

Welcome To the WPCA's Chattanooga Precipitator Controls Workshop

Paul Ford
President



REDKOH INDUSTRIES, INC.

MEGA *mation*

PO Box 801

Belle Mead, NJ 08502

Tel: +1 (908) 874 5588

Fax: +1 (908) 874 7994

paulford@redkoh.com

www.redkoh.com

ELECTROSTATIC PRECIPITATOR CONTROLS SYSTEMS

July 6, 2007

Paul Ford - Redkoh Industries



July 6, 2007

Paul Ford - Redkoh Industries



July 6, 2007

Paul Ford - Redkoh Industries



July 6, 2007

Paul Ford - Redkoh Industries



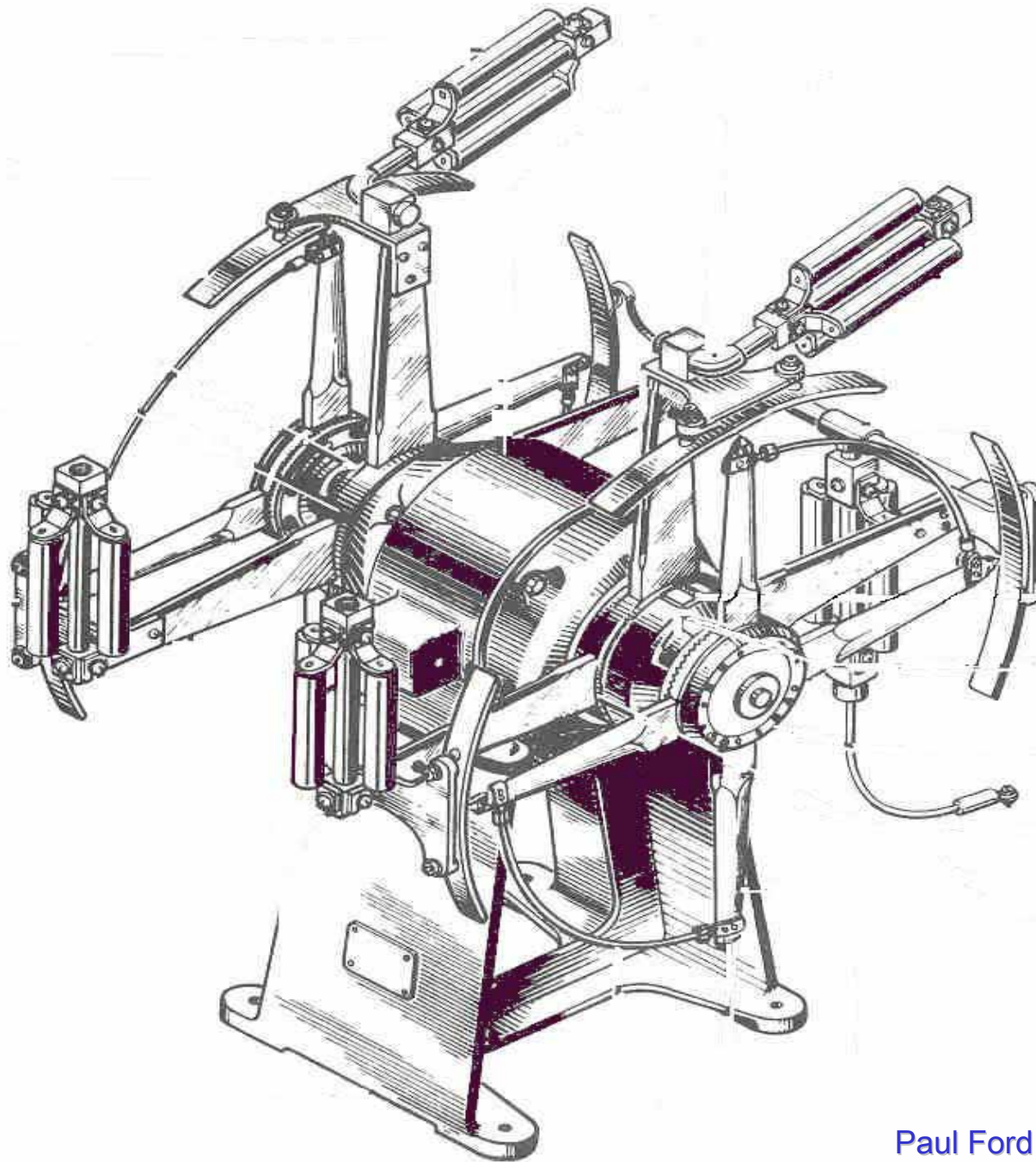
July 6, 2007

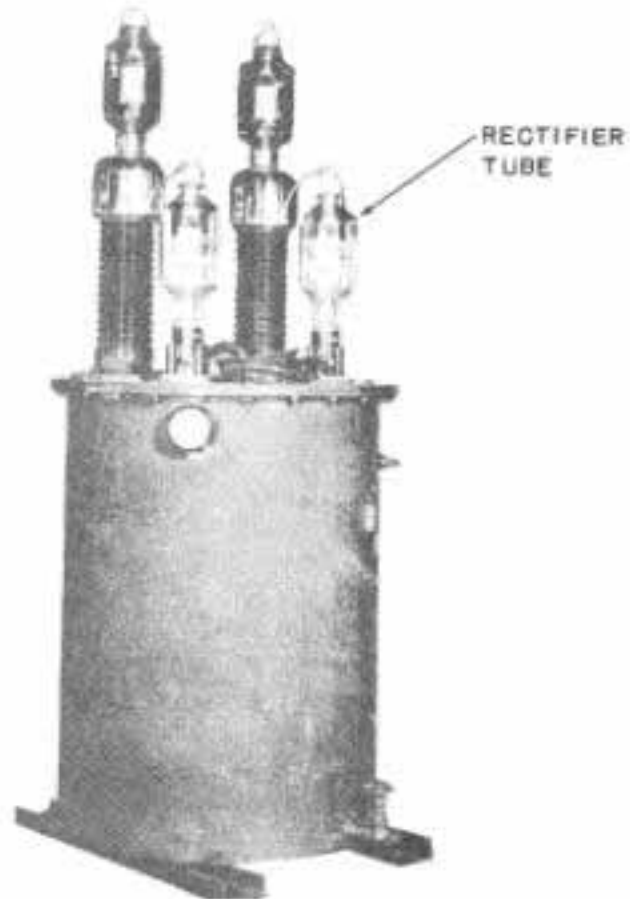
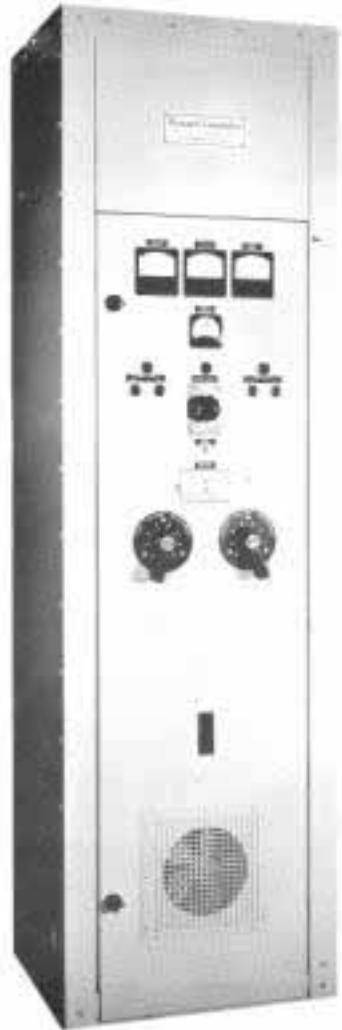
Paul Ford - Redkoh Industries

