Advanced Systems

Professional Systems Engineering, LLC (PSE) provides superior consulting, design, engineering, and construction services, giving our clients the edge in making even the most challenging project a success.

We are a nationally recognized engineering firm with a reputation for innovative project design. Our consultants, engineers, and designers have tackled some of the most demanding assignments for nuclear, electric, gas, cogen, and hydroelectric operators. We offer a project approach designed to solve problems; a competent, experienced project team, with proven effective client interface methods.

PSE develops cutting-edge solutions targeted to our clients’ needs and strives to design state-of-the-art systems that keep pace with evolving technology. We were recently featured as a world leader in security design by National Geographic, where our designs were showcased on the MegaStructures television program.

Comprehensive Capabilities

PSE offers complete engineering and associated consulting services directly to clients, architects, and allied design professionals to facilitate project planning and overall systems’ quality. We have the capacity to provide comprehensive services and complete documentation, including single study, report, or schematic design through full documentation and commissioning.

Emergency Planning and Continuity

Because decreasing risk, increasing safety, preparing for emergencies, and planning for continuity of business disruption is your business, our business must be providing the continuity of management and design services that create an increased value and return-on-investment. We create enterprise wide strategic communications, security, and safety plans that incorporate our responsibility as a partner for you and your organization. Providing highly integrated, visually managed, enterprise wide communication and control centers allows the incorporation of RF systems control, fleet management, SCADA and BMS control, networked CCTV, and GPS coordinated information flow. Centralizing, monitoring, automating, and integrating advanced systems into state of the art technologies has been demonstrated in hundreds of our projects, and reflects successful completion of your future project.
Emergency Operations Management

Professional Consulting and Engineering Services

- Project Management
- Applications Design/Engineering
- Specifications
- RFP Preparation
- Bid Analysis
- Drawings & Bid Documents Preparation
- Site Surveys/Studies
- Compliance Audits
- Planning/Programmatic Development
- Construction Observation
- Certification Testing
- Training
- Operating Policies/Procedures Code Compliance
- Evacuation Planning
- Systems Analysis
- Code Review

Emergency Operations (cont’d)

- Communication Infrastructure
- LAN-WAN-RF Combined Media Distribution
- Structured Copper-Fiber-Coax Distribution Networks
- Access Control/Central Station/Homeland Security Center Operation Planning
- Computer-aided dispatch
- 800 MHZ Trunked Radio Design/Management
- Geographic and Jurisdictional Database Mapping Management with Call Dispatch Integration
- Remote RF Mobile Data via Fixed Terminal Equipment and PDA Installs
- Critical Electrical and Environmental Systems Analysis
- Life Safety Analysis
- RFP Procurement, Bid/Negotiation
- Construction Services

Communications

- 911 Call Centers
- Data/Telecom
- Computer Networking
- Video Conferencing
- Video Arraignment
- Digital Video Broadcast
- Multi-Media
- Audio/Visual/Video
- Acoustics
- Noise & Vibration Control
- Theater Technologies
- Wide Area Networks
- Fiber Networks
- Educational Technologies
Physical & Electronic Security Technologies

Security Management

- CPTED Crime Prevention Through Environmental Design
- Crime Exposure and Risk/Threat Assessments
- Site Surveys/Studies, Analyses and Recommendations
- Security Design and Planning for Critical Facilities
- Personnel Screening
- Baggage Screening
- Mail Screening
- Contingency Planning and Procedures
- Applications Design and Engineering
- Specification Preparation
- Bid Analysis
- Personnel Procedures and Training
- Security Systems Integration and Design
- Perimeter Security Measures
- Automatic Parking Ramp Controls
- Security Safety Programs and Training
- Computer Security Measures
- Workplace Violence Consulting
- Equipment Sourcing and Procurement

