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**Refining Actuator Systems and Their Reliability,
Lifespan Improvements Available in the Industry**

CatCracking.com
MORE PRODUCTION • LESS RISK

League City, TX, April 12-15, 2010

Philip Black, Director
pblack@earthlink.net



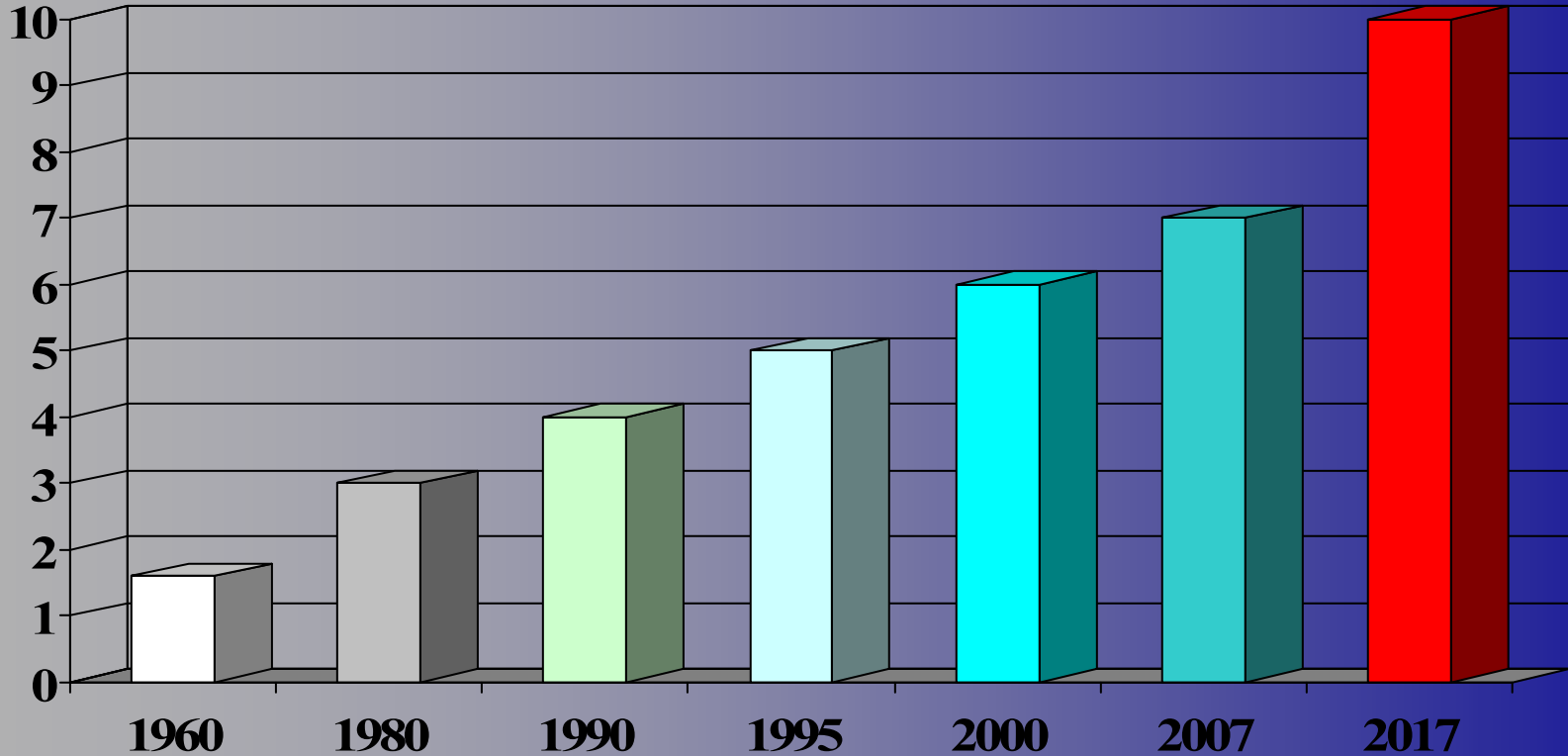
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Extending the Lifespan of FCCU Hydraulic Actuator Equipment



