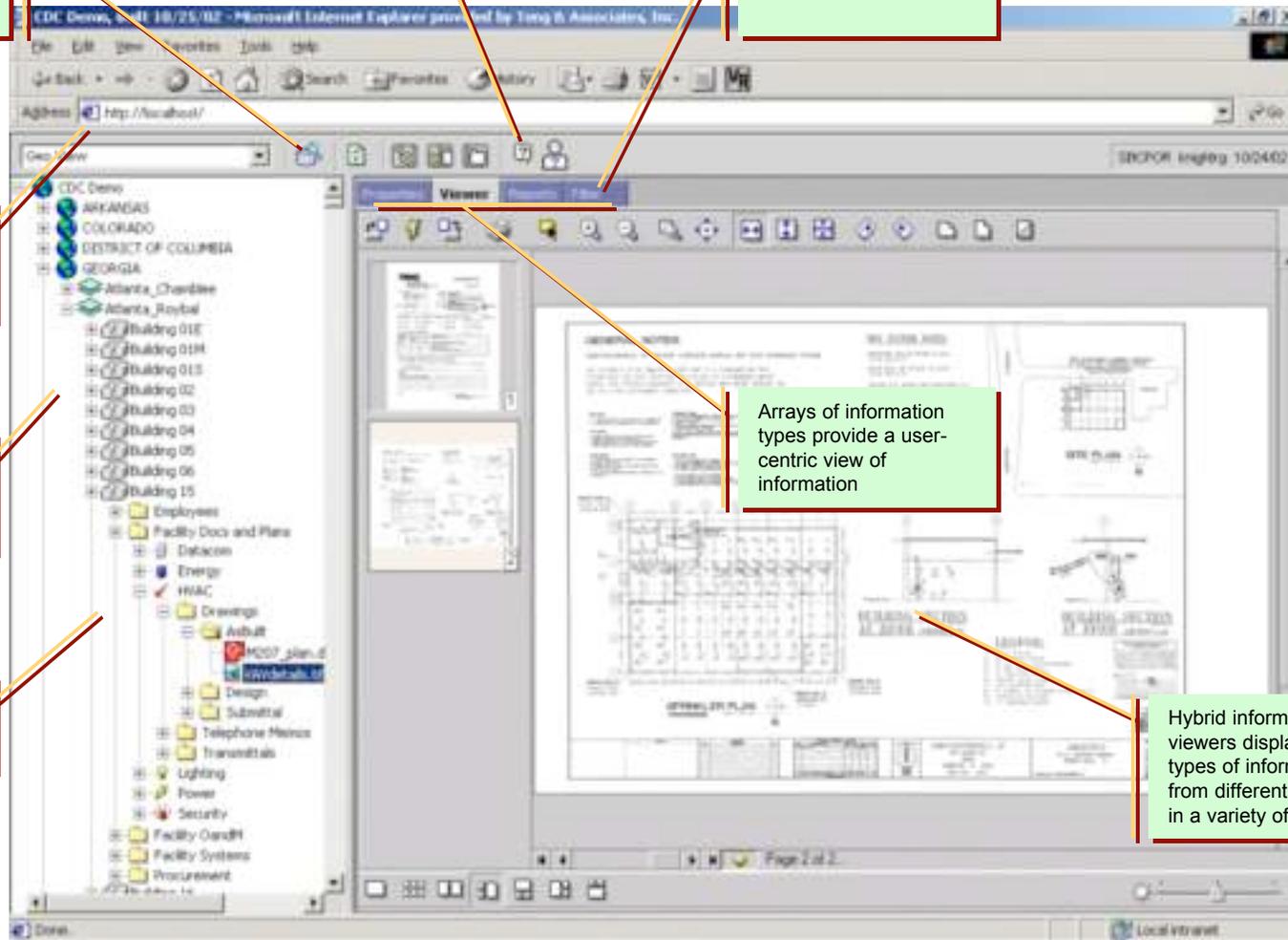
Web-based portal allows collaboration across the Internet and Intranet

