

**HAROLD D. CULLICK, PE
PROJECT MANAGER/ENGINEER
CONSTRUCTION MANAGEMENT**

**REGISTERED MECHANICAL ENGINEER
LEED ACCREDITED PROFESSIONAL**

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PROFESSIONAL REGISTRATIONS

Registered Professional Engineer - Arizona, California, Colorado, Louisiana, and Oregon.
NCEES Certification (National Council of Examiners for Engineers and Surveyors)

Licensed HVAC Contractor in California
Previously a Certified Mechanical Contractor – Florida

Licensed in Real Estate Sales in Arizona

LEED Accredited Professional in the USGBC (US Green Building Council)

EDUCATION

2003 **Concord Law School:** Completed 1st year Courses in Contracts, Torts, and
Criminal Law
1977 – 1980 **Colorado State University,** Fort Collins, Colorado. MBA Courses in
Accounting, Marketing, Economics and Finance.
1973 - 1975 **University of Alberta,** Edmonton, Alberta, Canada. BSME with Distinction,
May 1975.
1970 - 1972 **University of Oklahoma,** Norman, Oklahoma. Course work in the College of
Arts and Sciences and the College of Engineering.

SUMMARY of EXPERIENCE:

Over Thirty years in Project Management and Design in many areas of the manufacturing facility and construction industry. Experience in Project and Design Management for high tech manufacturing facilities, including Mechanical & HVAC process utilities and waste treatment systems, Mechanical Engineering system design, Procurement, Design/Build and Construction Management. During the past 13 years, specialized in Project Management and Engineering for Semiconductor Fabrication Projects with extensive process piping and gas systems, Manufacturing Support Buildings (Lab, Office Buildings, Data Centers) and Assembly/Test Facilities. Foreign experience includes projects in Ireland, Malaysia, Philippines, India, Taiwan, Israel and Canada. Technical and managerial experience includes Project Management, Design/Build projects, scheduling, estimating, and Quality and Safety management. Procure, Negotiate and Manage contracts with A/E's, Contractors, CM's and GC's to deliver projects in the in the \$10 to \$150M range.

1994-2008 INTEL CORPORATION-List of Recent Projects

Design Manager Rio Rancho, NM. Leading feasibility studies for Data Center expansions in old Fab space. Projects include extensive mechanical system design for high reliability, free cooling, energy conservation and UPS and Generator systems.

Commissioning Manager: Managed Base Build Commissioning for Fab Manufacturing and Support Buildings for a \$1.2 Billion project in Kiryat Gat, Israel. Coordinated the CM and the sustaining engineers efforts to startup, test and commission all systems, document and track punch list items, and safely operate facilities to support high volume manufacturing.

Project Manager Ocotillo, AZ. Fab 32 Construction: Managed construction and startup for the central utilities and waste treatment systems, approximately \$120M in construction cost. Utility systems supported new manufacturing facility, total base build cost of \$900M.

Design Manager:

Fab11 Gownroom Addition in Rio Rancho, NM to increase manufacturing capacity in the factory. \$20M Project.

Intel Mask Operations Expansion in Santa Clara, CA for new process equipment facility to accommodate new E Beam equipment. \$60M Project.

Fab 24 Phase 2 in Leixlip, Ireland \$250M Project

Project Design Manager for Wafer Fabrication Facility design including basebuild for the fab, central utility plant, office and lab buildings. Overall base build project in excess of \$750M construction value. Managed design contract of \$30M.

Project Manager:

Total delivery responsibility for Manufacturing Support/Office Building in Ocotillo, AZ Campus. A 340,000 Sq Ft Four Story Building (\$58MM Budget) including Computer/Automation Support areas, Cafeteria, Docks, etc. Responsibility from project inception for contracting A/E and CM services, leading and managing project from programming/design thru turnover phases. Project completed in an aggressive schedule (fastest General Purpose Building at Intel) and within budget.

Supported Project Management functions for a \$150MM Fabrication Facility base build fitup in Hudson, MA. Handled Owner Contractual negotiations and change order management.