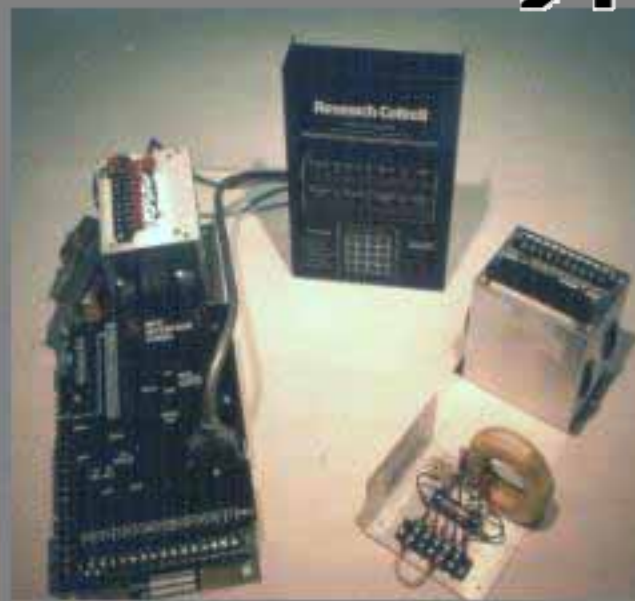


July 6, 2007

Paul Ford - Redkoh Industries

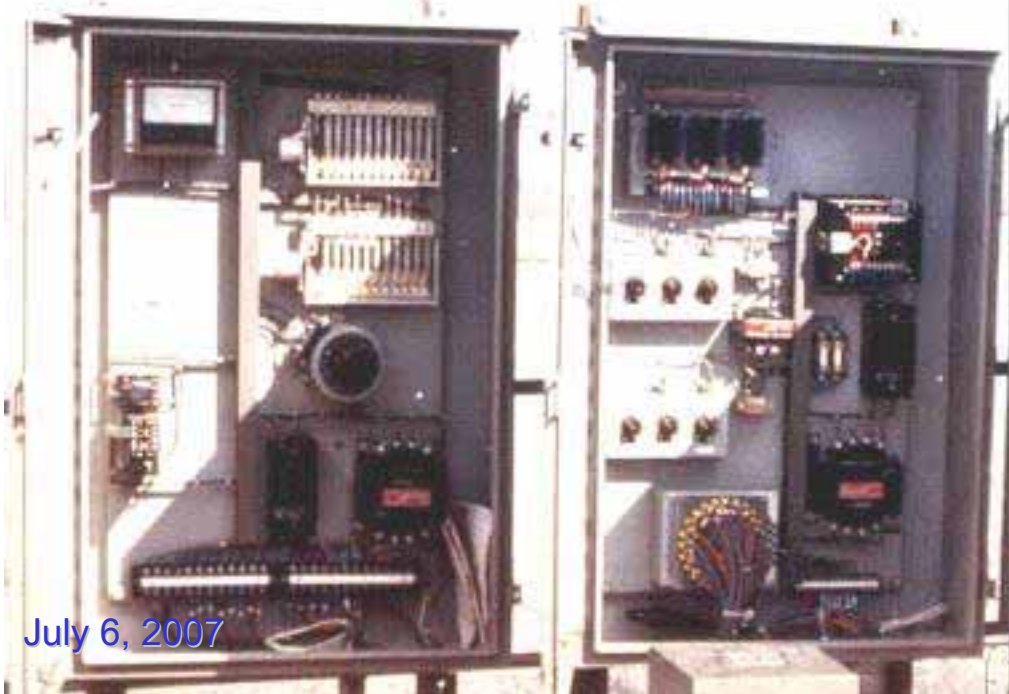
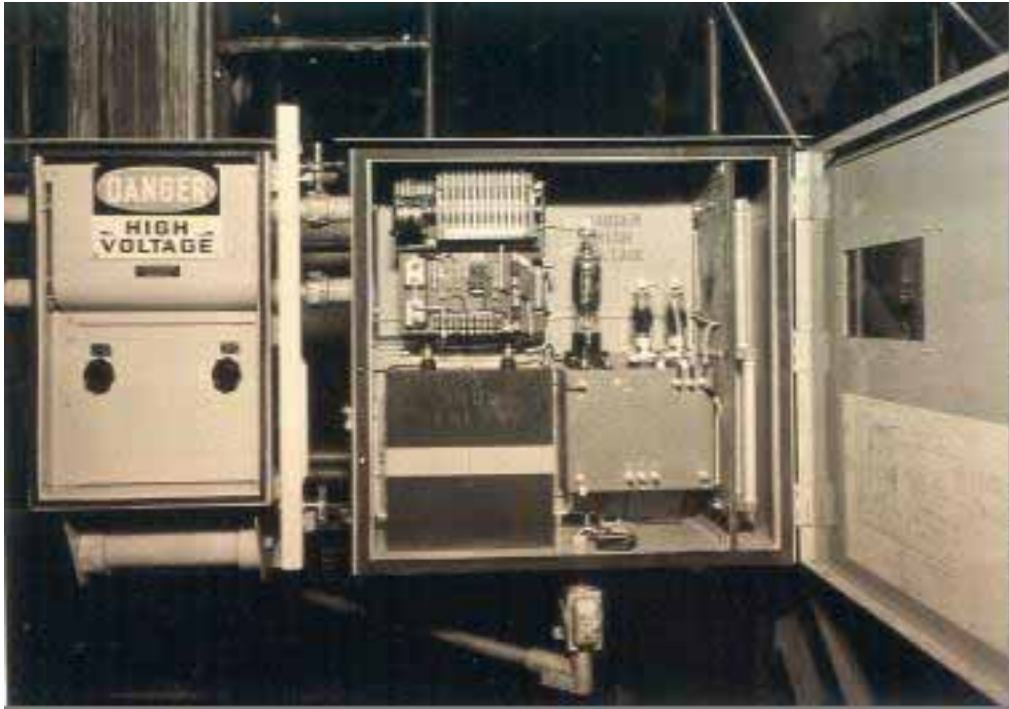






