



NOR-CAL CONTROLS

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ENERGY SOLUTIONS INC.

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Your **project.**
Our **passion.**

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THE NOR-CAL DIFFERENCE

TOTAL SOLUTION PROVIDER OPEN ARCHITECTURE

As your total controls and monitoring solution provider, Nor-Cal supports every phase of your project from turnkey design solutions to post-OEM enhancements, troubleshooting and training. Whatever your unique project requirements, our deep expertise in controls means we can provide detailed project management, field troubleshooting and adapt to your changing capacity requirements.

No vendor lock-in. Our DAS and SCADA systems are based on open architecture hardware and software, eliminating the need for ongoing subscription fees and restrictive service contracts. They're flexible, bolt-on compatible, readily scalable, and completely customized to meet your current and future needs. Maintain, expand and scale your system anytime, anywhere with confidence.

PROACTIVE & RESPONSIVE RELATIONSHIP DRIVEN

Nor-Cal provides responsive, dedicated and enthusiastic engineers, project managers and support staff that are always available to meet your needs. We love to solve complex problems and proactively work on your behalf to anticipate issues and mitigate risk before it impacts your project. We're always available to answer any question or address any challenge related to your solar project, offering peace of mind while reducing total development and operating costs.

A partner, not just a vendor. At Nor-Cal Controls, we studiously avoid "vendor mentality" that says this is just a job or chance to provide an expensive cookie-cutter product. Instead, we partner with you for the long-term, get to know your people, your business approach and your individual needs so we can provide the customized solution that best meets them.



**MAINTAIN, EXPAND AND SCALE YOUR
SYSTEM ANYTIME, ANYWHERE WITH
CONFIDENCE.**

EXPERIENCE THE NOR-CAL WAY

AT NOR-CAL, THERE'S IS ONLY ONE WAY TO SERVE OUR CUSTOMERS. THAT IS WITH DEEP EXPERTISE BASED ON 50 PLUS YEARS OF CONCENTRATED EXPERIENCE IN POWER GENERATION. WE PROVIDE **OPEN ARCHITECTURE SOLUTIONS** THAT GIVE YOU COMPLETE FLEXIBILITY & CONTROL OVER YOUR INSTALLATION. OUR PASSIONATE COMMITMENT TO EXCELLENCE MEANS YOU AVOID THE NEED TO UPGRADE OR MIGRATE YOUR TURNKEY SYSTEM FOR **AT LEAST 25 YEARS.**

Every project we bid begins with a simple question – **“What approach or products best serve our clients?”** Our answer is rooted in our uncompromising passion for excellence and your success. The Nor-Cal Way offers you a dedicated team, proven engineering excellence, customizable solar solutions and unparalleled customer support.

YOUR DEDICATED TEAM combines expertise, integrity, honesty and transparency. Each team is formed to bring deep knowledge and expertise to your specific project. Our engineers are problem-solvers with an industrial mindset for thoroughness and attention to detail, tempered by the ambition to provide designs that are cost-effective and under budget. Each of Nor-Cal's carefully selected employees has the same passion for solutions-driven technology and scrupulous attention to details so your project runs smoothly from initial bid to power-on.

PROVEN ENGINEERING EXCELLENCE. With expertise in a full range of equipment from GE, Emerson and more, our solutions are engineered to exceed the demands of your unique SCADA and DAS system requirements. Our open architecture hardware and software solutions offer the flexibility to meet today's power demands and scale for your future needs. They are designed to be easy to maintain, test and troubleshoot.

CUSTOMIZABLE SOLUTIONS. Our open-source SCADA and DAS systems deliver industry-leading efficient performance while allowing flexibility and scalability. They integrate well with third-party programs, giving you

the freedom to choose supplemental software that suits your budget. Our open-architecture system will lower your total cost of system ownership.

UNPARALLELED CLIENT SUPPORT. Fast, same day responsiveness is routine for our client-focused support team. We support and troubleshoot all solar systems whether we installed them or not.

CUSTOMER FOCUSED FROM DAY ONE

Robert “Bob” Lopez, President and CEO, founded Nor-Cal in 2006 with the passion to provide client-focused automation and controls engineering solutions that truly serve the client. Bob is a senior-level engineering professional with over 35 years of concentrated experience in the power generation industry, both traditional and renewable. Bob's founding vision has carried through over the years to each Nor-Cal team member, from our administrative staff to our engineers in the field.

