HDR ARCHITECTURE, INC.
COMMISSIONING GROUP

PROPOSED COMMISSIONING & FACILITY MANAGEMENT SERVICES FOR APPLE INC.

FEBRUARY, 2018

ABOUT HDR

HDR

- Established 1917
- Employee-Owned
- 200+ Offices Worldwide
- 10,000 Employees
- Markets
  - Healthcare
  - Civic
  - Science & Technology
  - Higher Education
  - Federal
  - Community

HDR was founded in 1917 in Omaha, Nebraska. We have grown to 10,000 employees located in more than 200 offices throughout the United States and abroad with clients and projects located world-wide. HDR is a full-service architectural, engineering, facility services, planning, and consulting firm. HDR is considered an industry leader and ranks as one of the best Architecture & Engineering companies in the world. HDR continues to focus on our clients with the desire to have "Clients for Life" and emphasizes doing what is right for the client.

HDR COMMISSIONING GROUP

HDR's Commissioning & Facility Services Group has been providing commissioning services since 2001 with dedicated staff focused on commissioning efforts alone. Our commissioning group consists of certified personnel in mechanical/electrical engineering, energy engineering, whole building commissioning, flow validation, building automation controls, plant engineering, and LEED. The expertise contained within the HDR Commissioning Group was assembled to provide the best value to our clients with the ability to perform root-cause analysis on any issue discovered during the commissioning of any facility.

HDR has commissioned over 20 million square feet of complex building systems to run at maximum efficiency. HDR's commitment to the commissioning process is reinforced by our certification as a Certified Commissioning Firm. This requires a training program for each of our staff.

HDR maintains commissioning and commissioning related certifications through various agencies and associations.

COMMISSIONING APPROACH

HDR recognizes each building has a unique schedule, make-up and requirements that must be met for a successful project. We believe a tailored "solutions-based" approach is the most appropriate method to achieve a successful project.

HDR enters into each project with the emphasis on an integrated approach to commissioning and understands that to perform commissioning services you must actively participate in the project. HDR strives to develop high quality working relationships with the owner's representatives, designers, and contractors on each project. We have found that the success of these relationships directly affects the success of a project.

We understand that commissioning is not only a validation of system installation, operation and performance, it is a form of Quality Assurance and Quality Control. We believe that success is not an option and we stay with every project until the documentation and training is complete.

HDR COMMISSIONED PROJECTS

Washington State University PACCAR Environmental Technology Building:
96,000 sq/ft • $53M
Completed in 2015
Jeff Lannigan: 509-335-7221

HDR provided LEED Enhanced Commissioning of the PACCAR Environmental Technology Building located on the Washington State University campus in Pullman, Washington. The facility provides over 96,000 square feet of new state-of-the-art research space and includes laboratories for environmental engineering, sustainable and renewable materials, atmospheric research, and support spaces requiring tightly controlled environments, and structural testing capabilities.

The PACCAR Environmental Technology Building achieved LEED Gold certification from the U.S. Green Building Council. HDR's Commissioning & Facility Services Group was contracted to provide commissioning services throughout design, construction, acceptance, and warranty phases.

University of Southern California Jill and Frank Fertitta Hall:
102,000 sq/ft • $46M
Completed in 2017
Hunter Gains: 213.744.0300

HDR provided all phases of commissioning services for the Fertitta Hall project which houses the Marshall School of Business. Considerable effort was spent during the design phase to bring the entire project team together into a unified commissioning group. The owner, contractor, controls contractor, and A/E team – along with HDR – worked to develop commissioning criteria that were measurable and obtainable.

Commissioning through the construction process was completed on a tight time schedule. Working as a team, functional tests were performed early in the construction process as possible, so the commissioning documentation could be completed and the report could be generated immediately following completion.

USACE USStratcom COMMAND & CONTROL facility:
912,000 sq/ft • $524M
Complete in 2018
Vince Turner: 402.995.2781
vincent.c.turner@usace.army.mil

HDR is providing full service A/E design and commissioning services for this 62-acre secure Department of Defense Command and Control Headquarters.

The facility meets ATFP requirements, follows IBC code, and is designed to LEED Gold certification level.

The HVAC Systems for the STRATCOM facility provide efficient highly reliable ventilation, cooling and heating for the mission critical and mission support functions in the building, including assembly space, office space, and data centers.

The project is being successfully delivered and exceeding client's expectations by assembling the best technical qualified team from HDR multiple offices using HDR's motto "National experts with local presence".