Information tree based on physical, spatial, or business rule relationships

Aggregation of information from different domains

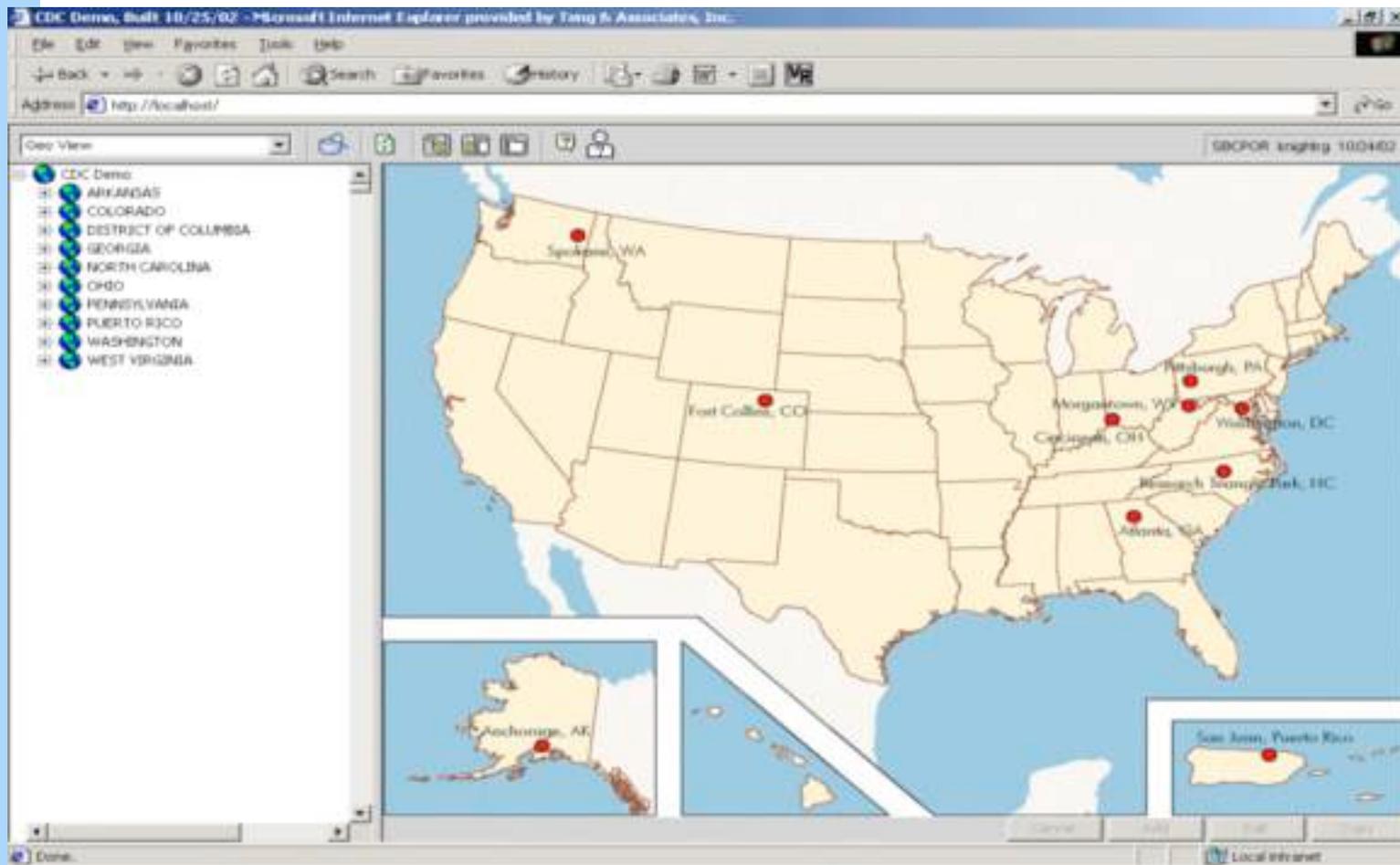
Arrays of information types provide a user-centric view of information

Hybrid information viewers display different types of information from different domains in a variety of forms



