

SOLVIFY LLC

Statement of Qualifications

Practical engineering with real results.

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FIRM OVERVIEW

Solvify LLC provides senior mechanical engineering services on demand for fluid, thermal, and mechanical systems; spanning design, analysis, failure investigation, and reliability engineering. Operating under a flexible "Rent an Engineer" model, Solvify delivers PE-stamped, code-compliant work using classical analytical methods with full life-cycle ownership from research through documentation. This structure gives clients senior-level engineering capacity, scalable to multi-disciplinary or infrastructure-scale efforts, without the cost or commitment of a full-time hire. Engagement models include hourly, hour-bank, and retainer arrangements, structured to fit each client's scope, schedule, and budget.

CORE CAPABILITIES

Systems Engineering & Project Integration Management

Applies an interdisciplinary, systems-thinking approach to complex projects, integrating requirements, design, verification, and operational needs across disciplines. For large, infrastructure-scale efforts, structures work around formal project integration, including chartering, integrated planning, coordinated execution, monitoring and control, change control, and formal close-out. Ensures the complete system, not individual components, meets stakeholder needs.

Root Cause Analysis & Failure Investigation

Leads modified 8D root cause investigations of mechanical, fluid, and thermal system failures, identifying probable failure mechanisms and driving corrective design and process changes.

Reliability, Availability & Risk Analysis

Conducts reliability and availability studies of complex systems using Failure Modes and Effects Analysis (FMEA) and Event Tree Analysis, quantifying uptime risk and supporting compliance with industry availability standards.

Fluid, Thermal & Chemical Systems Engineering

Performs first-principles thermal hydraulic and chemical system modeling, flow and pressure drop analysis, and heat exchanger performance evaluation for functional and safety-critical applications.

Combustion & High-Pressure Gas Systems

Supports design, analysis, and certification of combustion equipment and high-pressure gas systems, including LNG, CNG, and propane applications, as well as nuclear and industrial fluid systems. Performs hands-on burner tuning and combustion optimization, adjusting fuel-air ratios and firing rates to improve efficiency, emissions, and operational stability.

Structural & Mechanical Analysis

Performs statics, strength of materials, and load path analysis, including creep and fatigue evaluation, of pressure- and temperature-rated components.

Product Design, Development & Design for Manufacturing (DFM)

Manages product design projects from concept through production, applying design-for-manufacturing principles and coordinating suppliers, testing laboratories, and manufacturing partners.

Codes, Standards & Certification Support

Applies ASME Boiler and Pressure Vessel Code Sections III, VIII, IX, and XIII, ASME B31.1 and B31.3 piping codes, API 650, NFPA 58 and 70, and applicable ASTM standards, supporting UL, ATEX/IECEX, and ISO 9001 certification efforts.

Engineering Documentation & Change Control

Develops and maintains engineering documentation and calculation packages, managing change control records to support configuration management and regulatory traceability.

Cross-Functional Leadership & Team Development

Leads cross-functional and multi-disciplinary teams, coordinating design, sales, purchasing, planning, licensing, and risk functions, while mentoring engineers and developing technical talent.

REPRESENTATIVE PROJECT EXPERIENCE

Systems Engineering Framework Application

Applies systems engineering practices within an established framework on a first-of-a-kind, safety-critical engineering program:

- Develops verification and validation methodology addressing secondary system failures capable of propagating to a primary system
- Performs independent technical review of a safety-related calculation, including an independent verification calculation and feedback on inputs and assumptions
- Applies risk-informed design methods, using failure rate data and a plant-level risk model, identifying a critical design gap that avoids significant downtime and cost impact
- Manages ongoing changes to requirements and design under configuration control
- Serves as subject matter expert on a core technical subsystem, providing input used by the project's senior design authority.

Reliability & Availability

Performs component-level modeling and Event Tree Analysis for fuel gas conditioning systems supporting mission-critical infrastructure, identifying configurations that achieve uptime beyond 99.9% and mapping compliance pathways to industry tier availability standards.

Product Design

Upgrades explosion-proof electrical enclosures by replacing failure-prone mechanical contactors with solid-state relays to improve control system reliability. Derives a custom thermal model to evaluate the effects of sunlight loading on enclosure temperature, supporting design validation. Secures ATEX/IECEx certification for the upgraded design and reduces associated maintenance costs.

Root Cause & Failure Analysis

Leads a formal modified-8D root cause investigation of recurring mechanical seal failures, isolating contributing factors across equipment mounting, piping configuration, and test conditions, and delivering findings that drive design and process changes now in production.

Industrial Dryer Combustion System Retrofit & Commissioning

Resolves a design commissioning gap on a 4MMBTU/hr ultra-low NOx combustion system retrofit for an industrial dryer. Identifies root causes and recommends design modifications including damper settings, combustor flame shield installation, and idle-switch control logic. Witnesses performance testing post-implementation and delivers a comprehensive report with measured values, root cause analysis, and design improvements. System achieves compliance with applicable emissions standards.

Fluid & Thermal System Design

Redesigns a high-pressure gas equipment flow path to improve cold-temperature performance, validating results through extensive testing and thermal hydraulic modeling. Manages associated certification file updates. Conducts thermal scoping studies comparing cooling approaches for equipment operating inside high-temperature, pressurized enclosures. Conducts lessons-learned research across component-level failure history in comparable prior designs.

Advanced Nuclear Fluid Systems

Designs first-of-a-kind sodium-filled fluid systems for an advanced nuclear reactor program, covering research, design, analysis, test oversight, and procurement support. Develops thermal hydraulic and chemical system models later adopted project-wide. Provides test requirements for heat exchanger performance and chemical reaction dynamics programs, using results to validate analytical models

Structural & Mechanical Analysis

Evaluates immediate deflection and long-term creep of bolted, pressure- and temperature-loaded components using creep-rupture, Larson-Miller, and fatigue methods, confirming performance remains within safe limits over repeated cycles.

Systems Trade Studies & Certification

Leads multi-disciplinary trade studies evaluating energy storage alternatives against cost, efficiency, and feasibility criteria, presenting data-driven recommendations to executive stakeholders. Supports efforts to obtain and maintain ISO 9001, or equivalent quality standards such as AS9100, including internal quality auditing and continuous improvement of manufacturing and design processes.

CREDENTIALS & STANDARDS

Professional Engineer (PE), Mechanical, Washington

ASME Boiler and Pressure Vessel Code and piping codes | UL | ATEX/IECEx | ISO 9001 | FMEA methodology

TEAM

Briana Liddell, PE, leads a team that includes two part-time engineers covering combustion, mechanical design, and design for manufacturing, providing added bandwidth for larger or multi-disciplinary scopes. Additional capabilities include drafting (SolidWorks), asset management, and senior-level certified weld inspection.

COMPANY PHILOSOPHY

Solvify exists to make expert mechanical engineering accessible to every business; delivering rigorous analysis, practical solutions, and trusted technical leadership on demand, without the cost or commitment of a full-time hire. Solvify operates as a flexible extension of each client's team, scaling instantly as workloads change and delivering results in days, not months.

Core values guiding every engagement:

- **Technical Excellence.** Licensed expertise, code compliance, and disciplined, ISO 9001-informed quality.
- **Flexibility.** Support dictated by the client's needs, schedule, and budget.
- **Transparency.** Clear communication and honest assessments, even when the answer is hard.
- **Partnership.** Measuring success by the client's outcomes.
- **Practicality.** Real-world manufacturing and testing experience that works on the shop floor, not just on paper.