Nor-Cal's overall vision is not to be the biggest or most profitable power generation controls integrator in the industry, but simply to be the best. With this unwavering conviction, Nor-Cal consistently outperforms its competitors and continues to bring Bob's founding vision to fruition.

OUR CORE VALUES

FAMILY

We are supportive, respectful, and accepting.

DEPENDABLE

We are client-focused and responsive.

TRUST

We are honest, transparent, and ethical.

HARDWORKING

We do whatever it takes to get the job done right.

KNOWLEDGE

We promote a culture of learning.



NOR-CAL ALSO OFFERS **PSCAD PPC MODELING**, VALIDATED BY NAYAK CORP, THAT SATISFIES HECO, CAISO, ERCOT AND NE REQUIREMENTS.



SCADA SYSTEMS

SUPERVISORY CONTROL AND DATA ACQUISITION (**SCADA**) SYSTEMS FOR UTILITY-SCALE PV & STORAGE SYSTEMS (INCLUDING POWER PLANT CONTROLLER)

FULL CONTROL TO MEET ANY PPA, IA UTILITY AND OWNER REQUIREMENTS

Nor-Cal's turnkey SCADA systems include a Power Plant Controller (PPC), which enables site-wide substation, individual inverter and device level control. Our turnkey solutions meet all controls functionality requirements and provide for full monitoring, historian archiving, alarm notification, and control of all battery storage system components including the on-site inverters, MET sensors, and revenue meters.

Standard control functionality includes but is not limited to: solar smoothing/energy shifting, frequency regulation, power setpoint, voltage setpoint, grid support (black start operation), and variable ramp control.

LOCAL HISTORIAN FOR DATABASE QUERYING AND REPORT GENERATION

Our local, on-site historian server comes installed with software enabling operators and project stakeholders to perform historical trends, query data (1 second time stamps), and generate reports.

LOCAL HUMAN MACHINE INTERFACE (HMI) FOR OPERATORS

Our local, on-site SCADA server comes installed with high performance HMI software, programmed with custom tailored HMI graphical screens, enabling operators' total visibility and control over all site inverters and devices. Includes real time and historical alarm viewer.

HIGHLY CUSTOMIZABLE

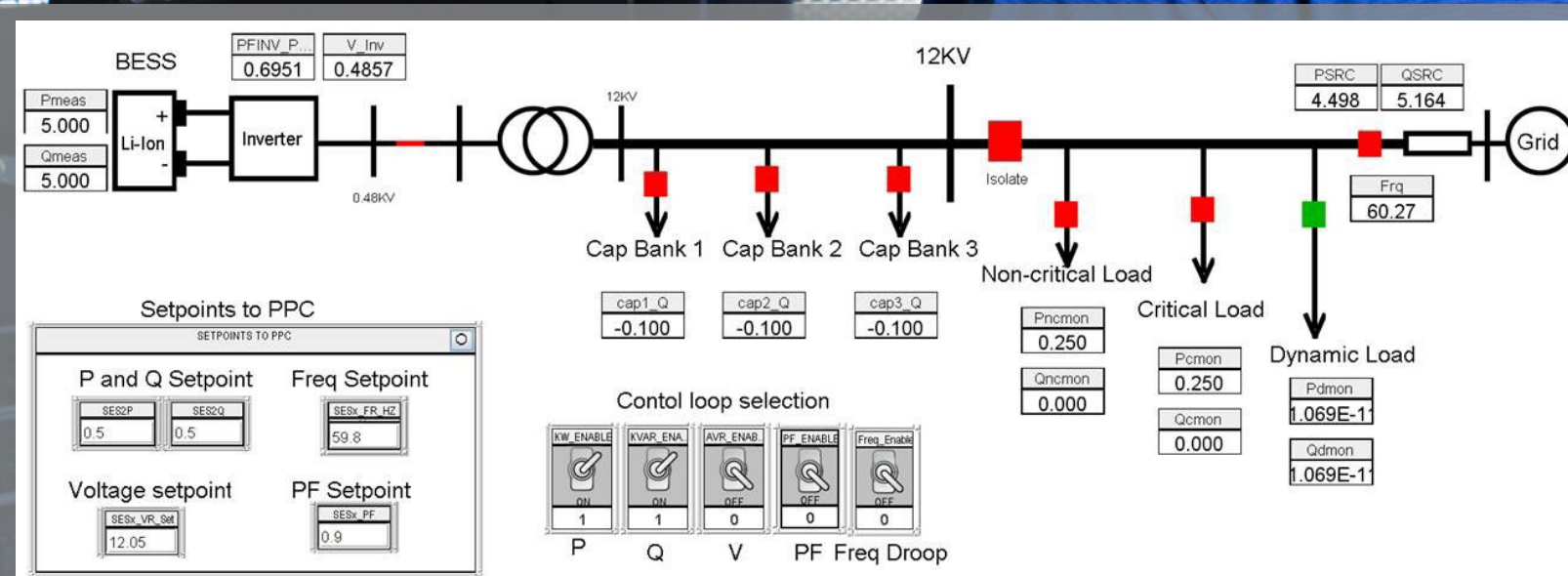
As with all of Nor-Cal's integrated solutions, each Nor-Cal SCADA system solution is fully tailored to meet all project and application specific requirements. Using best practices within the industry, our solutions are designed to meet our clients' unique needs and preferences.