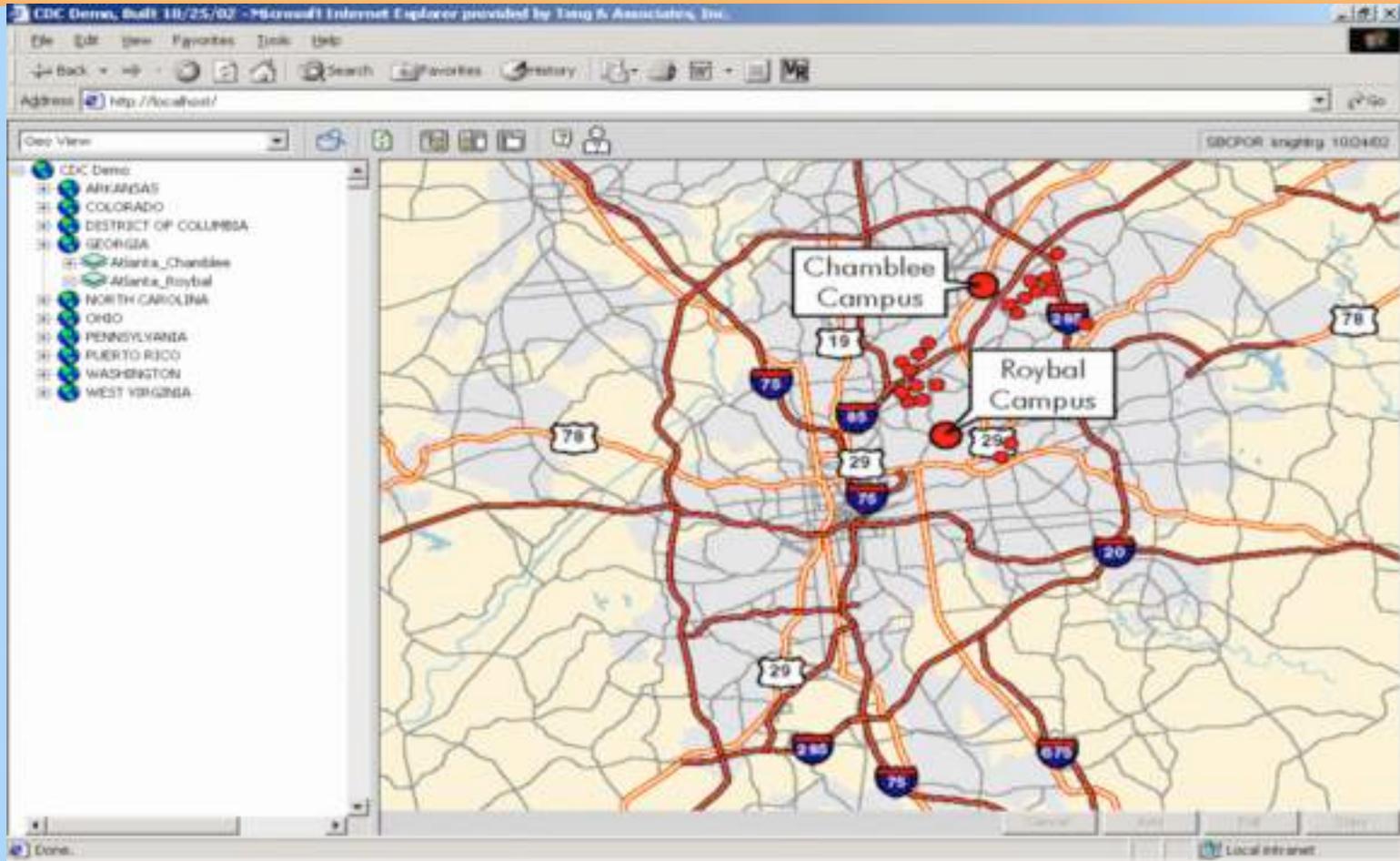


# CDC – U.S. Locations



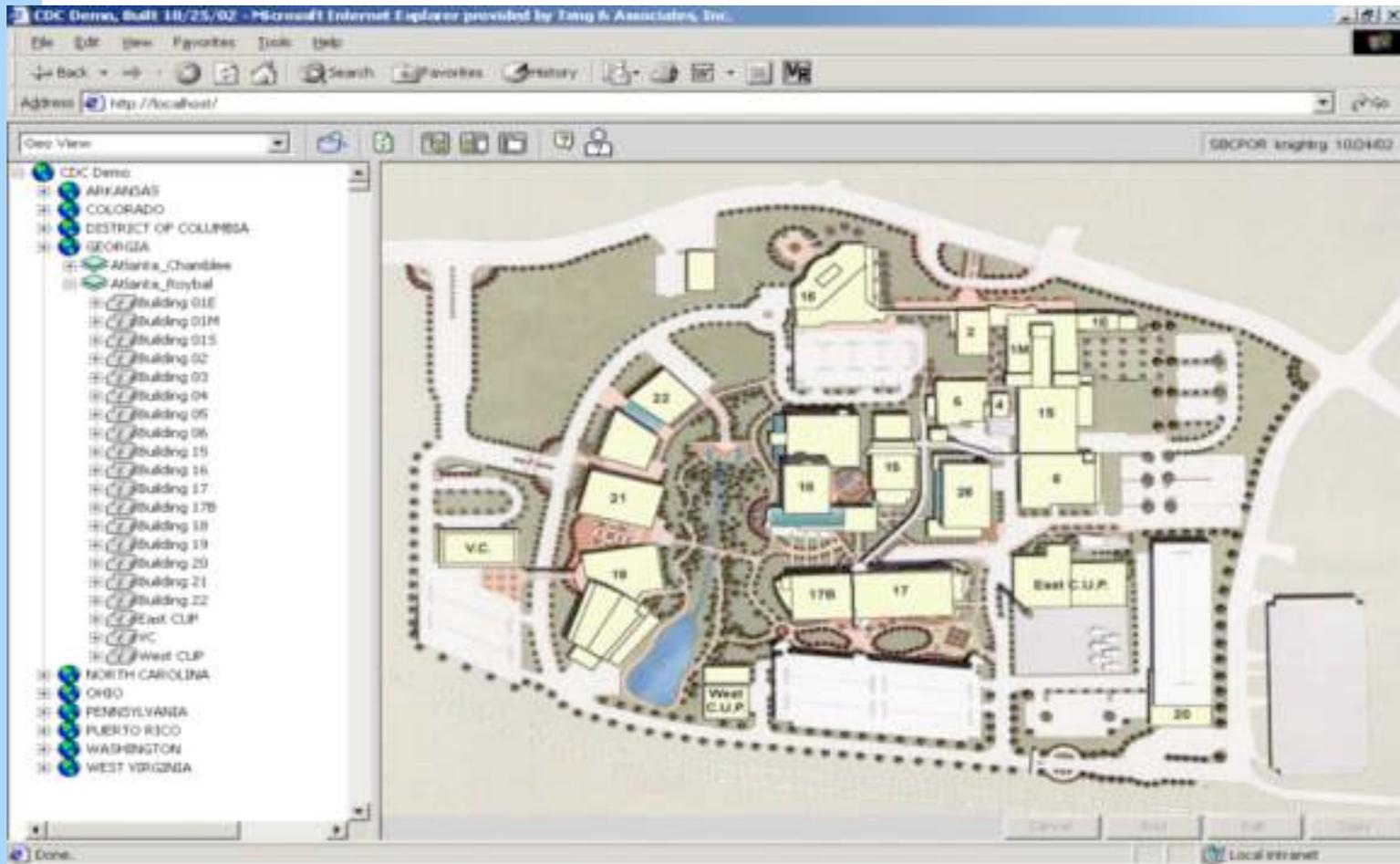


# CDC – Atlanta Locations





# CDC - Roybal Campus





# Facility Floor Plan – Employee Seat Location

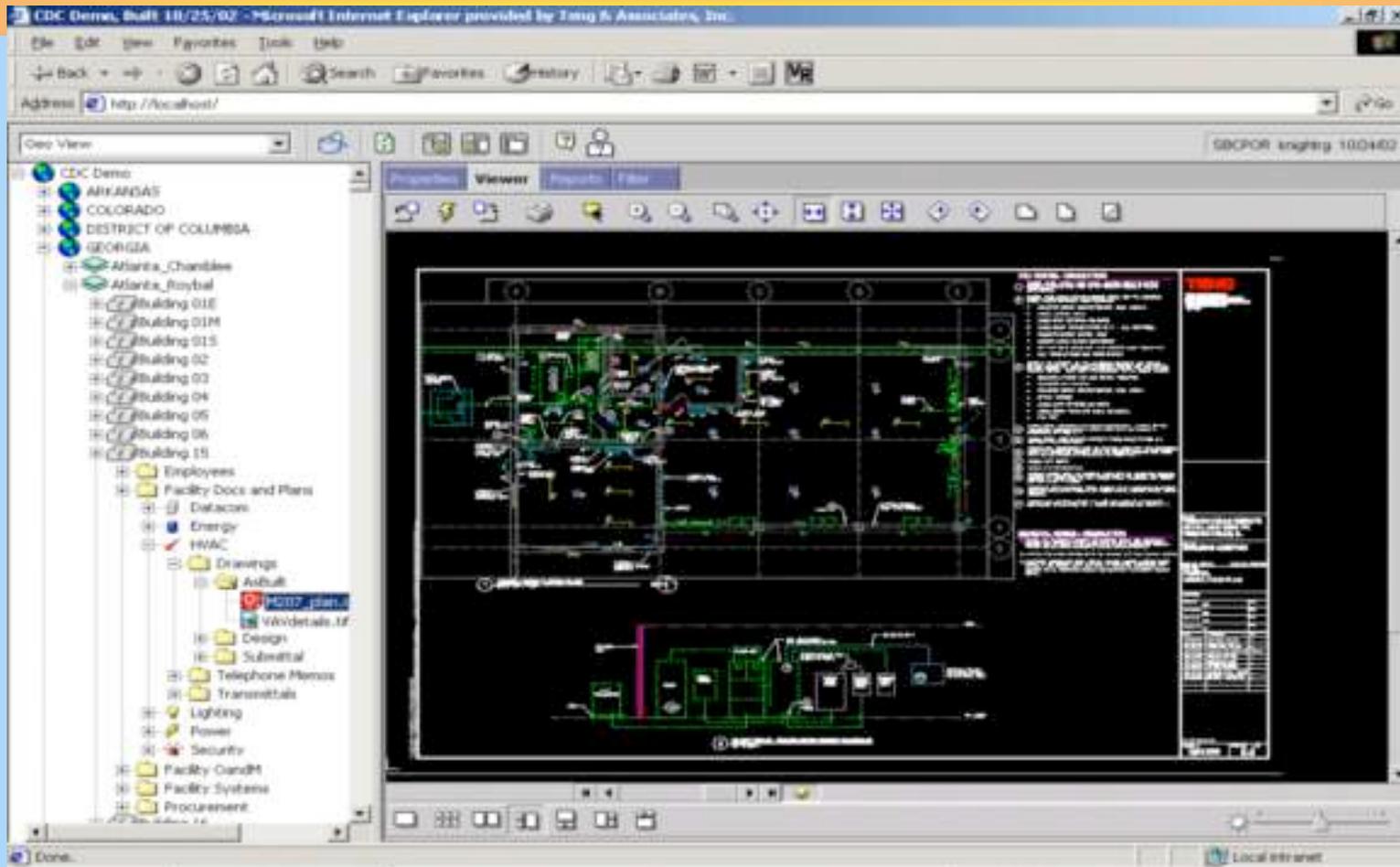
A screenshot of a Microsoft Internet Explorer browser window displaying a web application. The browser's address bar shows 'http://localhost/'. The main content area is a facility floor plan with a grid of numbered rooms. A search window titled 'Employee Directory' is overlaid on the floor plan. The search window has the following fields:

