

2 EXECUTIVE SUMMARY WITH SUMMARY OF LESSONS LEARNED, New Orleans, LA, March 12-14, 2007

Background. The U.S. General Services Administration (GSA) is dedicated to providing quality Federal facilities for our nation and improving the effectiveness of our Federal workforce by ensuring a quality work environment for them. The Office of the Chief Architect (OCA), created GSA's Design Excellence Program As a tool to enhance its portfolio of both new and renovation projects in response to evolving business practices and client expectations.

An important component of Design Excellence is Heating, Ventilating, and Air Conditioning (HVAC) performance, the improvement of which has been consistently identified as an excellent opportunity for GSA to increase tenant satisfaction while achieving energy efficiency, ease of operations and maintenance, and savings in utility costs. Responding to this opportunity, OCA requested that The National Institute of Building Sciences (NIBS) facilitate a National HVAC Excellence Workshop to address the issues of: "Looking Forward: Focus on Hurricane Recovery and Future Planning, and Energy Conservation."

Workshop Summary. As hurricane recovery and future planning were major focuses of the workshop, it was held, appropriately, in New Orleans, LA, at the JW Marriott Hotel on March 12-14, 2007. Participants included sixty representatives from PBS Regional Offices and Central Office. They included HVAC Excellence Advocates, Property Managers and personnel from the Office of the Chief Architect at Central Office.

Vijay Gupta, Chief Mechanical Engineer, Office of the Chief Architect, worked closely with NIBS in all phases of workshop planning and served as moderator during the workshop. In his opening remarks he welcomed the participants and speakers, including PBS Commissioner David Winstead, Assistant Commissioner Robert Fraga, and Chief Engineer William Holley. He welcomed the participation of property managers from throughout the regional offices and the opportunity for meaningful dialogue between HVAC Advocates and those with the responsibility of running and maintaining our buildings. Further, he stressed the importance of lessons learned that would be shared by those involved in dealing with the aftermath of devastating hurricanes such as Katrina and Rita. He said much-needed attention would be given to energy conservation issues such as recent legislation and a new executive order. Next, he introduced Earle Kennett, Vice President of NIBS, who would serve as Master of Ceremonies throughout the workshop.

Jim Weller, Assistant Regional Administrator (Region 7), was the first speaker addressing the extraordinary consequences of Hurricane Katrina and recovery efforts. He could relate first-hand about the difficulties of adequate personnel to get buildings operational again in a city where some areas

are still without power. In buildings where mechanical and electrical systems were in basements or sub-basements, the damaging affects of flooding involved enormous efforts to restore what could be restored, and with most of New Orleans below sea-level, GSA is initiating projects to raise equipment to building levels less vulnerable to flooding.

Ronald Vallort, President, Ron Vallort and Associates, Ltd., and Past President, ASHRAE, addressed the workshop on Energy Planning for Tomorrow, while Building for Today. His presentation traced the history of human reliance on energy and technology. This has led to climate changes that require immediate attention. After Katrina, all the agencies served by GSA were operational within 8 weeks. The biggest challenge was mold, and GSA utilized the opportunity to improve energy efficiency of facilities. He further stressed the need for being pro-active and inter-active among disciplines in order to meet the challenges of energy conservation and environmental protection in every aspect of building design and construction.

The keynote address by Commissioner David Winstead focused on preparing for future events such as hurricanes as a means to minimize potential damage. He congratulated Regions 4 and 7 for having mobilization plans in place and suggested all regions should follow their example. Each region should have a mobilization checklist. Existing buildings should be assessed to determine weaknesses and vulnerabilities and plans developed to better protect them and minimize potential damage in our era of erratic weather patterns. Further, selecting professional architects and engineers who are familiar with local climatic conditions, and are registered locally, can contribute to ensuring the best results in design and construction.

Assistant Commissioner Robert Fraga gave an overview of changes, restructuring and future directions for the Office of the Chief Architect. He emphasized the importance of working together with other Offices in design and construction for better functionality and efficiency.

William Holley, Chief Engineer, Office of the Chief Architect, presented his Vision for Engineering. He stressed the need to involve engineers early in the design and construction phase to achieve integrated design.

Patrick Fee, Director, Building Operations and Maintenance, directed his remarks to Better Planning for Better Customer Satisfaction. He spoke of the PBS definition of Value engineering: An organized effort directed at analyzing the functions of systems,

Stan Hall, Region 4 Commissioning Officer, and Region 4 HVAC Advocate Greg Medert gave a close-up visual and narrative account of hurricane damage, mitigation, assessment and future planning in southern Mississippi. The survival and revival of the Gulfport Federal Courthouse and other Federal buildings demonstrated positive aspects in construction and design as well as areas where attention should be given in preparing for possible future events.

Alberto Sanchez, A. J. Sanchez Consulting Engineers, Inc., shared his valuable experience in building pressurization, 24/7 operations and mold control. His involvement in and knowledge gained from a mold case study at the US Courthouse, West Palm Beach, FL, provided insight into combating such challenges as mold. In this case, he cautioned against overdesign of HVAC systems, operations and maintenance issues and the need to keep building under positive pressure.

Harvey Brickman, retired Senior Vice President, Tishman Realty & Construction, delivered somber and enlightening remarks that compared Katrina to 9/11. He stressed how vulnerable our mechanical and electrical systems are in such major events as well as the need for risk assessment before disaster strikes. Life safety systems and building codes must be responsive to protect human life and critical equipment systems. They must respond to the possibilities of flooding and high winds, especially in the Southeast.

Mike Sullivan, Region 3 HVAC Advocate, reported on Energy Savings Techniques & Results in Federal Buildings. He emphasized the need for a team approach to include engineer, controls contractor, testing and balance firm, operations and maintenance, and facility manager to meet new energy conservation requirements.