AUTOMATIC ALARM NOTIFICATION

Automatically receive critical alarm notifications (email and SMS text) for all devices monitored by the Nor-Cal SCADA system. Configure alarm recipients and escalation schemes based on alarm priority.

ENERGY MANAGEMENT SYSTEMS FOR BATTERY STORAGE (EMS)

Nor-Cal provides turnkey engineering services to integrate complete Energy Management Systems, extending the value of your solar investment. The EMS acts as the master orchestrator enabling control between the battery storage system and PV Balance of Plant (BOP) equipment (inverters). Our solutions meet or exceed all utility requirements.

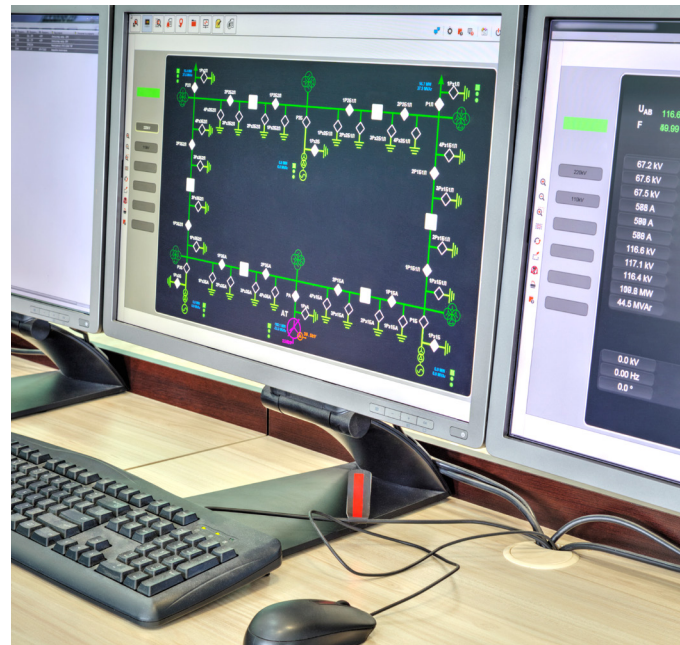


ENTERPRISE SCADA FOR GOPs

ENTERPRISE HUMAN MACHINE INTERFACE (HMI)

We work closely with our clients to develop custom HMI graphical screens and dashboards, enabling operators the ability to see a fleet-wide view of all sites within their PV operating portfolio. Clients will have the ability to drill down into individual PV sites, allowing for full visibility and control over all site inverters and devices.

Includes real time and historical alarm viewing, and the ability to trend performance data. All HMI graphical screens will be tailored to meet the needs of the client and obtain the client's desired "look, feel and functionality".