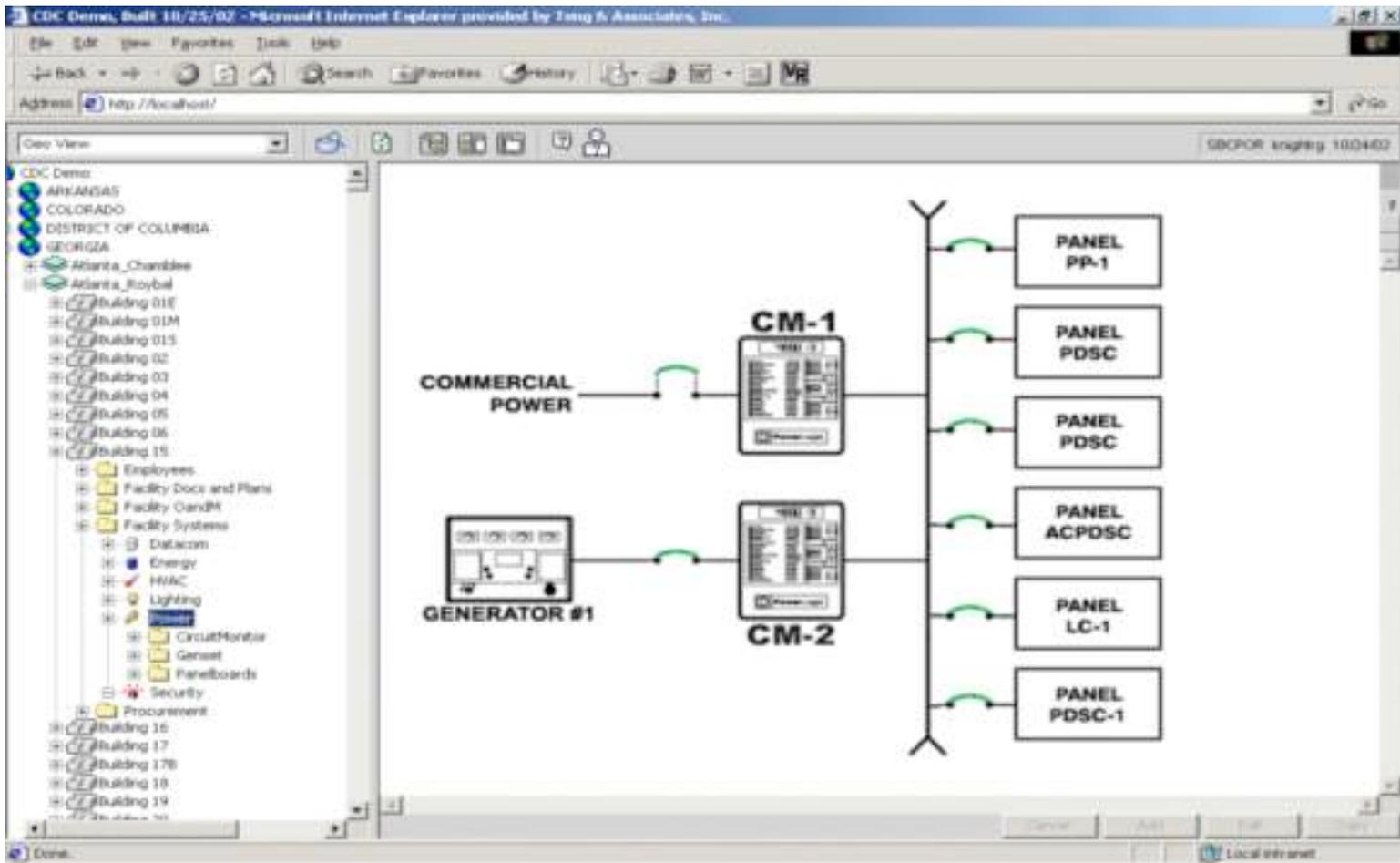
- First name: Knight
- Last name: (empty)
- Employee: ALL (dropdown menu)
- Office: ALL (dropdown menu)
- Buttons: 'Go' and 'Cancel'

The floor plan shows a grid of rooms, with room 2095 highlighted in red. The search window is positioned over the right side of the floor plan. The browser's status bar at the bottom shows 'Done' and 'Local intranet'.



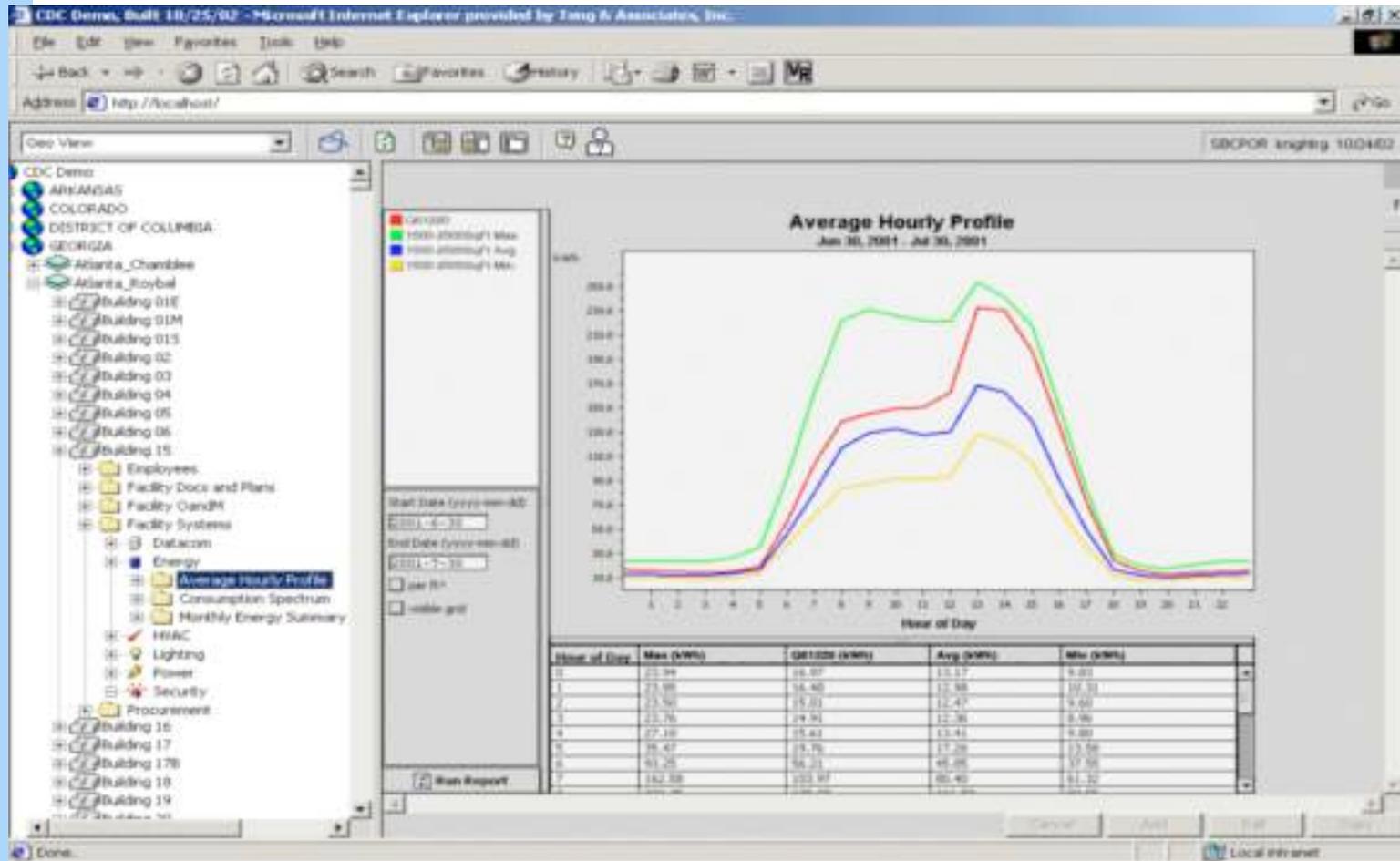
# Facility Documents and Plans – CAD Viewer