Physical Security

- Barriers
- Virtually Impenetrable Fencing
- Site and Border Fencing to 100 Acres or 100 Miles
- Sallyports
- Special Gate Design
- PLC Controls
- Optical/Physical Turnstiles
- Mantraps/Enclosures
- Locking Systems
- Pneumatic/Electro-Mechanical

Hardware Consulting

- ASTM Grade 1-4 Detention
- UL Tool-Attack Resistance
- ANSI/BHMA 1-3
- Magnetic Locking
- Strikes/Bolts/Locks
- Hollow Metal Design
- Polycarbonate Evaluation
- Motorized Locking
- Secure Openings Consulting
- Electronic Controls
- Life Safety Operations
- Life Safety 101 Egress

Systems Management

- Systems Integration
- Security Communications
- Secure Site Analysis™
- Enterprise Level Card Access
- GUI/Touch Screen Door Control
- Digital CCTV/DVR
- Intrusion Detection
- Correctional Systems
- Motion Detection
- Elevator Control
- Systems Testing
- Proprietary Monitoring

Security Specialties

- Museums/Cultural
- Healthcare/Laboratories
- Hospitality/Casinos
- Nuclear Site Protection
- Corporate
- Airport/Gates/EDIA
- Train/Concourse
- Juvenile Justice
- Jails/Concourse
- Forensic Facilities
- K-12/Magnet/Private Schools
- Parking
- High-Rise Office/Residential

With proper procedures and controls, our clients’ staff, facilities, and operations perform to their full potential. Supplying solutions that properly safeguard facilities, property, and people yields an improved work environment, mitigated losses, and reduced liability for our clients.
3rd Party Security Commissioning Inspections

Inspection Services
- Whether code evaluation and enforcement issues or homeland security standards conformance, collaborative efforts of our staff with client and contractors produce safe and effective plans to allow judicious and respectful use of facilities for licensing and inspection. Compliance with local, state, and national codes as adopted is assured with our field-tested staff.

Systems Testing and Commissioning
- Our staff holds advanced educational degrees and provides years of experience with building and site systems. Projects having significant complexities, as well as those costing over $400 million, have been tested and commissioned, yielding smooth occupancy transition with minimal readjustment.

Commissioning Services and Inspection Services
- K-rated access/perimeter fencing
- Linear intrusion detection
- Volumetric intrusion detection
- Intelligent video assessment
- Fire alarm/smoke detection
- Access Control/alarm monitoring
- Command/control/communication
- Emergency evacuation/mass notification
- Control systems – pneumatic and electro-mechanical

3rd Party Programs
- Deployment of gear and equipment in most technical facilities demands conformance to testing and certification programs for assurance of capital expenditures, life cycle cost maximization, least cost maintenance programs, operational requirements, and warranty response issues. Certification of contractors include 3rd party review of life safety, security, data and communications, acoustical, and noise and vibration control issues.
Professional Systems Engineering, LLC provided design analysis for the replacement of the St. Lucie Nuclear Power Plant's Perimeter Intrusion Detection System. The plant's perimeter line is approximately 7,500 ft. of varied terrain in a coastal environment, divided into 37 detection zones.

PSE’s services included the following:

**Research Existing Conditions**
- Interviewed PIDS manufacturer
- Collected system performance and reliability data
- Obtained As-built documentation
- Determined equipment life expectancy and maintenance history

**Security Assessments**
- Assessment of the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide’s performance criteria for detection
- Comparison of microwave systems verses other technologies
- Verification of zoning layouts and multiplexing to prevent frequency interference
- Evaluation of double, triple, and quadruple stack volumetric detection designs
- Construction phasing requirements
- Cost analysis

**Design of Replacement System**
- System of like and kind which met NRC performance requirements (Regulatory Guide 544 and Design Basis Threat 10CFR73.1)
- Replacement Methods
- Phasing required for construction
- Opinion of probable cost
Professional Systems Engineering, LLC conducted a comprehensive security survey and high level risk/threat assessment of each PEPCO property specified by PEPCO, including all structures and their interiors, other improvements and facilities, the property perimeter, and the property immediately surrounding perimeters. This included a homeland security based threat assessment and risk mitigation recommendation plan for over 25 locations.