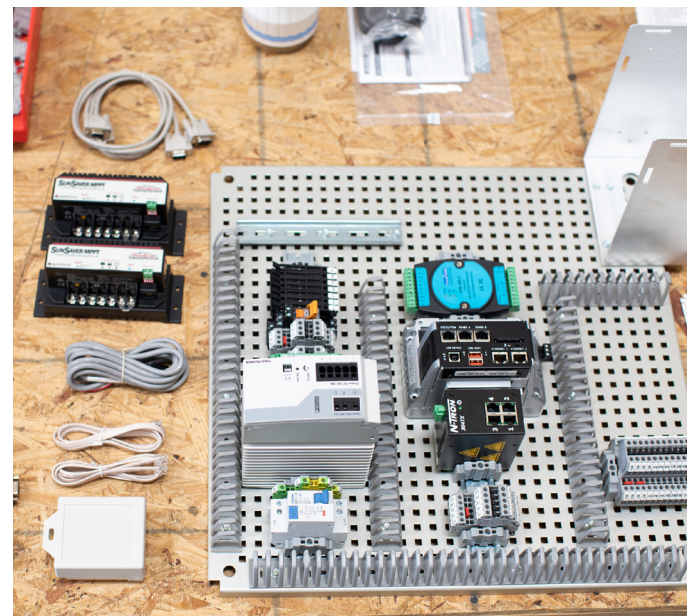


ENTERPRISE HISTORIAN FOR QUERIES AND REPORT GENERATION

With an option to include an Enterprise Historian for off-site data storage and archiving of all PV sites' data, our clients have the ability to perform historical trends, query raw, view calculated data (one second time stamps) and generate advanced reports.

FULL REDUNDANCY, INCLUDING VIRTUALIZATION (HARDWARE & SOFTWARE)

Our Enterprise SCADA system solution design can incorporate fully redundant hardware and software, including virtualization redundancy.



NETWORK OPERATION CENTER (NOC),
OPERATIONS & MAINTENANCE (O&M)
ENTERPRISE SCADA SYSTEMS FOR PV
& STORAGE PLANT OPERATORS.

NERC CIP

Structured with NERC CIP compliance requirements in mind. By providing a flexible virtualized architecture, the SCADA systems benefit from the redundancy and resiliency of virtualization, as well as provide security tools which can easily be deployed and configured.

The resulting single-rack provides all the necessary hardware and software to operate a CIP medium-impact SCADA system. Nor-Cal will work with our clients to establish hardened baseline configurations to support CIP-002, CIP-005, CIP-007, CIP-009, and CIP-010 requirements.

BENEFITS OF NOR-CAL TOTAL ENTERPRISE CONTROL:

- Total control and visibility of your entire operating portfolio through a single operating platform solution
- Eliminate inefficiencies and liability associated with having to operate multiple third-party SCADA system platforms
- Save on costs by eliminating the need to train operators on multiple third-party SCADA system platforms
- Operators can finally focus on what they excel at: operations
- Seamlessly integrate with any third-party offtakers, including utility entities

DATA ACQUISITION SYSTEMS (DAS)

NOR-CAL'S DAS SYSTEMS ARE DESIGNED TO CONTINUOUSLY MONITOR PERFORMANCE DATA & ALARMS FOR ALL PV AND STORAGE SYSTEM DEVICES, INCLUDING ALL ON-SITE INVERTERS (STRING OR CENTRAL), BMS, MV TRANSFORMERS, REVENUE METERS, METEOROLOGICAL (MET) STATION SENSORS AND/OR INTELLIGENT EQUIPMENT DEVICES (IEDS).



POWER FACTORS

CLOUD-BASED DATA MONITORING

Leveraging **Power Factors Drive**, the leading cloud-based technical asset management software, users can view real-time and historical data coming from their portfolio of assets. Drive cleanses, aggregates and consolidates operating data, delivering role-specific dashboards for insights into data, alarms, reports and KPIs.

Drive's hierarchical monitoring feature allows trends and analysis to be done at any level within the asset portfolio, and its library of industry-standard reports and analytics equip owners and operators with a deep repository of knowledge about commercial and operational states.

CONTROL-READY

As a leading SCADA system and controls integrator in solar PV, Nor-Cal understands the importance of having the ability to control PV and storage system devices at a moment's notice if dictated as a requirement by the Owner, Host Utility and/or Independent System Operator (ISO). Adding control functionality may be necessary in the future as a grid stability requirement, however some operators like having the ability to manually reset or start/stop inverters from a DAS HMI graphical interface if desired.

Each DAS system comes "control-ready": robust, and scalable for control. Adding manual and/or automated control for any and all site devices can be done at any time at a minimal cost.



REAL-TIME DATA ACQUISITION

Continuously monitor performance data and alarms for all PV system devices, including all on-site inverters (central or string), MV transformers, revenue meters, meteorological (MET) station sensors and/or Intelligent Equipment Devices (IEDs).