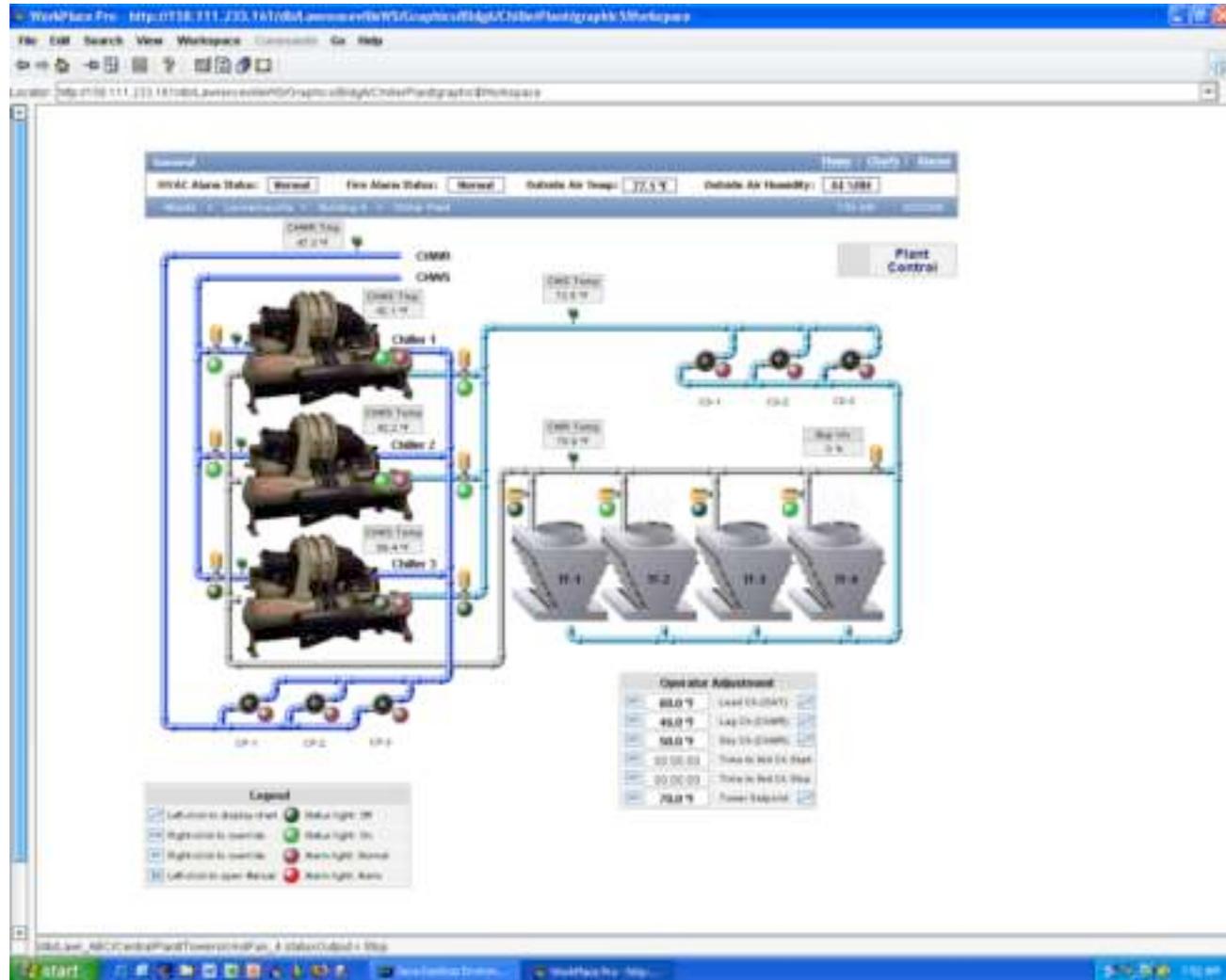


# Energy Summary





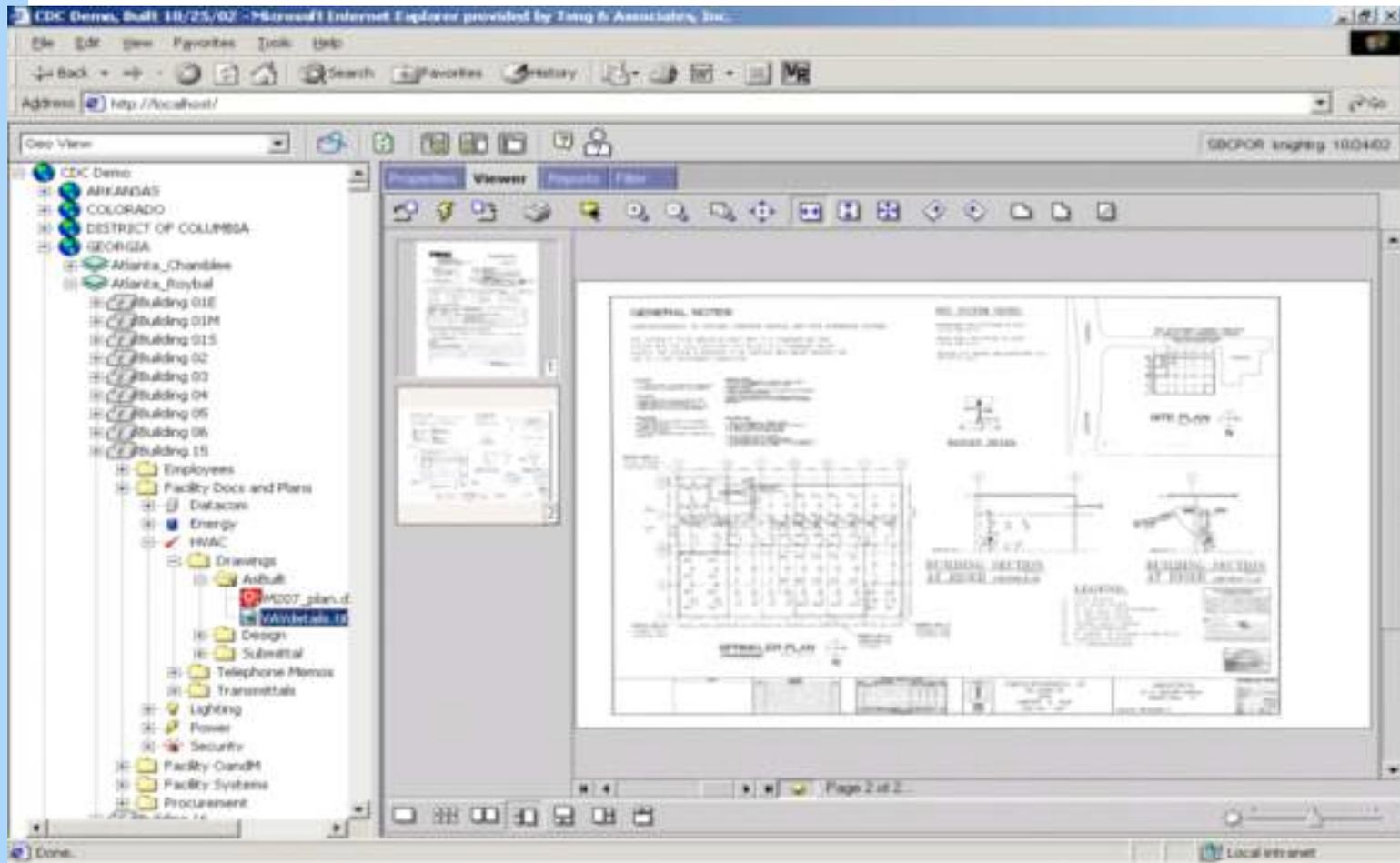
# HVAC System Flow Diagram





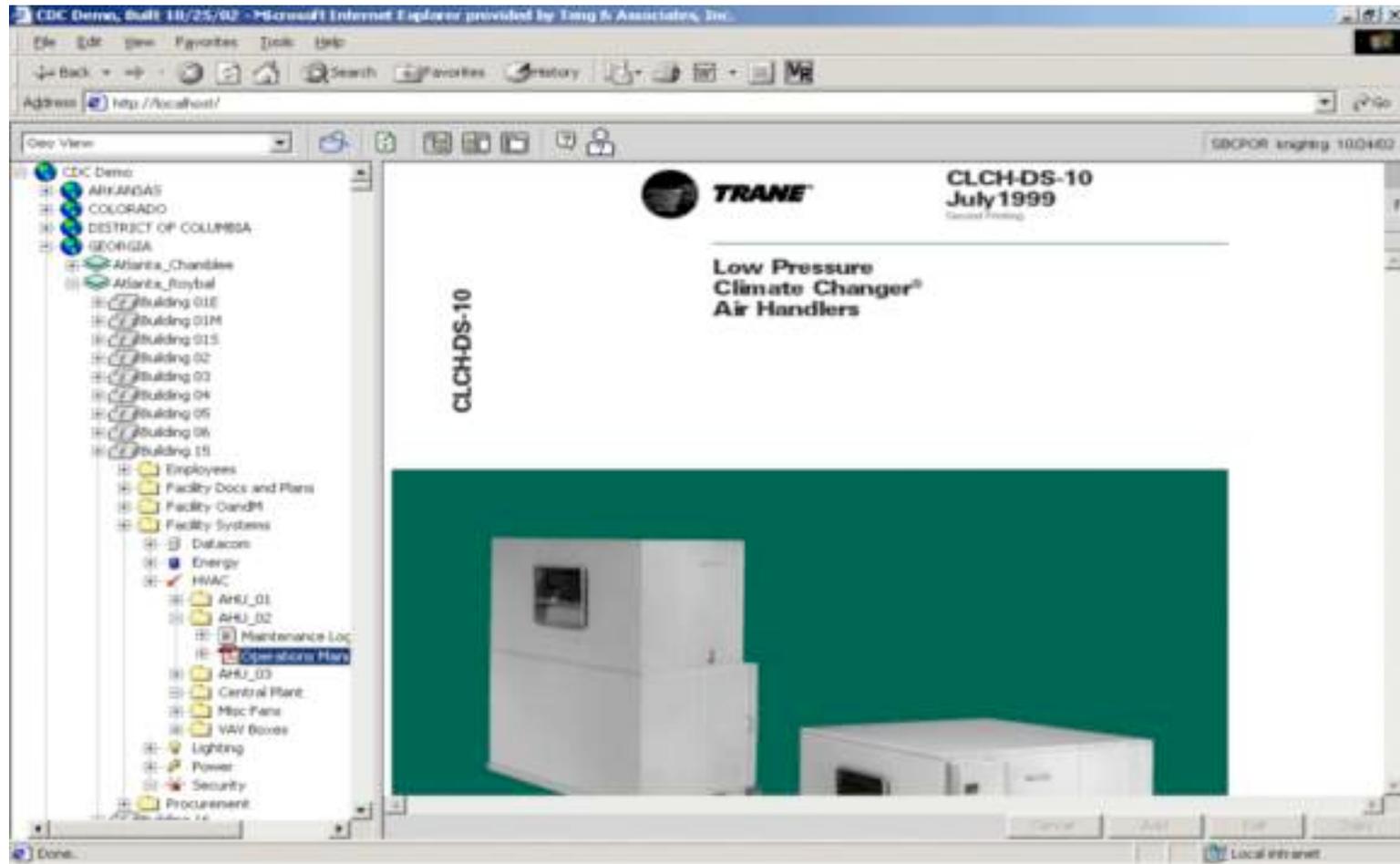
# Document Management

## HVAC Equipment Submittal Drawings





# Document Management HVAC Equipment O & M Manuals





# HVAC Equipment Work Orders & CMMS Data

CDC Demo, Built 10/25/02 - Microsoft Internet Explorer provided by Tang & Associates, Inc.

Address: http://localhost/

Site: GBCFOR - Inghtrg 100462

Navigation: Identity | Labor Cost | Material Cost | Other Charges | A/R Payments | Billing Info | Safety & Risk | View Charges

Location ID:	RED-100	WD Number:	PP-20000122
Building:	Redwood Office Park	Reference No.:	5
Area:	100	Trade:	HVAC Technician
Date/Time:	04/20/2000 11:52 PM 5	Supervisor:	Masafinez, Toby
Repair Center:	PP Physical Plant	Est start date/time:	04/20/2000 00:00
Type:	WO Work Order	Est end date/time:	04/30/2000 17:00
Requester:	Greg Kostyshock Ph:	Status:	Awaiting contractor's visit
