



# DCR ENGINEERS & CONSTRUCTORS

## Startup Managers

- ▶ Mechanical
- ▶ Electrical
- ▶ I & C
- ▶ Chemical Cleaning and Flushing

*North America*

*South America*

*Asia*

## Power Plant Commissioning: Plant Operations & Betterment, & Rehabilitation

DCR Engineers & Constructors, Inc. can provide you the experience and expertise to get your plant on line and keep it there with reliability and maintainability. The objective in the construction of a new plant is to get in on line and into commercial operation without expensive delays.

DCR Engineers & Constructors, Inc. will provide direction and technical know-how to achieve a timely and trouble-free transition between construction & operation. DCR's hands on field experience enables them to assess when the experts for electrical protection testing, chemical cleaning and other specialized areas are needed. DCR can assist with these critical operations by early planning for the conversion from area construction to system completion.

### Startup Engineering:

- Engineering review during preliminary & detail engineering
- Planning & scheduling startup activities
- Writing procedures for each phase of startup
- Directing & observing all phases of startup
- Calibration, testing, troubleshooting
- Results engineering
- Failure Analysis



[www.dcrengineers.com](http://www.dcrengineers.com)

## Third Party Commissioning >>>



*Inadequate control system debugging can be dangerous,  
and at times, devastating*

### ELIMINATE COSTLY DELAYS

DCR is a third-party test group that is dedicated to eliminating errors and omissions in industrial and utility plants. DCR can anticipate problems before they arise preventing the crisis which can require expensive repairs and costly delays. DCR's experience in starting up scores of similar plants will assist you in presenting yourself as the professionals.



## Full Service Spanish or English Speaking Teams

DCR Teams are professional engineers and technicians that will work under your control. As a team, they will relieve you of administrative and coordinating burdens with many years of hands-on field experience. DCR teams ensure successful startup in the following disciplines:

Mechanical • Electrical • Instrumentation & Controls

Which include full service capabilities:

- Checkout & Performance Tests
- Chemical Cleaning & Water Chemistry
- Electrical Testing & Instrument Calibration
- Troubleshooting & Failure Analysis
- Planning & Scheduling



## Operation >>>



Successful plant operation depends on personnel who understand the plant's processes and who know what to expect and how to deal with nonstandard conditions.

On-the-job training alone can be costly - even disastrous. DCR can provide complete, experienced operations staffs, or experienced DCR engineers can prepare procedure manuals, conduct classroom training, and coordinate vendor demonstration and training sessions for the client staff.

### Training services include:

- Defining scope of training required
- Defining staffing requirements
- Assembling instruction manuals, system descriptions, and drawings
- Writing training manuals
- Providing instruction

**OUR EXPERIENCE WORKING FOR YOU!**

# ELECTRICAL TESTING

The cost of electrical testing during commissioning is inconsequential compared to the costs of delay, damage or injury that can occur energizing defective or damaged equipment and systems.



DCR electrical technicians and engineers have the required sophisticated test equipment and training to quickly and effectively check out and test your entire project in one coordinated operation.

- Relay Calibration
- Instrument Transformer Testing
- Ground Fault Systems Testing
- Transformer Testing
- Phasing
- Energizing

**Primary Injection** provides accurate simulated short circuit testing of low voltage breakers and instrument transformer integrity.

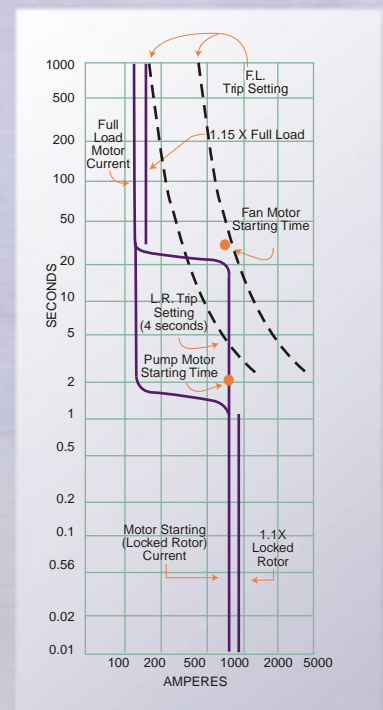
**Secondary Injection** provides accurate impedance values in protective relay circuits to simulate actual protective functions prior to energizing of primary circuits.