AUTOMATIC ALARM NOTIFICATION

Automatically receive critical alarm notifications (email and SMS text) for all devices monitored by the DAS. Configure alarm recipients and escalation schemes based on alarm priority.

COMMON MEASUREMENTS INCLUDE:

- GHI Irradiance
- POA Irradiance
- Back of Module Temperature
- Air Temperature
- Relative Humidity
- Barometric Pressure
- Wind Speed
- Wind Direction
- Precipitation
- Solar Position

METEOROLOGICAL (MET) STATIONS

The Tahoe™ solution is fully customizable and compatible with various SCADA platforms. It significantly lowers the total cost of ownership of both MET/WMS instruments and SCADA systems. Our MET Station is preconfigured for ease of startup and commissioning by either Nor-Cal's engineering experts or others.

Nor-Cal's Tahoe MET station is equipped with a host of features to support the end user:

- Supports a wide variety of serial communication based sensors
- One-second sampling data logging
- Support for over 250 protocols for ease of access
- Support of up to 10 simultaneous protocols from one TCP ethernet port
- Features lithium-ion battery back-up power at 12VDC 55Ah
- Optional, solar panel for standalone battery charging off the grid functions
- Backup power equipment monitoring and data logging
- Utility power input support (120/240VAC)
- Universal SCADA platform support
- Optional FTP services
- Optional email notifications
- Optional SMS functions
- Port access programming functions available for configuring/reconfiguring of attached devices
- Optional local machine interface (HMI)
- Scalability of I/O functions (RTD, DI, DO, AI, and AO)
- Web server for remote access over LAN or WAN networks
- International languages and unicode characters

THE NOR-CAL CONTROLS TAHOE™ METEOROLOGICAL (MET) STATION COMBINES FUNCTIONALITY, RELIABILITY, AND SIMPLICITY WITH A DESIGN CENTERED ON OPEN ARCHITECTURE.



SOLAR PV OPERATIONS TRAINING

UNDERSTANDING THE “BIG PICTURE” OF SOLAR PV PLANT OPERATIONS BY ENHANCING YOUR OPERATOR FUNDAMENTALS .

Join us at Nor-Cal Controls’ Training Facility in the Northern California foothills for a deep dive into operator fundamentals as they pertain to Supervisory Control and Data Acquisition (SCADA) systems. Learn NERC fundamentals and SCADA as they apply to the electrical grid. The training topics and principles covered can be applied to any SCADA system platform (hardware/software).

This 3-day training course is designed to benefit EPC contractors, asset owners and solar industry professionals. Graduates will understand the ‘big picture’ as it applies to solar PV plant operations within the utility scale sector. Training is held once a quarter or available upon request

DAY 01

GRID/NERC 101 *Presented by GridSME*

Day one consists of elementary electrical system knowledge and fundamentals, and how they apply to regulatory and compliance authorities within the growing power generation industry. This general overview will aid in providing a ‘big picture’ holistic view that is critical to the industry as it pertains to operations, planning and forecasting, in an effort to meet present day regulatory guidelines.

TOPICS COVERED:

- Electrical systems
- System operations
- NERC functions
- NERC compliance
- Operations planning
- Forecasting

DAY 02

SCADA 101 *Presented by Nor-Cal Controls*

Day two is comprised of a thorough, introductory course regarding today’s most critical power generation necessity: gathering data from site devices and successfully making time-sensitive decisions to enhance productivity, efficiency, and revenue. This course empowers its students with an understanding of SCADA systems that work with any platform, and ensures adherence to best practices for any utility-grade power generation site.

TOPICS COVERED:

- Introduction to SCADA
- How SCADA is used
- SCADA architecture
- SCADA protocols
- HMIs and data visualization
- Historian overview
- Network overview
- SCADA implementations

DAY 03

FLEET MONITORING & PERFORMANCE ANALYTICS *Presented by Power Factors*

Day three is specifically focused on fleet monitoring and performance analytics for SCADA systems. This course covers industry basic and advanced analytics, including loss characterization analysis, and how asset management and performance analytics are not only a necessary but beneficial complement to localized SCADA systems.

