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CURICULUM VITAE

May 6, 2014 edition

NAME:

CHRISTOPHER BARROW SHIVER

PROFESSIONAL REGISTRATION:

Registered Professional Engineer, State of Georgia Number 16312
Registered Professional Engineer, State of Alabama Number 23718
Registered Professional Engineer, State of North Carolina Number 026064
Registered Professional Engineer, State of Florida Number 55966
Registered Professional Engineer, State of Texas Number 87133
Registered Professional Engineer, State of South Carolina Number 20751
Registered Professional Engineer, State of Tennessee Number 108827
Registered Professional Engineer, State of Arkansas Number 13577
Registered Professional Engineer, State of Mississippi Number 19855 LTD
National Council of Examiners for Engineering and Surveying Record Number 47326

EDUCATION:

Georgia Institute of Technology, Bachelor of Mechanical Engineering, 1981

EXPERIENCE:

Chris Shiver, PE, (originally Chris Shiver, PE, LLC) Roswell, Georgia, (4/2010 to present)

President and Principal Engineer, 2010-present.

Diverse mechanical/electrical/structural engineering and testing responsibilities relative to failure investigations, safety, design, and products and materials testing. Investigation experience includes fire and explosion losses, construction and industrial accidents, electrical and mechanical system failures, and machine and site safety.

Cerny & Ivey Engineers, Inc., Norcross, Georgia, (7/1988 to 4/2010)

Vice President and Principal Engineer, 2000-2010. Responsible charge for management of Professional Engineering and Technical Staff. Diverse mechanical/electrical/structural engineering and testing responsibilities relative to failure investigations, safety, design, and products and materials testing. Investigation experience (over 900 separate evaluations) includes fire and explosion losses, construction and industrial accidents, electrical and mechanical system failures, and machine and site safety. Supervised and completed required reports on over 200 mechanical/structural manufactured building component design and/or certification tests. Reviewed over 1000 evaluations and reports prepared by other professional engineers and technical employees. Involved in several mechanical, electrical and civil design projects including as lead engineer.

Senior Staff Engineer, 1988-2000. Diverse mechanical/electrical/structural engineering and testing responsibilities relative to failure investigations, safety, design, and products and materials testing. Investigation experience (over 1500 separate evaluations) includes fire and explosion losses, construction and industrial accidents, electrical and mechanical system failures, and machine safety. Involved in several mechanical, electrical and civil design projects including as lead engineer.

Georgia Power Company, Safety and Licensing (1982 - 1988)

Safety Review Board Support Engineer, 1986-1988. Involved in engineering review of numerous events and deficiencies at operating plants and construction sites including flooding events, valve failures, reactor transients, HVAC inadequacies, service water reliability, refueling canal seal leak, electrical hazards, piping system water hammers, fire protection system failures, construction accidents, fires/explosions, crane safety, personnel training, and other issues. Daily interface with site Operations, Maintenance, Engineering, Chemistry, Compliance, and Management personnel. Responsible for safety review of operating plant design and change proposals. Reported on analysis of safety issues and results of incident investigations directly to senior corporate management on a regular basis.

Project Engineer, 1982-1986. Coordinated and provided engineering support for many projects including environmental and seismic qualification of all plant equipment, reactor core structural modifications, containment personnel airlock redesign, diagnostic testing of Safety/Relief valves and Main Steam Isolation Valves, analog control system installation, containment purge and vent system analysis and redesign, reconfiguration of control rod positioning logic, boiler slagging analysis at all fossil plants, and other efforts.

Georgia Power Company, Plant A.W. Vogtle, Operations, (1981 - 1982)

Systems Engineer, 1981-1982. Had primary responsibility for BOP-HVAC, and Auxiliary Steam Systems. Wrote specifications for Turbine Building electrical redesign. Coordinated initial contract work on Effluent Monitoring/Post-Accident Sampling System. Participated in Main Control Panel layout modifications. Provided initial write-up for portions of the Final Safety Analysis Report.