Project Manager for Assembly/Test Facilities: PG8, Penang, Malaysia

A 200,000 Sq Ft. Two Story Facility including 750-car carpark. Responsibilities included overall PM responsibilities for Schedule, Budget, Quality and Safety Management. Project budgeted at \$45M US. Cost Savings and Currency fluctuations resulted in >\$10M underrun, lowest cost A/T facility at Intel. Relocated to Penang for 2 years for this project.

Project Manager for Standby/Emergency generator plant design, construction and installation in Cavite, Philippines to support assembly/test production facilities with additional 3MVA of 33KV power.

Cost Reduction Task Force Manager - CV1 in Cavite, Philippines

Task forced for 4 months in the Philippines to reduce cost of Assembly/Test Facility design from \$145/sq ft to \$110/sq ft (\$35M US cost reduction). Reduced scope and cost of all areas and disciplines of the project scope to reach goal.

Senior Project Engineer - D1B Development Fab in Hillsboro, OR

Responsible for Estimating and Project Engineering support for Greenfield Fab project. Areas of responsibility included the management of the \$20M site improvement budget, the estimating and budget establishment of \$40M of Mechanical Contract work, managing the contractors for Mechanical work for facilitating for equipment installation. Site work included grading, roads, and site utilities.

1990 - 1993

CRS SIRRINE ENGINEERS, (Now Jacobs Eng) PORTLAND, OREGON:

Mechanical Department Manager/Design Manager

Representative Projects:

United Microelectronics Corporation, Hsin Tsu, Taiwan. Responsible for Mechanical and process systems programming and conceptual design for a new 50,000 sq. foot Class 1 ASICS wafer fabrication facility.

Intel Corporation, Chandler, Arizona. Responsible for management of design and coordination of construction management activities for the expansion of the C4 assembly/test facilities. Project includes a \$10MM fast-track expansion of all support utilities, and major HVAC and electrical power system expansion for additional 30,000 SF of Class 10,000 and 100,000 areas. Responsibilities include managing field office and construction management staff. Production was maintained in adjacent assembly/test area during expansion.

Intel Corporation, Aloha, Oregon: Complete retrofit of Wafer Fab 5, design of expansion for energy center, converting development fab area into full production fab for 486 product. Responsible for all design, design team management and coordination for \$30MM cleanroom expansion, central plant expansion, process support systems, and major facility utility upgrades. Facilities and process support systems upgrades included RO/DI, PCW and bulk gas delivery. Provided mechanical design services for ongoing and varied project work for facilities and process related upgrades and tool installations.

Semiconductor Complex Ltd., Hyderabad, India: Integrated pilot production facility. Responsible for schematic design development of B-2 and H-6 occupancies for gallium arsenide wafer fabrication grassroots 90,000 SF facility with 10,000 SF Class 10/100 cleanrooms.

United Technologies-Hamilton Standard, Colorado Springs, Colorado: Responsible for mechanical design for a 100,000 SF printed wiring board assembly manufacturing facility including HVAC, plumbing and fire protection plans and specifications for chilled and process cooling water generation, hot water boiler plant, compressed air supply, VAV air handling system, DDC control and energy management systems, and air permitting.

1988 - 1990 **ENVIRONMENTAL AIR SYSTEMS, GREENSBORO, NC:** Mechanical Contractor--Engineering/Project Manager for Design/Build Projects.

AT&T Eagle Project, Greensboro, North Carolina: Responsible for complete mechanical design/construction for the fast track contract for the 100,000 SF facility. Project included chiller plant, steam boiler, compressed air and hot water systems, and all air side HVAC control systems to support two 10,000 square feet class 10,000 cleanrooms and ancillary support facilities.

Loch Pharmaceuticals, Clayton, North Carolina: Responsible for the design and construction of the fit-up phase work for a 100,000 SF large volume parenteral pharmaceutical manufacturing facility. Design included WFI, clean steam, nitrogen, clean dry air and plant air utility systems, central chilled water, hot water and plant steam central plant systems. The HVAC design incorporated Class 100, 1000 and 10,000 areas for syringe and vial filling, component washing and preparation, sterilization and gowning.

1987 - 1988 **CRS SIRRINE ENGINEERS, GREENVILLE, SC:** Mechanical Project Engineer.