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Turn around chart in years



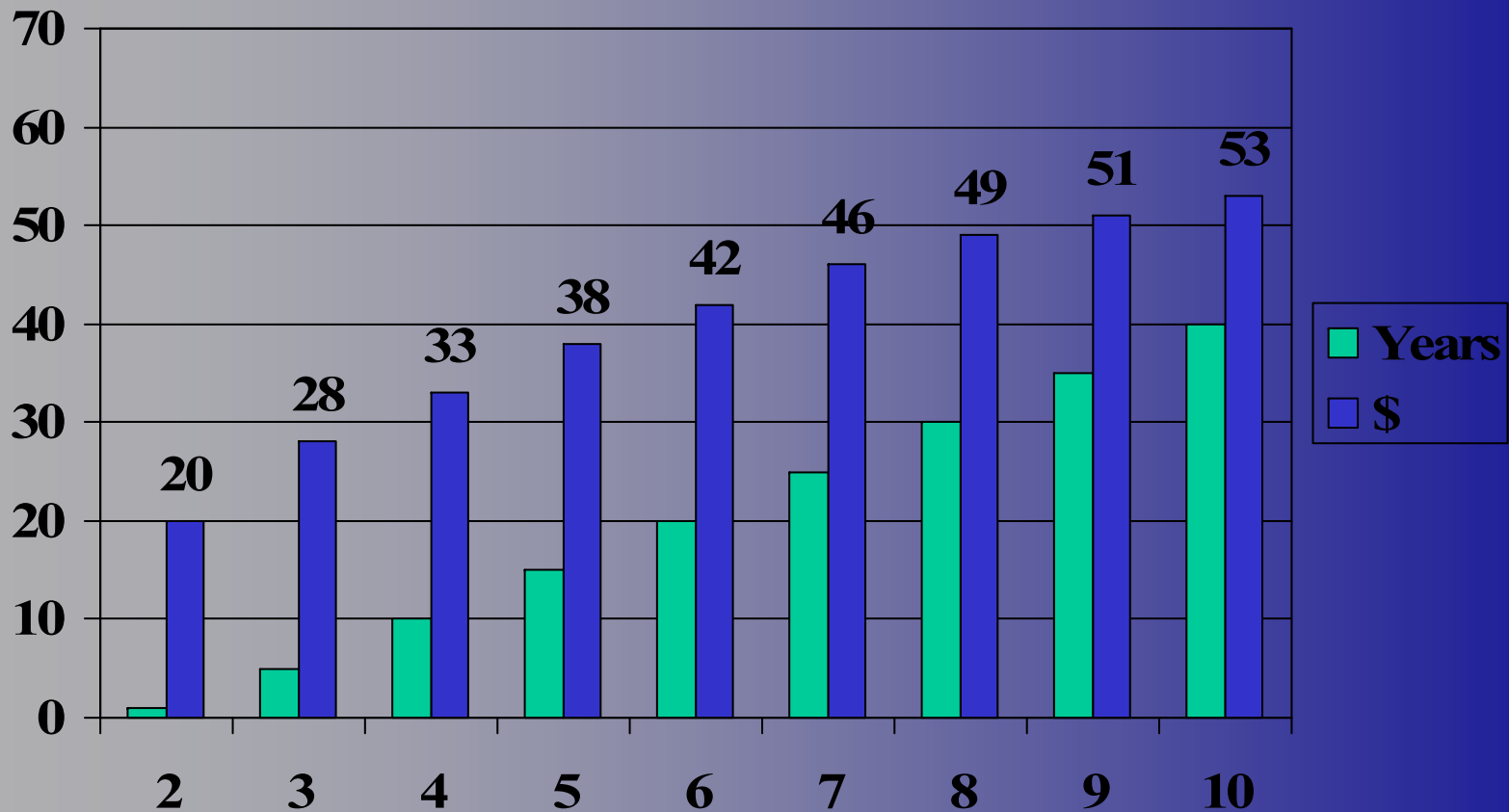


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Typical Failures of FCCU Hydraulic Actuator Equipment

- Cylinder Rod Seals
- Servo Valves
- Feedback Devices
- Pumps
- Position Control Amplifiers
- Solenoid Valves