PSE’s services encompassed a comprehensive management-oriented physical security survey and risk/threat assessment for representative substation properties and facilities.

PSE provided the following:

- Analyzed the security requirements for each site to achieve adequate and cost-effective protection for facilities, equipment, and personnel
- Assessed adequacy of existing site security installations and systems in regard to the requirements
- Determined the existing risk with current security systems
- Provided recommendations concerning the security organization, operations, procedures, and security guard force composition
- Provided cost and benefit analysis

The emergency designs included:

- Card access control
- Perimeter surveillance
- Intrusion detection
- Physical control
- Enterprise access considerations
Professional Systems Engineering, LLC conducted a security study and implemented counter terrorist security deterrents for two dams, the 345kV/765kV high tension distribution Massena switchyard, and the water supply intake for the town of Massena, NY. A component of the study included cyber security for SCADA and telemetry systems.

The R.E. Moses Power Dam (FDR Power Project) is a critical power generation dam spanning the St. Lawrence River, and is shared with Canada. The Long Sault Dam is a critical water control dam on the St. Lawrence River, which is associated with the Moses Dam. The Massena switchyard is a critical feed to the NYPA electrical power distribution system. The study assessed the vulnerabilities of the facilities, documented the existing security measures, provided recommendations with alternatives, and provided a detailed construction cost estimate.

The Clark Energy Center is a major control center for electrical power distribution for NYPA and is manned 24 hours per day. The 345kV switchyard is a critical feed to the NYPA electrical power distribution system. The study assessed the vulnerabilities of the facilities, documented the existing security measures, provided alternatives and recommendations, and provided a detailed construction cost estimate. The CEC system will interface with the existing NYPA system-wide security control center located approximately 125 miles away, which will have remote control and monitoring capabilities of the CEC system.

Our consulting and specifications included:

- Perimeter barriers
- Intrusion detection
- Digital CCTV cameras
- Digital CCTV switching and recording
- Security lighting
- Interfacing with existing security power supplies
- Computer systems
- Security control center
- Cyber security analysis
Professional Systems Engineering, LLC provided a complete technology package for Bloom Energy’s Natural Gas Fuel Cell Manufacturing Facility. This facility blends the latest in Green Power Generation Technology with a vision for a new model of American manufacturing. Our services included security, communications, audio/video presentation and video conferencing systems. These systems and networks will be spanning from Sunnyvale, California to Newark, Delaware and will eventually connect all energy servers installed worldwide. PSE successfully mixed IP networks with a keen sensitivity to a different kind of IP (Intellectual Property) to provide systems which support both Bloom’s digitally connected creative environment and the critical security elements needed to keep Bloom at the head of the Green power sector.

Security
❖ Access control
❖ IP video surveillance
❖ Video intercom
❖ Remote monitoring

Networks
❖ Wifi distribution
❖ Industrial network
❖ Data center planning

Communications
❖ Universal cabling distribution system
❖ Inside/outside plant communication
❖ IP telephone
❖ Video conferencing

Audio/Video
❖ Conference room presentation system
❖ Video conferencing
CITGO Petroleum - Corpus Christi Refinery
Security Threat & Vulnerability Assessment

Corpus Christi, Texas

Professional Systems Engineering provided a baseline threat and vulnerability assessment of refinery security and made recommendations from which CITGO management optimized efficiency, minimized cost, and maximized the protection of critical assets. The data and information gathered by the on-site PSE project team was contained in a Security Survey Report, which contained recommendations addressing areas for change and/or improvement, alternatives, benefit analysis, as well as identification of areas that are satisfactory. PSE utilized the CARVER Model to assess and determine the threats and vulnerability of the refinery operation including offshore and land traffic impact.