TOPICS COVERED:

- Introduction to plant monitoring
- When to use SCADA vs. plant monitoring
- Portfolio management
- Notifications and automated workflow
- Event management
- Analytics – basic and advanced
- Reporting – basic and advanced



**UNLOCK YOUR
UTILITY-SCALE,
SOLAR PV
OPERATIONAL
POTENTIAL**

FEATURED PROJECTS

VIEW OUR COMPLETE LIST OF PROJECTS AT:
WWW.NORCALCONTROLS.NET/PROJECTS

01	MOUNT SIGNAL 3, CA (2019) 250 MW
02	COPPER MOUNTAIN SOLAR 5, NV (2020) 250MW
03	DESERT HARVEST - PV + STORAGE, CA (2020) 150MW
04	UTAH PORTFOLIO - 7 SITES, UT (2019) 525MW
05	ROBINS AFB SOLAR, GA (2020) 128MW
06	TEXAS DAS PORTFOLIO - 4 SITES, TX (2019) 65 MW



WE PROVIDE THESE SERVICES AND MORE FOR SOME OF THE NATION'S LARGEST UTILITY-SCALE SOLAR PV PROJECTS:

- Full SCADA system design, including network architecture
- SCADA system documentation
- Remote SCADA configuration and testing
- On-Site SCADA commissioning and testing
- SCADA control system specific training
- MET stations (turnkey, including on-site installation and commissioning)
- Soiling stations (turnkey, including on-site installation and commissioning)
- Remote Intelligent Gateway (RIG) (turnkey, includes on-site installation and testing)
- Revenue meters (turnkey, includes on-site installation and testing)
- California-ISO (CAISO) process management camera surveillance system support

OTHER SERVICES

- Legacy system retrofits and replacements
- SCADA/DAS/MET specifications development
- Troubleshooting support
- SCADA/HMI programming
- PLC programming
- Reports programming
- System startup & commissioning support
- SCADA Owner's Engineering (OE)
- Controls functionality implementation
- UL panel fabrication
- Industrial networking & cybersecurity
- Surveillance systems (security cameras)
- CAISO: NRI, RIG & metering support

WE PROVIDE THESE SERVICES AND MORE FOR SOME OF THE NATION'S LARGEST UTILITY-SCALE AND C&I SOLAR PV PROJECTS.



FOR MORE
INFORMATION,
PLEASE VISIT OUR
WEBSITE.



JOIN OUR FAMILY

NOR-CAL CONTROLS IS A COMPANY YOU WILL BE PROUD TO BE A PART OF. OUR TOP-NOTCH EMPLOYEES ARE A REFLECTION OF THE OUTSTANDING CUSTOMER SERVICE WE PROVIDE. WE VALUE THE CONTRIBUTIONS EACH EMPLOYEE MAKES, AND WE ENCOURAGE AND SUPPORT EMPLOYEE GROWTH AND COLLABORATION.

HERE ARE JUST SOME OF OUR EMPLOYEE BENEFITS



HEALTH INSURANCE

We pay the entire premium for employee-only coverage for medical, dental and vision.



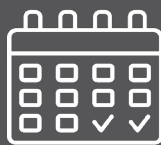
RETIREMENT

We provide a generous Safe Harbor 401k match based on an employee's salary deferral.



PAID TIME OFF

Employees accrue 14 days during their 1st year, 15 during their 2nd, and each year the rate continually increases based on length of service.



9 PAID HOLIDAYS

Plus an additional floating holiday each year that you can use at any time, like your birthday.



\$75,000 LIFE INSURANCE

Plus we offer supplemental life insurance for employees who may be interested.



LONG-TERM DISABILITY

For claims over 90 days, employees are eligible for 60% salary replacement.



EMPLOYEE ASSISTANCE PROGRAM

Free and confidential consultations for legal and financial issues, as well as stress from every day life.



GYM MEMBERSHIP

We cover the membership fees for our local gym, or provide an annual fitness allowance.



PROFIT SHARING & BONUSES

Dispersed annually at the company's discretion, based on company & individual performance.

If you are seeking a work environment that is fun, professional, appreciative of your contributions and encouraging of your professional goals, you will find all of these things at Nor-Cal Controls! We pride ourselves on our amazing work environment, including quarterly teambuilding celebrations, gold-level benefits, and happy employees!

Our office in El Dorado Hills is located in the beautiful foothills between Sacramento and South Lake Tahoe. We are close enough for you to live an urban lifestyle or enjoy the great outdoors—whichever your preference may be.



PLEASE VISIT US AT WWW.NORCALCONTROLS.NET/CAREERS TO SEE OUR AVAILABLE POSITIONS.

**Your project.
Our passion.**



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