ADDITIONAL TRAINING:

Provided by/through Georgia Power Company:

- Engineering Department Power Plant Design and Operations course (22 weeks classroom, 6 weeks control room simulators)
- Power Plant Maintenance and Troubleshooting (2 weeks)
- Designing Electrical Systems (1 week)
- Environmental Testing of Industrial Equipment, by EPRI (1 week)
- Safety and Risk (Fault Tree/MORT) Analysis, by EG&G (1 week)
- Nuclear Plant Transient Evaluation, by ANS (3 days)
- Industrial Fire/Explosion Investigation (3 days)
- Nuclear Site Radiological and Safety Training (3 days)
- Use of various software packages (several 1-day courses)
- Presentation skills (3 days)
- Electrical Equipment Applications (2 days)
- National Electrical Code Review (2 days)
- HVAC Design (1 day)

ADDITIONAL TRAINING continued:

Provided by other organizations:

- Fire Cause and Origin Investigation, by Georgia Fire Marshall/GFIA (5 days)
- Crane Safety, by Georgia Tech/Construction Safety Association of Ontario (1 day)
- Fall Protection, by Georgia Tech (1/2 day)
- Short Circuit and Overcurrent Protection Analysis, by Technical Seminars Group (1 day)
- Grounding, Shielding and Surge Protection, by ACS (1 day)
- Accident Prevention and OSHA Compliance, by AMA (1 day)
- Electromagnetic Interference/Compatibility (EMI/EMC), by I&CS (1 day)
- Machinery Lockout/Tagout Programs, by Southern Tech (1 day)
- Scaffolding Safety, by Georgia Tech (1 day)
- Industrial Electrical Equipment Applications, by IEEE/IAS (3 days)
- Fire Cause and Origin Investigation, by GFIA (6 days)
- Mobile Crane Safety, by CICB (2 days)
- CO and Combustion Analysis and Safety, by Bacharach (1 day)
- Vehicle Fire Investigations by GFIA/GA Fire Commissioner (1/2 day)
- Electrical Fire Investigation by GFIA/SEA/GA Fire Commissioner (1/2 day)
- Plumbing Vents and Venting, by ASPE (1/2 day)
- Underground Tanks, by ASPE (1/2 day)
- Electrical, Electronic and Computerized Controls, by Iowa State University, (8 days)
- Fire Protection Systems Design, by Southern Tech (1 day)
- Failure analysis, by ASME (1/2 day)
- Fire Scene Investigation & Computer Modeling, by GFIA/GA Fire Commis./NIST (1/2 day)
- Intrinsic Safety, by MTL (1/2 day)
- Fire Sprinklers – New Codes & Technology, by ASPE (1/2 day)
- Construction Site Health & Safety, by Georgia Tech/OSHA (1 day)
- Fire Origin & Cause Investigation & Techniques, by GFIA/GA Fire Commissioner (1 day)

ADDITIONAL TRAINING continued:

Provided by other organizations (continued):

- Gas Appliance Venting, by ASPE (1/2 day)
- Smoke Management in Building Fires/Restaurant Vent Hood, by ASHRAE (1/2 day)
- Cooling and Heating Load Calculation Principles, by ASHRAE (1 day)
- Electrical Fire Investigation by GFIA/EFI (1 day)
- Scientific Method in Fire Investigations by GFIA/ATF/NIST (1 day)
- Vehicle Fire Investigations by GFIA/ATS (1/2 day)
- Grease Interceptor Design & Standards, by Josam (1/2 day)
- Transient Voltage Surge Suppression, by SSI (1/2 day)
- Electrical Protection/NEC Grounding by Red Vector/Clemson Univ. (1 day)
- Electrical Safety/OSHA Regulations by Red Vector/Clemson Univ. (1 day)
- Fire Sprinkler & Standpipe Systems Design, by ASPE (1/2 day)
- Psychrometrics – Practical Applications, by ASHRAE (1/2 day)
- Lightning - Science & Detection, by Vaisala (1/2 day)
- Industrial Explosion Protection for Combustible Dust & Vapor, by Fenwal (1/2 day)
- Computer Fire Modeling in Fire Investigation & Analysis, by HGI (1/2 day)
- Chiller Systems Design Topics, by JM Pleasants Co. (1 day)
- Fire Alarm Systems Design & Installation, by AFAA (2 days)
- GA Codes & Standards & Other Building Issues, by ACEC, GSPE & SAME (1/2 day)
- Machine Safeguarding, by Georgia Tech/OSHA (1 day)
- Pneumatic Conveying – Current Principles, by PCC (1/2 day)
- Plumbing/Piping System Advanced Design Topics, by ASPE (4 days)
- Fundamentals of Troubleshooting Large HVAC Systems, by NRC (2 days)
- Mitigating Fire Risks in Mission Critical Facilities, by APC (1/2 day)
- Grease Interceptor Design & Project Inspections, by ASPE (1/2 day)
- Pump Cavitation & NPSH, by JM Pleasants Co./Bell & Gossett (1/2 day)

ADDITIONAL TRAINING continued:

Provided by other organizations (continued):