PSE’s services included a comprehensive management oriented physical security survey and risk/threat assessment which:

- Analyzed the security requirements to achieve adequate and cost-effective protection for the Corpus Christi Refinery, equipment, and personnel
- Assessed the adequacy of existing site security systems with regard to the requirements
- Determined the existing risk that CITGO had with its current security program as it relates to the unauthorized access, sabotage, public safety, and overall vulnerability of the refinery
- Provided recommendations regarding how to better protect CITGO assets
- Provided a cost estimate for the recommended courses of action

PSE surveyed, inspected, and assessed all existing refinery security devices, equipment, alarms, and monitoring systems currently installed. This included: fences, intrusion detection devices, surveillance equipment, and access control devices. Policy and procedures for the use of security equipment were addressed in a full threat and vulnerability assessment. PSE was responsible for CITGO obtaining a $14 million grant from the Department of Homeland Security.
Professional Systems Engineering provided baseline threat and vulnerability assessment and security consulting services including a review of the designs to date for the upgrade of the security system at the Lake Charles Manufacturing Facility.

Our services included:

- Applications review of the perimeter fence location and mechanical configuration of the fence, perimeter access control points including vehicle gates, vehicle barriers, and personnel entrance points.
- Review of the perimeter lighting system including fixture type(s), locations, pole type(s), light levels, perimeter coverage, light-to-dark ratio, and circulating to ensure compatibility with the proposed CCTV surveillance system and security force human surveillance requirements.
- Conducting an applications review of the proposed perimeter intrusion detection system (PIDS) including PIDS equipment type, zone lengths, zone break points (to match CCTV coverage), and power requirements.
- Conducting an applications review of the video monitoring, switching/control and recording system to support the proposed CCTV surveillance system, including the integration of the CCTV system with the PIDS.
- Review of the security computer access control and alarm monitoring system.
- Applications review of the Security communications system including telephone, radio, intercom/paging, for both facility and Local Law Enforcement Agency (LLEA) interface.
- Review of the proposed security console layout and security control room arrangement to ensure ergonomic design concepts have been incorporated.
- Review of technical bid specification(s) for procurement and installation of the proposed security system.
Professional Systems Engineering provided a physical security risk assessment for the North American Headquarters Building located in the City of Houston, Texas. The major objectives of the assessment were to determine the current risk to CITGO, evaluate the existing security program, and recommendations for improvements.

The objectives of the study:

- Analyze the security requirements and present a standard for security
- Assess the adequacy of existing security systems
- Provide recommendations for improvements
- Provide a cost and benefit analysis of alternative

The engineering designs included:

- Integrated enterprise level card access
- Smart card implementation
- Hydraulic barriers
- Iris reader for high security with independent biometric access
- Secure man-trap revolving entrances
- Digital video with archiving
- Computer room grade security monitoring and server rooms
As part of the steam generator replacement project, Professional Systems Engineering, LLC prepared detailed designs for the expansion of the existing Callaway Nuclear Generator Station. The 1235 megawatt pressurized water required enhancements to secure the perimeter. The design included development of all construction documents including fence and barrier location drawings, equipment location drawings, system block diagrams, interconnection wiring diagrams, CCTV design, equipment mounting details, conduit and cable lists, bills of material, purchase requisitions, plant modification package, and acceptance test procedures. The design included perimeter barriers, perimeter duct bank, perimeter intrusion detection, CCTV cameras, and towers high mast lighting, interfacing with the existing security system power supplies, computer system, alarm stations, multiplexers, and CCTV switching and control system.