Turn Around Chart in Years / \$





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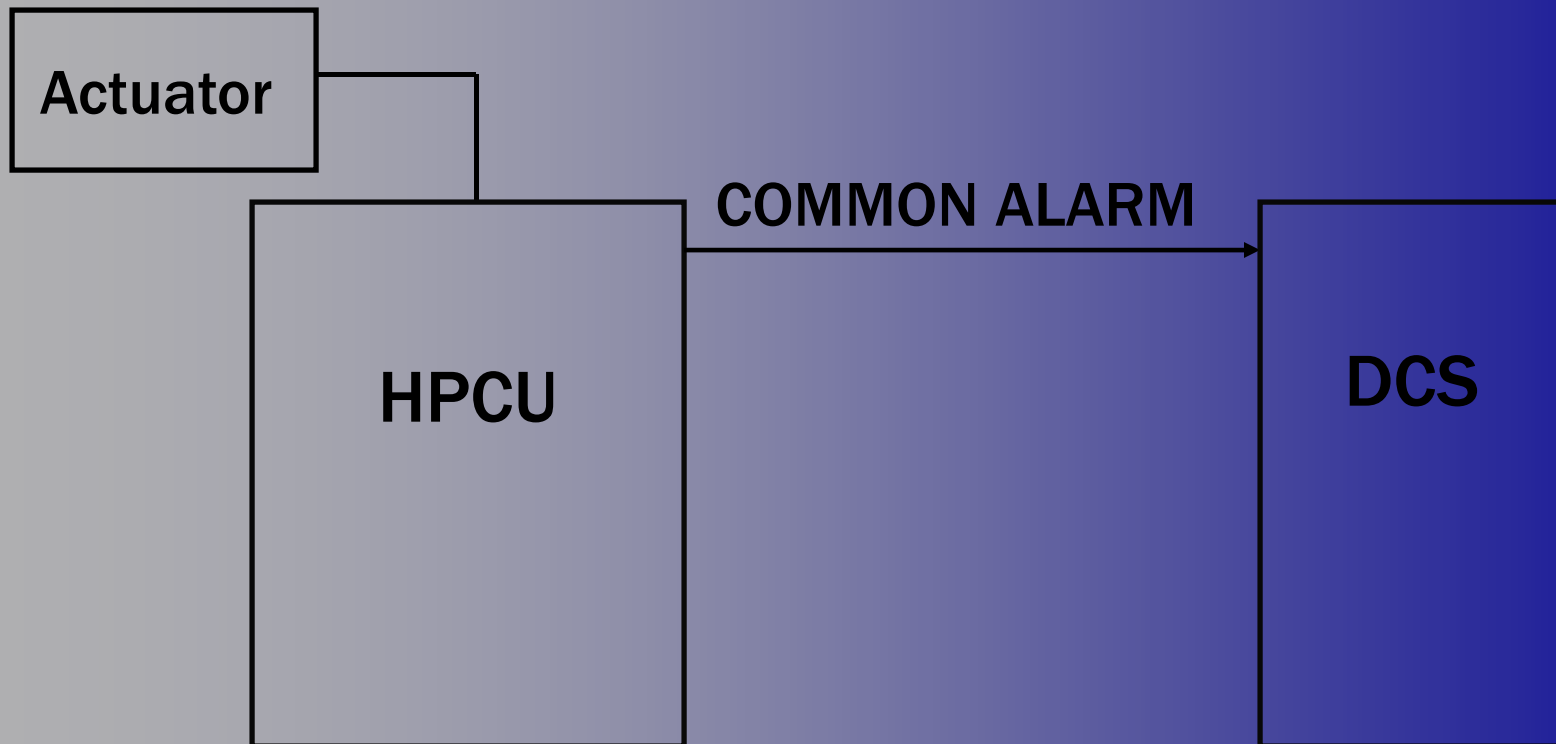
**COSTS OF 4 YEAR TA CYCLE
VERSUS
COSTS OF 6 YEAR TA CYCLE**

- **4 Year Cycle – 6 TA in 24 Years – Total Cost \$198**
- **6 Year Cycle – 4 TA in 24 Years - Total Cost \$ 168**
- **Savings of \$30 Million Dollars**