HDR VALUE DURING DESIGN & CONSTRUCTION

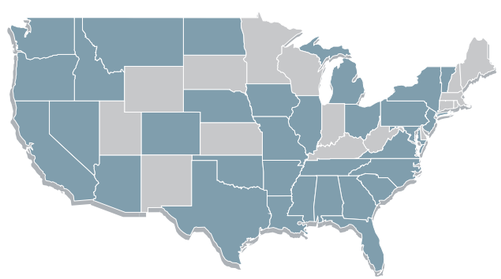
1. Utilization of independent data loggers to verify instrumentation.
2. Document final set points and associated sensor readings for inclusion in systems manual.
3. Incorporate system one-line diagrams for each commissioned component.
4. Incorporate photos with each issue identified.
5. Provide web-based commissioning, which scales to mobile devices in field.
6. Distinguish analytics from alarming and implement both to better operate facility.
7. Provide a teammate on each project for review, perspective, and backup.
8. Review energy model in design and track performance of building during warranty.
9. Utilizing intensive pre-testing during equipment start-up to minimize functional testing issues, and delayed resolution.
10. Develop control system specification requirements to require specifically tailored graphics outlining system operations and global performance data to be used during validation testing.
11. Identify and resolve potential equipment access issues early on to set precedent, minimizing rework and schedule delays.
12. Focus on maintainability to optimize O&M activities for facility staff.

HDR INNOVATION

HDR is continually looking to update our commissioning process and exceed the expectations of our customers. We continually look towards technology as an avenue for improved communication and associated transfer of knowledge from staff to staff or staff to customer. We encourage our commissioning agents to work toward improvements of our process or deliverables, through actual work place applications in a parallel process.

Presently we are:

1. Utilizing a facility management software package to gather CMMS data during the Cx process, which can be used for service in the future.
2. Utilizing software to link equipment specific information and locations on drawings, allows for issue identification and resolution more quickly.
3. Development of an asset management tool that combines CMMS data, Cx data, and one-line diagrams for each piece of equipment on a single form, which is usable in the field on a mobile device.
4. Streamlining traditional installation checklists to gather essential field data through Bar Coding; while encouraging construction team members to utilize this process.



• *States with HDR Commissioned Projects*
Additional Locations: Alaska, Hawaii, Puerto Rico

TURN OVER

PROPOSED TEAM MEMBERS

Walter Salazar, CxA
Senior Commissioning Agent

Walter is certified as a Commissioning Authority with 7 years of hands-on field experience with controls and 12 years commissioning project management experience. He is skilled in Building Automation Controls and proficient troubleshooting mechanical and electrical system problems quickly and efficiently. Walter has a wide range of experience in developing and executing commissioning requirements including pre-functional checklists, functional testing procedures and commissioning plans for education, healthcare, data centers, bio-research facilities and governmental and municipal facilities. As an operations manager, Walter has supervised and directed project managers to ensure meeting project goals, project contractual obligations and scope of work from design phase, construction, and acceptance to warranty phase.

EDUCATION
Bachelor of Science, Electrical Engineering, CA State University Los Angeles, 1999

REGISTRATIONS
Certified Commissioning Agent (CxA), ACG, No. 408-301

Certified CA Lighting Controls Acceptance Test Technician, California Advanced Lighting Controls Training Program No. TC-A813884

HDR TENURE
5 years

OFFICE LOCATION
Los Angeles, CA

Steven Leight, PE, CxA, EMP
Director of Commissioning and Facility Services

Steve has 27 years of experience in analysis of energy efficiency and problem solving in existing buildings, as well as quality assurance/commissioning experience in new construction. In existing buildings, this experience includes performance of detailed energy analysis using energy simulation software, development of long-term energy master plans for large, multiple-facility organizations, and development and construction management of large-scale energy efficiency improvement projects. Steve has used his experience in existing buildings to provide quality assurance and commissioning for new construction projects including hospitals, casinos, civic buildings, and educational facilities.

EDUCATION
Bachelor of Science, Engineering Mechanics, University of WI Madison, 1991

REGISTRATIONS
AEE Certified Energy Management Professional (EMP), Energy Management Association, No. 412-E05

Certified Commissioning Authority (CxA), ACG, No. 406-128

HDR TENURE
7 years

OFFICE LOCATION
Phoenix, AZ

Al Jagentenfl, PE, CCP
Senior Commissioning Agent

Al has 21 years of experience in commissioning services, mechanical engineering and automation controls design that spans across the healthcare, science & technology, higher education, federal, and civic sectors. He adds value to every commissioning project by capitalizing on his background in the design of complex building systems. Al excels at troubleshooting and identifying solutions to resolve deficiencies. He routinely utilizes root cause analysis and communicates back to the project team to quickly remedy an issue. Al provides detailed and clear communications on all his projects, and integrates well with both the design and construction teams.

EDUCATION
Bachelor of Science, Mechanical Engineering, State University of NY at Buffalo, 1996

REGISTRATIONS
Certified Commissioning Professional (CCP), Building Commissioning Association 07.30.2018

Professional Engineer, Mechanical, Washington, No. 47281 04.14.2019

HDR TENURE
20 years

OFFICE LOCATION
Portland, OR

NOTES:

HDR ARCHITECTURE, INC.
COMMISSIONING GROUP