**Nuclear Regulatory Compliance**
- Design input record (DIR)
- Design document status report (DDSR)
- Re-licensing input
- Plant modification package (PMP)
- Acceptance test procedures
- Personnel access, nuisance delay and vehicle barriers

**Security Improvements**
- Fencing and barrier designs
- Perimeter duct banks
- Intrusion detection (PIDS)
- CCTV surveillance
- High mast lighting
- Block diagrams, mounting details, conduit/cable lists, bills of materials, and purchase requisitions
Under a tight timetable established by the Nuclear Regulatory Commission (NRC), PSE adapted a 20-year-old nuclear security infrastructure to accommodate new technologies. This enhancement, in response to recent terrorist threats and attacks, established a higher level of ability to neutralize many threats perceived by the plant operators and security staff.

Professional Systems Engineering, LLC performed threat assessment and risk mitigation studies and developed a conceptual design to upgrade the perimeter security systems and procedures for the Donald C. Cook Nuclear Power Station. The plant has the capacity to produce 1020 megawatts through the pressurized water reactors. The project included a site assessment and preparation of a report and conceptual design. Recommendations were made to modify protected area barriers, establish bullet-resistant defensive positions, replace the soil for stabilization, and upgrade intrusion detection system, CCTV system, and lighting. PSE also prepared a detailed cost estimate.

PSE developed a conceptual design to upgrade the vital area security system. The design included enhancement of vital area barriers, addition and replacement of CCTV surveillance equipment, and enhancement of the interior intrusion detection system. The design also included new conduit and cable, seismic supports, and interface to the existing security system and the existing CAS and SAS consoles.

**Threat Assessment and Concepts**
- Protected area barrier design
- New defensive position recommendations
- Vital area barrier design
- Upgrades to central and secondary alarm system consoles

**Critical Enhancements**
- New CCTV surveillance systems
- Perimeter intrusion detection systems (PIDS) enhancement
- New critical infrastructure
- New entrance gate barriers and controls
Like many nuclear operators throughout the U.S., the events of 9/11 made security of nuclear generator stations a national homeland security priority. PSE met this challenge with experienced methodologies to address new Nuclear Regulatory Commission (NRC) requirements for owners-controlled areas and general access.

Professional Systems Engineering, LLC conducted an on-site evaluation of the physical and electronic security systems for the Fermi 2 nuclear power plant. The plant has a capacity to produce 1139 megawatts from its boiling water reactors. The evaluation included perimeter barriers, perimeter intrusion detection, CCTV, lighting, access control, power supplies, computers, alarm stations, consoles, multiplexers, personnel screening/search entrance facility, licensing, documentation and procedures. PSE prepared a detailed assessment report containing alternatives, recommendations, drawings, schedule and a detailed cost estimate with cost benefit analysis.

**Studies and Recommendations**
- Re-licensing application documentation support
- Screening/search study for contractors, employees, and visitors
- Perimeter threat assessment
- Mitigation study of terrorist and criminal intent
- Systems cost-benefit study and estimate
- Defensive positions study
- NRC post 9/11 owners’ area compliance

**Critical Physical Infrastructure**
- New entrance facility design to withstand ballistic assault
- New barrier placement design
- New perimeter intrusion detection system (PIDS)
- New CCTV surveillance
- Enhancements to central alarm system (CAS)
- Enhancements to secondary alarm systems (SAS)
- New high lumen perimeter lighting
AGENCIES
City of Baltimore, MD
City of Elizabeth, NJ
City of Hoboken, NJ
City of Perth Amboy, NJ
City of Philadelphia, PA
County of Bergen, NJ
County of Carbon, PA
County of Caroline, MD
County of Delaware, OH
County of Delaware, PA
County of Eaton, MI
County of Essex, NJ
County of Franklin, OH
County of Hudson, NJ
County of Luzerne, PA
County of Montgomery, MD
County of Orange, CA
DC Department of Mental Health
District of Columbia
Federal Aviation Administration
General Services Administration
Hancock County, WV
Internal Revenue Service (IRS)
Lexington-Fayette Urban Co. Gov’t, KY
Maryland Dept. of Public Safety and Correctional Services (DPSCS)
Merrimack County, NH
National Cancer Institute
National Fish and Wildlife Foundation
NJ Dept. of Corrections
NJ Division of Property Management and Construction (DPMC)
NJ Economic Development Authority
New York Department of Corrections
New York City Dept. Design & Construction
New York Juvenile Administration
Patapsco Waste Water Treatment Plant
Pennsylvania Dept. of General Services
Social Security Administration
South Brunswick Township, NJ
The State of New Jersey
US Agency for International Development