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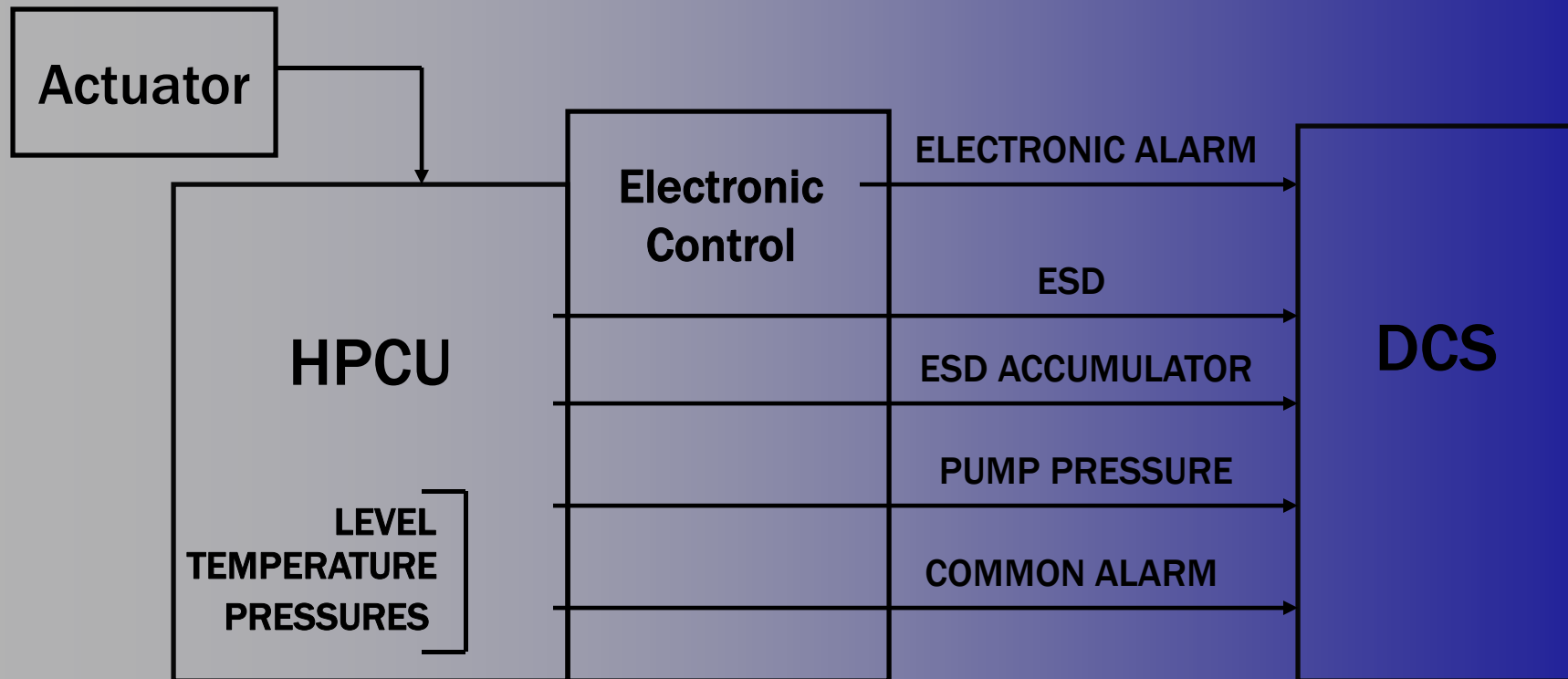
**SUPPLIED ALARM INFORMATION TO DCS
Actuator Systems in Early 1980's**





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**SUPPLIED DETAILED ALARM INFORMATION TO DCS
Late 1980's**