Digital Equipment Corporation, Greenville, South Carolina: Project Engineer for new Research and Development Center Cleanroom for printed wiring board manufacturing. Performed programming, design and specifications for the state-of-the-art 5,000 SF Class 100 and Class 1000 Cleanroom areas. Cleanroom certified at Class 10 at rest. Project responsibilities included the design coordination of all engineering disciplines as well as the design and specification of the HVAC, HVAC Controls and piping systems for the Cleanroom. The design included $\pm 1/2^{\circ}\text{F}$ and $\pm 1\% \text{RH}$ control tolerances utilizing single loop electronic analog controllers.

Field responsibilities at Digital included all contractor, subcontractor, equipment manufacturer and engineering coordination for the Cleanroom construction.

1984 - 1987 **STEARNS CATALYTIC CORPORATION:** **Winston Salem, North Carolina and Denver, Colorado:** Mechanical Engineer with responsibility for full project mechanical requirements including all aspects of HVAC design and coordination of plumbing and process piping requirements for pharmaceutical manufacturing and microelectronics manufacturing.

Organon Teknica Durham, North Carolina: Project design work included the design of "grass roots" facilities for pharmaceutical manufacturing, and research consisting of a Central Energy Center (chilled water, heating water and steam plants); Warehouse building; Manufacturing building including tissue culture, sterile fill, and packaging areas (70,000 SF); Cafeteria building; Research and Development building (30,000 SF) and an Administration building (45,000 SF). Design included an energy conserving water-side free cooling economizer system, desiccant dehumidification systems, exhaust air heat recovery, DDC HVAC controls and a central Energy Management/Building Automation System.

- 1983 - 1984 **BHCD ENGINEERS: Denver, Colorado. Atlantic Richfield Company Denver, CO.** Project Manager for the Paleontology Laboratories project. Responsible for overall project design team and client coordination including architectural, structural, mechanical and electrical disciplines for the production of Contract documents for five laboratories plus office and warehouse space. Designed the HVAC systems including scrubbed fume hood exhaust, DDC temperature and room pressure control systems, heating water plant, and chilled water plant.
- 1982 - 1983 **RMH GROUP: Denver, Colorado. Hewlett Packard Company, Loveland, Colorado.** Project Engineer for the Integrated Circuit Cleanroom remodel. Responsible for mechanical and electrical design coordination for the remodel and expansion of a 10,000 SF, Class 100 and Class 1000 wafer fab. Designed new HVAC systems including the temperature, humidity and room pressure control systems. Design included new utility pipe-racks, fume exhaust headers, a new Class 100 wafer stepper area and a new Class 10,000 diffusion furnace area. Project included a new facility for storage and supply of flammable and toxic gases for the diffusion furnaces.
- 1980 - 1982 **PRACTICON ASSOCIATES: Denver, Colorado. Hewlett Packard Company, Fort Collins, Colorado.** Project Engineer for the Fab II project with responsibility for project design, specifications and construction administration for HVAC and process cooling water systems. Project designs included heating, chilled water, chilled glycol and condenser water systems: VAV and high pressure air systems, and pneumatic control systems for a 10,000 SF integrated circuit fabrication facility Class 10, 100 and 10,000 cleanrooms, processing areas, offices, computer rooms, mechanical rooms and a boiler building. Wafer Stepper area designed for full 100% coverage, vertical laminar flow, Class 10.
- 1977 - 1980 **STEARNS-ROGER ENGINEERING CORPORATION: Denver, Colorado.** Petroleum and Petrochemical Division, Machinery engineer specializing in HVAC, pressurization and plumbing system design and specification work for control rooms, motor control centers, office building, process building, etc. Machinery responsibilities included the specification, bid tabulation and purchasing of various rotating equipment requirements for process plant services.
- 1975 - 1977 **JOHN GUTH ASSOCIATES, SHREVEPORT, LOUISIANA:** Design engineer working on commercial and institutional projects performing HVAC, mechanical systems, computerized life cycle cost studies, and fire sprinkler system design.

ASSOCIATIONS

- American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
- National Counsel of Examiners for Engineering and Surveying (NCEES)
- National Society of Professional Engineers (NSPE)
- Association of Facility Engineers (AFE)
- Construction Industry Institute (CII)
- American Society of Plumbing Engineers (ASPE)