AGENCIES cont.
US Army Corps of Engineers
US Fish and Wildlife Service
US Coast Guard
US Dept. of Health Human Services
US Postal Service
Virginia Department of Corrections
West Virginia State Government

INDUSTRIAL / CHEMICAL / PHARMA / CRITICAL INFRASTRUCTURE
ARCO Chemicals, PA
AT&T, NJ
Bell Atlantic
US Army Corps of Engineers
US Fish and Wildlife Service
US Coast Guard
US Postal Service

ENCYCLOPEDIA

30 Delaware Sites,
400 Pennsylvania Sites
Coates Reprographics, PA
Exxon Biomedical Facilities, PA
Henkel Chemical, PA
Missouri River Dams, CO
Kulicke & Soffa, PA
Patapsco Waste Water Treatment Plant
RCA New Products Division, PA
Unisys Corporation, PA

ENERGY
Ameren UE
AEP
Bruce Power
CITGO
Dominion Power
Florida Power and Light
New York State Electric and Gas Corporation (NYSEG)
New York Power Authority
Potomac Electric and Power Company (PEPCO), MD, VA, and DC
Rochester Gas & Electric (RG&E)
SCANA Corporation, SC
Client List

TRANSPORTATION
Amtrak
   Los Angeles Maintenance Yard, CA
National 9-1-1 Call System
Homeland Sec. Prog. - NE Corridor
City of Philadelphia - PHL Int'l. Airport
Honeywell Corporation
Montgomery County MD, Dept. of Public
Works and Transportation
New Jersey Transportation Authority
   (NJTA)
Pennsylvania Turnpike Commission (PTC)
Pennsylvania Dept. of Transportation
   (PennDOT)
SEPTA

TELECOMMUNICATION
INFRASTRUCTURE
Bergan County, NJ
City of Hoboken, NJ
City of Philadelphia, PA
County of Essex, NJ
Fiserv Trust - BHC, PA
General Electric
Lexington County Government, KY
NASDAQ
NBC - NYC
Provident National Bank, PA
Richard Stockton College, NJ
RCA - Indianapolis, IN
RCA - Rockefeller Center, NY
State of Maryland (Multiple Sites)
University of Pennsylvania, PA
Verizon
   Corporate Computer Center and
   Multiple Sites

LABORATORY / HIGH PERFORMANCE SPACE
AstraZeneca Pharmaceuticals, DE
   Administrative Support/Training
Astro Space Center, NJ
BASF Corporation, NJ
   Research and Development Center
Boehringer Ingelheim, NJ
Johnson and Johnson Patient Care, NJ
   Administrative Areas
Merck Pharmaceutical, PA
McNeil Consumer Products, PA
   Labs and Manufacturing
McNeil Consumer Products, TX
   Class 100 Manufacturing
McNeil Consumer Products, PR
   Class 100 Manufacturing
McNeil Pharmaceutical, Spring House, PA
   Animal Research Labs and
   Manufacturing
Nortel, Ottawa, Canada
   New Production Laboratories
Ortho Pharmaceutical, NJ
   Labs and Manufacturing
Rhone-Poulenc Rohrer Pharmaceuticals, PA
   Labs and Manufacturing
Sterling Pharmaceuticals
   Precious Metals Laboratory Analysis
Thomas Jefferson University, PA
   Microbiology Research

30 YEARS + STRATEGY + SPECIFICATIONS + TECHNOLOGY

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