Charge?	YES Acct No.: 123 874 2277	Contractor:	
Project No.:			
Tag No.:	FAN Ceiling Fan		
Task Code:	1115 A/C Is Too Cold (Air Conditioning Systems)		
Request:	The room is too cold.		

Assigned: [ ] Authorize: [ ] Estimate: [ ] Linked Documents: [ ] Oper: [ ]

Department: Controller Last Print: [ ] Model record: [ ]

Email Address: greg.kostyshock@tmcsystems.com Posted: [ ]

Done. Local intranet



# Project Management – Project Website

TENG - Project Website Version 2.0.1, Built 5/31/02 - Microsoft Internet Explorer provided by Teng & Associates, Inc.

Address: http://www.teng.com/col\_DemoWeb/beam.htm.asp

Web Centric / TENG

webSite, Items: 10/24/2002 Log out

Reports

- Weekly Summary
- Project Running List
- Current Progress Status**
- General RFI Log
- Meeting Minutes

Procedure  
Log Menu  
Restricted Access  
Admin Tools

**CONSTRUCTION PROJECT STATUS** 10/24/2002 4:21:44 PM

Item	Call	Status	CRD	Mid Secs	Permit	Grid In	Pre Ins	Cert of Occ	Final Ins	Accepted	By
<b>IL - ILLINOIS</b>											
<a href="#">710111 - DEWET</a>	71118	Complete	N/A	3/1/02, N/A	3/21/02, N/A	3/17/02, N/A	10/16/02, N/A	10/16/02, N/A	10/24/02, N/A	10/21/02, N/A	Jingxin, Peng
<a href="#">710112 - DANVILLE</a>	71118	Complete	3/26/02	3/1/02, N/A	N/A, N/A	3/17/02, N/A	10/16/02, N/A	N/A, N/A	N/A, N/A	N/A, N/A	Jingxin, Peng
<a href="#">710113 - ADRIAN</a>	71118	Complete	4/12/02	3/1/02, N/A	N/A, N/A	N/A, N/A	N/A, N/A	N/A, N/A	N/A, N/A	N/A, N/A	Kathleen, B
<b>MI - MICHIGAN</b>											
<a href="#">710106 - (Standard) Spring</a>	71118	Complete	4/13/02	3/1/02, N/A	N/A, N/A	N/A, N/A	N/A, N/A	N/A, N/A	N/A, N/A	N/A, N/A	Kathleen, B
<b>MI - MICHIGAN</b>											
<a href="#">710102 - (AND) JAR</a>	71118	Accepted	3/13/02	N/A, N/A	3/13/02, N/A	3/13/02, N/A	3/20/02, N/A	3/20/02, N/A	3/16/02, N/A	3/13/02, N/A	Kathleen, B

End Of Report, 5 records. Printed By: Phoenix, Demo

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THANK YOU!