From the private sector and also directly involved in mitigating the effects of Katrina, risk reduction and planning for the future was a three-member team from URS Corporation: John Hart, Lead Project Manager; Ashok Maheswari, Vice President, Electrical Engineering; and Dilip Parikh, Lead Mechanical Engineer. Their experience stressed the need for Assessing vulnerability of buildings and its systems, corrective solutions and preparedness for future events. Emphasis was given to the need for the design team to have professional registration in the state where a project is located.

Kurt Knight, Chief Engineer, Veterans Administration, addressed the role of the VA in communities and areas when disaster strikes. He emphasized that the VA becomes involved in assisting the whole community at such times. After extensive assessment of its facilities, especially in areas subject to wind and water damage, the VA has developed comprehensive preparedness plans. His colleague, Phil Boogaerts, Chief Engineer, VA Medical Center, New Orleans, gave a personal account of the extreme situation

he and his facility faced in the wake of Katrina. From having to take in entire families of VA workers to the frustrating lack of support from federal relief agencies, they persevered and protected the facility and its occupants.

William Holley also gave an update on the Facilities Standards for the Public Buildings Service, PBS P-100. A 2007 edition will soon be published. Vijay Gupta gave a broad overview of changes and additions to Chapter 5, Mechanical Engineering.

James E. Woods, Ph.D., P.E., Executive Director, The Building Diagnostics Research Institute, brought attention again to energy conservation as he compared government and private sector energy use data. He spoke of the Federal Energy Policy Act, Executive Order 13423, and brought into focus the fundamentals of building design, construction and functionality. Further, that energy use over the last 25-30 years is not shown by evidence to have decreased when measured in energy consumption per gross square foot. Energy use is approximately 40% higher than energy targets that have been set for this same period. The new Executive Order now requires real savings be achieved annually at a rate of 3% per year through the year 2015. Preliminary data were shown to indicate that GSA is now on track to meet this goal.

Mark Levi, Region 9 HVAC Advocate addressed problems in his region such as energy performance in new buildings being systemically worse than in older buildings. He proposed solutions that included commissioning, better integrated design efforts and documentation.

A panel of Region 7 PBS first responders recalled how the PBS team responded to and assisted in the recovery from Hurricane Katrina. This team gave a remarkable accounting of their efforts following Katrina. Even with shortages of food, water and housing, and even contractors, they were able to open the Hale Boggs Federal Building and District Court two months ahead of schedule and it served as a beacon of re-establishment.

On the final afternoon of the Workshop, participants were invited to join site visits to either the U.S. Customs House, New Orleans, or the US Courthouse, Gulfport, MS. Both facilities were severely impacted by Hurricane Katrina.

Lessons Learned:

- ? The design team A/E must be familiar with local conditions and be registered in the state where the project is located.
- ? The PBS criteria must be enhanced and enforced to address such issues as the flood plain and hurricane force winds.
- ? Do not install chillers, boilers, emergency generators, pumps and electrical switch gear in the 100-year flood plain.
- ? Seize the opportunity. Recovery from Hurricane Katrina involved enormous challenges to get functional again the mechanical and electrical systems of many buildings.. In many cases, extra efforts were exerted to improve systems so that when they were up and running again they were more reliable and functional..
- ? Better energy efficiency can be achieved by designing a supplemental system to meet overtime utility requirements. This will avoid the high cost of overtime operations to the customer and reduce wear and tear on the primary system.
- ? To improve energy management in buildings, at the design phase methods of calculations must accurately reflect expected energy use at the time of building delivery.
- ? **Preparedness for natural disasters and other events: Develop your own facility mitigation plan.**
 - Organize resources:
 - Assemble a team and appoint a leader
 - Gather relevant data
 - Develop and stick to a schedule
 - Assess potential hazards and associated risks
 - Prioritize actions to reduce risk
 - Understand your needs

- Protect mission critical assets
 - Evaluate the costs vs. benefits
 - Be realistic – match your capabilities
 - Adopt the plan and make it a living document
 - Assign responsibility for implementation
 - Dedicate resources to accomplish the actions
 - Review your progress
 - Regularly update the plan
- ? For high risk areas, have in place infrastructure needs before an event:
- Emergency power availability and capability
 - Storage tanks for 4 days – potable water, industrial water, fire safety and sewage
 - Louvers for air handler – watertight design/barriers
 - Accurate readings of elevations for 100-year flood plain and building floor levels
 - Roof mounted equipment such as exhaust fans, cooling towers, etc. must be secure
 - to the structure.
 - Minimize locating equipment on the roof
 - Maintain exterior envelop to resist water penetration
 - Improve window resistance to debris impact
 - Trained staff
- ? From the 24/7 operations and mold case study of the US Courthouse, West Palm Beach, FL, lessons learned include:
- Design:
 - Do not overdesign HVAC Systems as it can result in poor humidity control,

increased energy use, and increased first cost and maintenance cost.

- Carefully select cooling / dehumidification coils
sensible / latent loads
 - Pre-treat outside air
 - Consolidate relief/exhaust systems to take advantage of energy possibilities
 - Design for building positive pressure
 - Monitor occupancy, temperature and humidity throughout
 - Reset AHU leaving air temperature to prevent overcooling
- reclaim
- Operations / maintenance:
 - 24/7 Operations (EX: Federal Marshal's Offices) – Monitor systems for positive pressure, temperature and humidity
 - Keep building under positive pressure
 - Do not allow toilet exhaust fans to operate 24/7 (They should only during occupied hours)
 - Check operation of outside air dampers. Check for corrosion
 - Energy recovery systems. Monitor filters and replace often
 - Know your building, every building is different, every mechanical system is different
- operate