- Water Heater Design, Manufacturing & Applications Engineering, by Rheem (1 day)
- Designing for Moisture & Humidity Control in Buildings, by ASHRAE (1/2 day)
- Manufacturing & Specialized Equipment Loss Investigation & Codes, by PLRB (1 day)
- Vehicle Fire Investigation & Subrogation, by NASP (1/2 day)
- Fire Cause and Origin Investigation, by Georgia Fire Marshall/GFIA (3-1/2 days)
- General Industry Health & Safety, by Georgia Tech/OSHA (1 day)
- Water Heating and Commercial Kitchen Design, by ASPE (1/2 day)
- Electrical Power Distribution System Protection, by SEL & Georgia Tech (4 days)
- Plumbing Water Systems Design, by JM Pleasants Co./Bell & Gossett (3 days)
- Adhesive Technology Workshop, by Loctite/Henkel (1/2 day)
- Certified Plumbing Design, by ASPE (1/2 day)
- Plastic Pipe & Fittings, by ASPE (1/2 day)
- Soil, Waste & Vent System Design, by ASPE (1/2 day)
- Firestopping from Specification to Inspection, by Hilti, Georgia Tech & UL (1 day)
- Fire Prevention and Combustible Dust Hazards, by Georgia Tech/OSHA (1/2 day)
- Piping expansion and flex joint design, by JM Pleasants Co & ASHRAE (1/2 day)
- Pump Design, Maintenance and Troubleshooting, by Pumping Systems/Flowserve (1 day)
- Industrial Electrical Equipment Design and Protection, by ABB (1 day)
- Heat Pump Design Principles, by JM Pleasants Co (1/2 day)
- Booster & Lift Pump Systems Design, by JM Pleasants Co. & ASPE (1/2 day)
- Advanced Fire Alarm Systems Design, by Honeywell (1/2 day)
- Electrical Arc Flash Safety – NFPA 70E, by Lewellyn Technology/Westrex (1/2 day)
- Fireplace/Chimney Abnormal Burn Evaluation, by GFIA & ESI (1/2 day)
- Kitchen Fire Investigations, by GFIA (1/2 day)

ADDITIONAL TRAINING continued:

Provided by other organizations (continued):

- Design of Modern MV Protective Relaying, by IEEE-IAS/General Electric (1 day)
- Engineering of Fasteners for Wood Construction, by Infinity LC (1/2 day)
- Portable Ladder Safety, by American Ladder Institute (1/2 day)
- Steam System Design, by Xylem, JM Pleasants and ASHRAE (1 day)
- Plastic Parts Design, by American Plastic Molding Corp. and Dupont (1/2 day)
- Fire Dynamics related to Fire Investigation, GFIA and FIF (1 day)

PRESENTATIONS MADE:

To Georgia Power Personnel:

- Electrical Equipment Qualification
- Accident Prevention Fundamentals
- Preventative Valve Maintenance and Inspection
- Conclusions of Accident Investigation (several different specific accidents)

To Other Organizations:

- Forensic Engineering, to the National Society of Professional Engineers
- Expert Witness Testimony, to the American Board of Trial Advocates
- Forensic Engineering, to GEA, ACEC, GSPE and SAME
- Electrical Fire Causes and Investigation, to Georgia Fire Investigators Association (twice)
- Electrical Fire Causes and Investigation, to the Georgia Fire Academy
- Electrical Fire Causes and Investigation, to the Farm Bureau
- Electrical Fire Causes and Investigation, to the Piedmont Claims Association
- Appliance Fire Causes and Investigation, to the Southern Loss Association
- Advanced Electrical Fire Causes and Investigation, to the Georgia Fire Academy
- Air Conditioning Systems Failure Analysis, to Grange Insurance
- Crane Accident Investigations, to the Crane Inspection Certification Bureau
- Technical Investigations for Insurance Losses, to the Southern Loss Association
- Building Products Design & Certification Testing, to GEA, ACEC, GSPE and SAME
- Pedestrian Egress and Access Systems Design, Safety & Evaluation, to Westfield Insurance
- Investigation of Water Damage, to National Association Subrogation Professionals Georgia
- Codes Related to Fire Protection & Investigation, to Metro Fire Investigator's Association

PRESENTATIONS MADE continued:

- Responsibility of Engineers for Safe Designs, to American Society of Mechanical Engineers
- Investigation of Water Damage, to Insurance Law Institute
- Investigation of Plumbing Failures & Lessons, to American Society of Plumbing Engineers
- Investigation of Water Damage, to National Association Subrogation Professionals Alabama
- Failure Evaluation of Electrical Equipment, to Institute of Electrical & Electronics Engineers
- Commercial/Industrial Electrical Fire Investigation, to Metro Fire Investigators Association
- Commercial/Industrial Electrical Fire Losses, to Southern Loss Association
- Failure Evaluation of Electrical Equipment, to Metro Code Council
- Product Failure Evaluations, to Cincinnati Insurance Co.
- Investigation of Mower Switch Malfunction, to National Academy of Forensic Engineers
- Investigation of Appliances for Arson Fires, to Georgia Fire Investigators Association
- Investigation of Plumbing Failures, to American Society of Plumbing Engineers – Atlanta
- Technical Investigations for Insurance Losses, to Southern Loss Association
- Investigation of HVACR Failures, to American Society of Htg., Refrig. & AC Engineers
- Technical Investigation of Fires Involving Cellulose Insulation, to Southern Loss Association
- Flammable Gas System Fires & Explosions, to Metro Fire Investigators Association
- Flammable Gas System Fires & Explosions, to NW Georgia Fire Investigators Association
- Failure Evaluation of Mechanical Systems, to American Society of Mechanical Engineers
- Causes for Plumbing Failures, to Southern Loss Association
- Design, Installation & Testing of Fuel Gas Regulators, to Georgia Fire Investigators Assoc.

PUBLISHED ARTICLES:

- *Hydraulic Boom Crane Lattice Extension (Jib) Drop During Rigging Due to Specialized Pin Design*, 15th Annual Proceedings, Crane Inspection Certification Bureau, November 1998
- *Mobile Crane Lattice Boom Overtravel and Collapse*, 15th Annual Proceedings, Crane Inspection Certification Bureau, November 1998
- *Investigation of Water Damage Claims*, Subrogator Magazine, National Association of Subrogation Professionals, Winter 2007
- *Preventing Plumbing System Freeze Damage*, Plumbing System & Design, American Society of Plumbing Engineers, May 2008
- *Lessons Learned: Investigation of Plumbing Failures and Causes*, Plumbing System & Design, American Society of Plumbing Engineers, November 2008
- *The Case of the Misguided Plumber – Limited Understanding of Temporary Power Connection at Residential Construction Site Leads to Electrocution*, EC&M (Electrical Design, Construction & Maintenance), March 2009
- *Forensic Engineering Investigation of Lawnmower Seat Switch Malfunction*, Journal of the National Academy of Forensic Engineers, Vol. XXVI, No. 2, December 2009
- *The Case of the Secondary School Fault – Electrical Contractor’s Failure to Verify Integrity of Cable Insulation Results in Arc Flash Event, Injury, and Litigation*, EC&M (Electrical Design, Construction & Maintenance), April 2013

PROFESSIONAL SOCIETY MEMBERSHIPS:

American Society of Mechanical Engineers (ASME)

Institute of Electrical and Electronics Engineers (IEEE)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

American Society of Plumbing Engineers (ASPE)

International Association of Arson Investigators (IAAI)

National Fire Protection Association (NFPA)

Georgia Fire Investigators Association (GFIA)

National Society of Professional Engineers (NSPE)

American Consulting Engineers Council (ACEC) – *past member*

Society of Automotive Engineers (SAE)

Metro Fire Investigators Association (MFIA)

Waste Equipment Technology Association (WASTEC) – *past member*

National Floor Safety Institute (NFSI)

National Academy of Forensic Engineers (NAFE) - Senior Member and Board Certified Diplomate in Forensic Engineering by NAFE, program accredited by the Council of Engineering Specialty Boards (CESB)

PROFESSIONAL SOCIETY COMMITTEE MEMBERSHIPS (current and past):

National Fire Protection Association Technical Committee on Chimneys, Fireplaces, and Venting Systems for Heat Producing Appliances (Standards NFPA 97 & NFPA 211)

National Fire Protection Association Technical Committee on Electrical Equipment of Industrial Machinery (Standard NFPA 79)

Underwriters Laboratories Standards Technical Panels for Grease Exhaust Systems (STP 1046, STP 1889 & STP 1978), which cover Standards UL 710, UL 1046, UL 1889, UL 1978 & UL 2221

American Society of Heating, Refrigerating and Air-Conditioning Engineers Project Committee to create ANSI/ASHRAE/ACCA Standard 180-2008, Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems (project completed August 2008)

Institute of Electrical and Electronics Engineers Industrial and Commercial Power Systems (I&CPS) Energy Systems Committee (ESC)

National Floor Safety Institute Standards Committee on Safety Requirements for Slip, Trip and Fall Prevention (created Standard ANSI B101.1-2009)

American Society of Plumbing Engineers (ASPE) Working Group Number 10 for Domestic Water Pipe Sizing Design Standard

American Society of Sanitary Engineering International (ASSE) Scald Awareness Task Group