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Typical Failures Equipment

- Cylinder Rod Seals
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- Position Control Amplifiers
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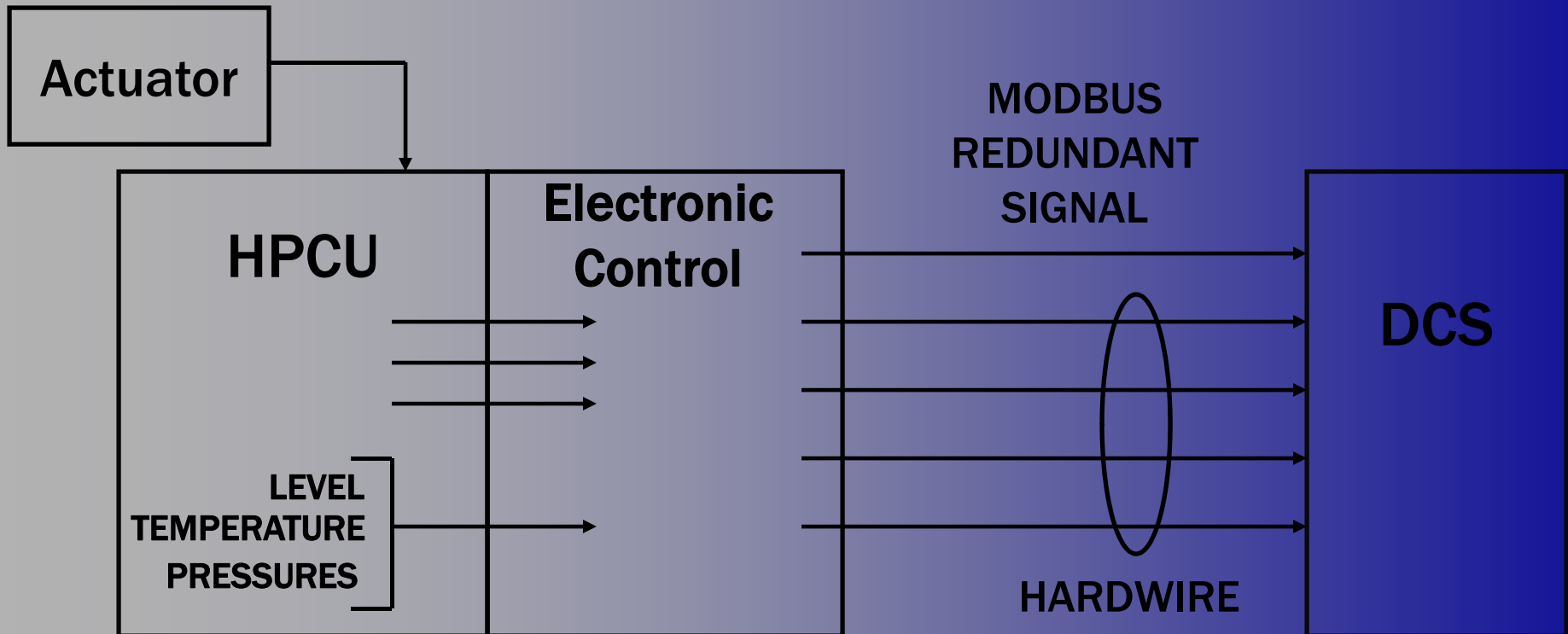
BLAC INC. Solutions

- BLAC INC. Patented Cylinder
- BLAC INC. Designed Servo
- Dual Feedback Devices / Patent
- Much Higher Quality Pumps
- Complete High Performance Amps
- Complete Change in Design



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**SUPPLIED ALARM INFORMATION TO DCS VIA
MODBUS AND HARDWARE
1990's From BLAC INC.**





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Hydraulic Power Unit Status:

- **Main Pump Pressures for Status of Operation**
- **Filter Discharge Pressure**
- **Circulation System Status**
- **Reservoir Level Transmitter**
- **Reservoir Temperature Transmitter**



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Hydraulic Control Unit Status:

- **Main Accumulator Pressures**
- **ESD Accumulator Pressures**
- **ESD Function Confirmation**
- **ESD System Mode Status**
- **Auto / Manual Status**



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Hydraulic Control Unit Status:

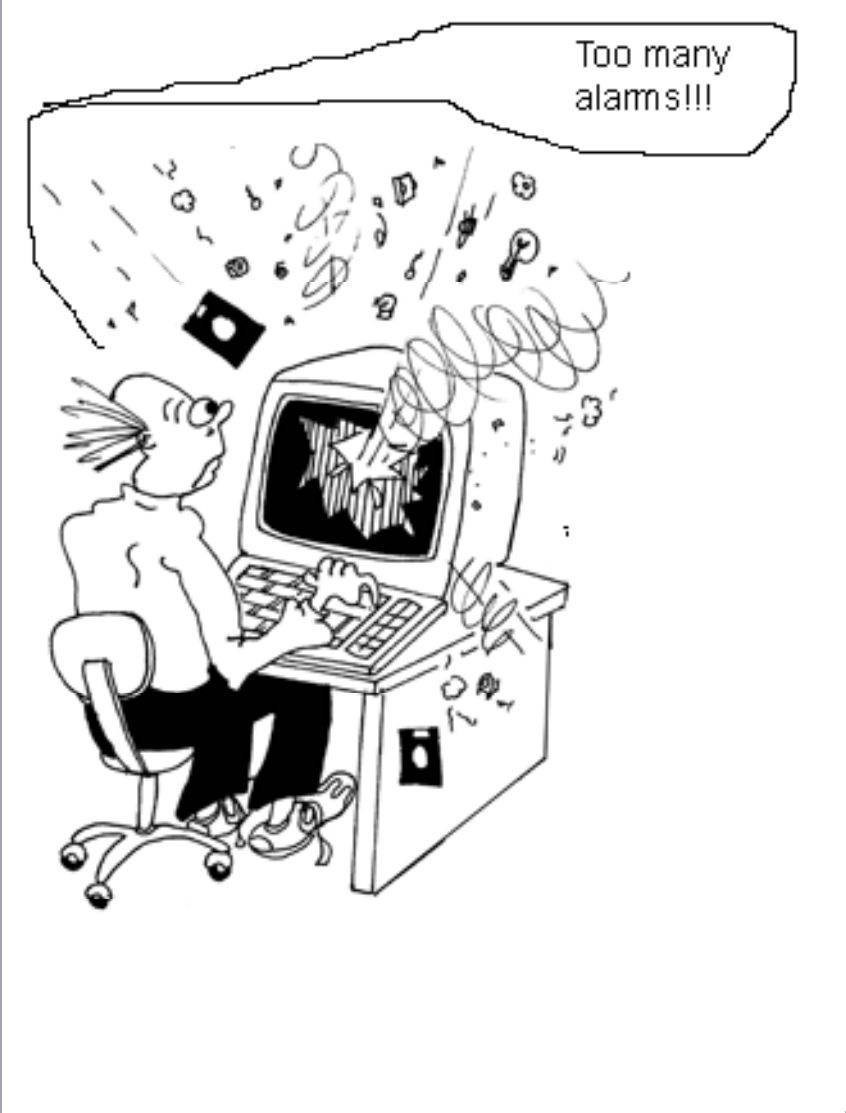
- Accumulator Pre-charge Pressures
- Readout of Actuator Force Output
- Dual Feedback Devices
- Limit Switches for End of Stroke
- Handwheel Engagement Limit Switch



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**Electronic Controller Functions Indicated
Through a Common or Individual Alarms:**

- **Loss of Command Signal**
- **Loss of Feedback Signal**
- **Loss of Tracking Signal (Deviation Compliance)**
- **Loss of Instrument Power Supply from UPS**
- **Loss of Internal Dual Redundant Power Supplies**





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In 1992 BLAC INC.

- **Redundant Testable Online ESD Installed**
- **Redundant Hydraulic Positioning Control System Installed**
- **Created the Monitoring of Real Time Data From The Actuators and Hydraulic Power and Control Systems**
- **Provided Redundant Power Supplies on All Projects**



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BLAC INC. Methods to Achieve Long Term Operation Cycle

- **Regular Change of Air And Oil Filters Ensures System Operation For 5-7 Years Without Failure**
- **Redundant Feedback Devices – BLAC INC. Is The First Company To Provide In 1994 - Now It Is In Most Of The Licensors Specifications**
- **Redundant Controlling Valves – BLAC INC. Is The First Company To Provide in 1992 - Now It Is In Most Of The Licensors Specifications**



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BLAC INC. Methods to Achieve Long Term Operation Cycle

- **Redundant Emergency Trip Valves – 1992 – Now
This is Part of Most Licensors Specs**
- **Circulation Systems To Circulate Fluid
Continuously To Remove Moisture And Small
Particulates**
- **Monitoring Of The Force Levels Of The Operated
Valve Through It's Stroke Sequence**



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**BLAC INC. Methods To Achieve Long Term
Operation Cycle**

- **Monitoring Of The Steam, Air Or Nitrogen Purge To The Valve Stem Packing**
- **Monitoring Of Valve Position With Respect To The Thrust Required To Move The Valve**



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**BLAC INC. Methods To Achieve Long Term
Operation Cycle**

- **We Now Use The Data Collected Over Time To Predict The Turnaround Requirements For The HPU and Actuators**

CONTROL MANIFOLD