**Power Factor and Insulation Resistance** tests verify generator, transformer and circuit integrity.

**High Potential** testing check for insulation leakage to ground.

## Items of importance are:

- Protective Relay Calibration
- Transformer Oil Sampling
- Transformer Turns Ratio Test
- Power Factor Tests for Generator & Transformer Deterioration
- Contact Resistance in Circuit Breakers
- Grounding Systems Testing
- Visual Inspection, Cleaning & Mechanical Maintenance





# INSTRUMENTATION and CONTROLS

Commissioning and Maintaining Projects are your Critical Path and One of Our Specialties

Our objective is to reduce down time or delays in start-up often caused by inaccurate or faulty components and systems. We accomplish this by a thorough analysis of individual instrument functions and loop tests.

And above all we provide a communications interface between design, construction and operations. In this way the integrity of the entire project is raised by a smooth, trouble-free startup.



## Instruments • Loops • Systems • Coordinated Systems



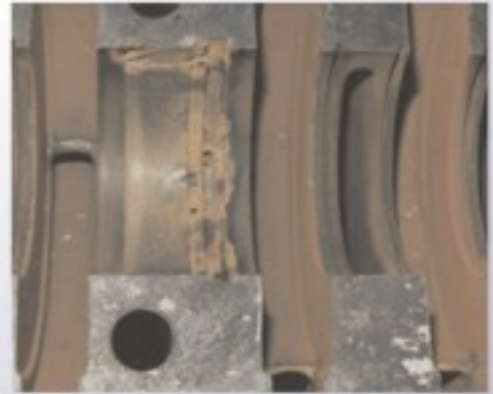
All instruments in a loop will be calibrated as a loop where possible. Before hand, instruments will be lab tested to assure maximum component reliability. When a system is placed in service, the instrumentation and control system will be calibrated and functional to suit the process operation.

The effort is always systematic and efficient. It's coordination is developed with due consideration given to the future need for component and system signature historical data. Complete documentation of data and procedures is recorded and given to the plant staff.

## MECHANICAL ENGINEERS

DCR provides “root cause failure analysis” for all types of failures and is an integral part of our Commissioning Department.

Analysis are conducted by senior industry professionals that are recognized experts in their field who can be called as expert witnesses. DCR has been a lead analyst and expert witness on such notable failures as the Geysers Unit 15 turbine failure and the Seminole Electric twin 620 MW turbine failures at Palatka, FL. DCR also was the engineering firm called in to determine the root cause of transformer explosions at the Nugget Hydro Electric plant in Strawberry Valley, CA. DCR determined the cause, brought in temporary transformers, and synchronized the unit moments before the power sales contract was to expire.



## FAILURE ANALYSIS >>>



DCR provides Mechanical Engineers to check the overall installations and coordinate the supporting disciplines such as Electrical, I & C and Chemical groups before and during trial operation. The installation is checked against engineering documentation for accuracy and completeness. The engineers are responsible for startup and construction “Work Arounds” to expedite commissioning in parallel path startup and construction completion efforts.

During trial operation DCR Mechanical Engineers perform initial equipment performance tests to determine in advance if there are problems. Before commercial operation they can, if requested, perform all required performance tests required by contract and in accordance with the applicable codes.

DCR Mechanical Engineers also, assure that the equipment being turned over is turned over to operations with the proper operating instructions.



## WATER TREATMENT CONSULTING

DCR provides water treatment consulting services during the design phase as well as oil and water system flushing and chemical cleaning services during power plant commissioning.

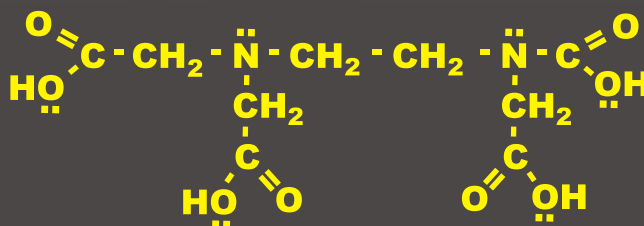


*Fine (60) mesh screen is perfectly clean after high velocity flushing superheater for 4 hour acceptance run.*

DCR is a pioneer of revolutionizing procedures for flushing and cleaning of Boilers and HRSGs. We use proprietary chemicals and processes to clean steam generator water and steam sides simultaneously. DCR flushing capabilities also includes steam blowing, hydro laser pipe cleaning as well as lube oil flushing.

DCR provides flush pump and filter platforms as well as mobile chemistry laboratories with our professional services. These services are always conducted by industry experts who are dedicated and efficient.

## Ethylenediaminetetraacetic Acid



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North America • South America • Asia  
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**DCR ENGINEERS & CONSTRUCTORS**

*Since 1984*

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