July 6, 2007

Paul Ford - Redkoh Industries



July 6, 2007



Paul Ford - Redkoh Industries



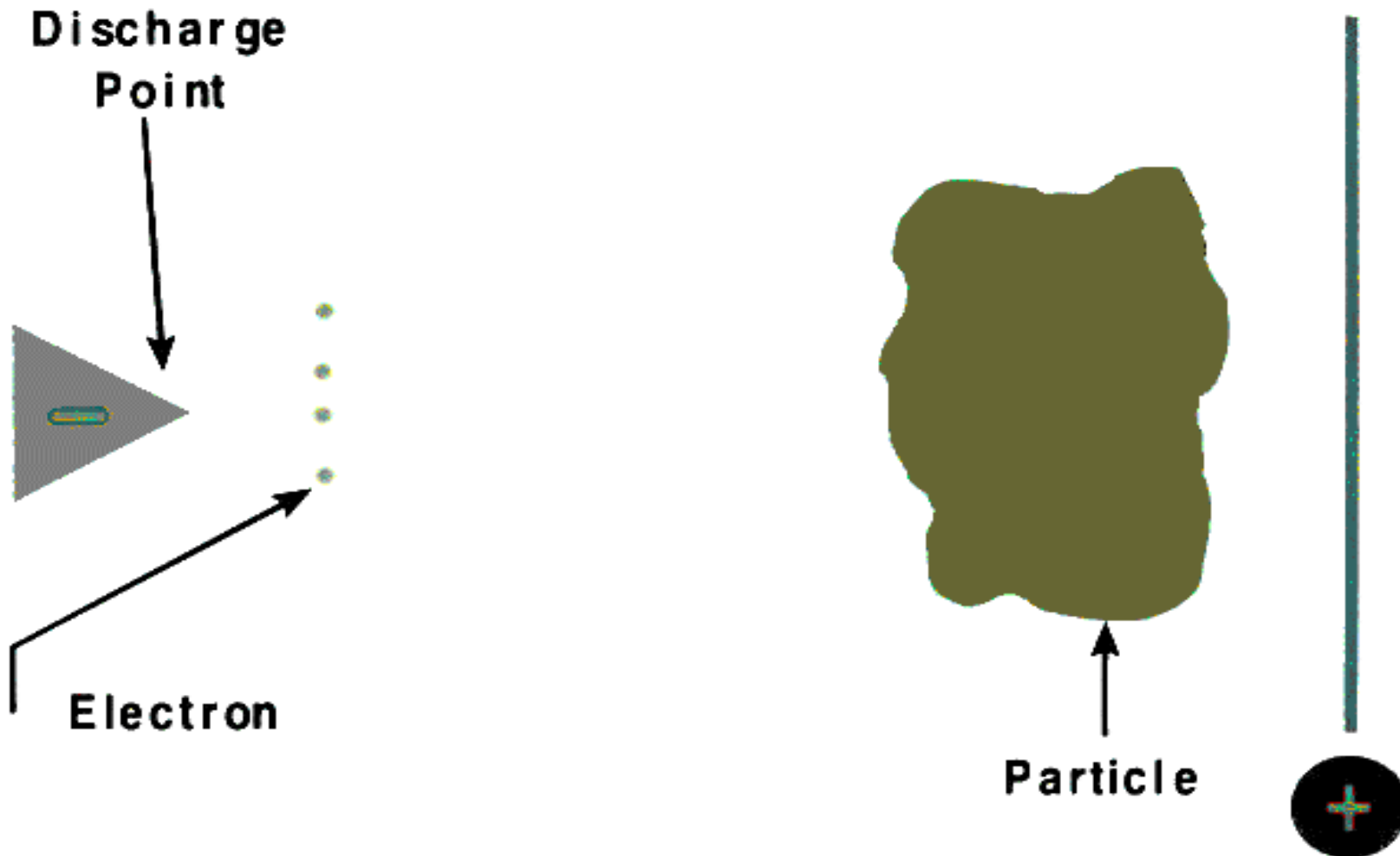
July 6, 2007

Paul Ford - Redkoh Industries

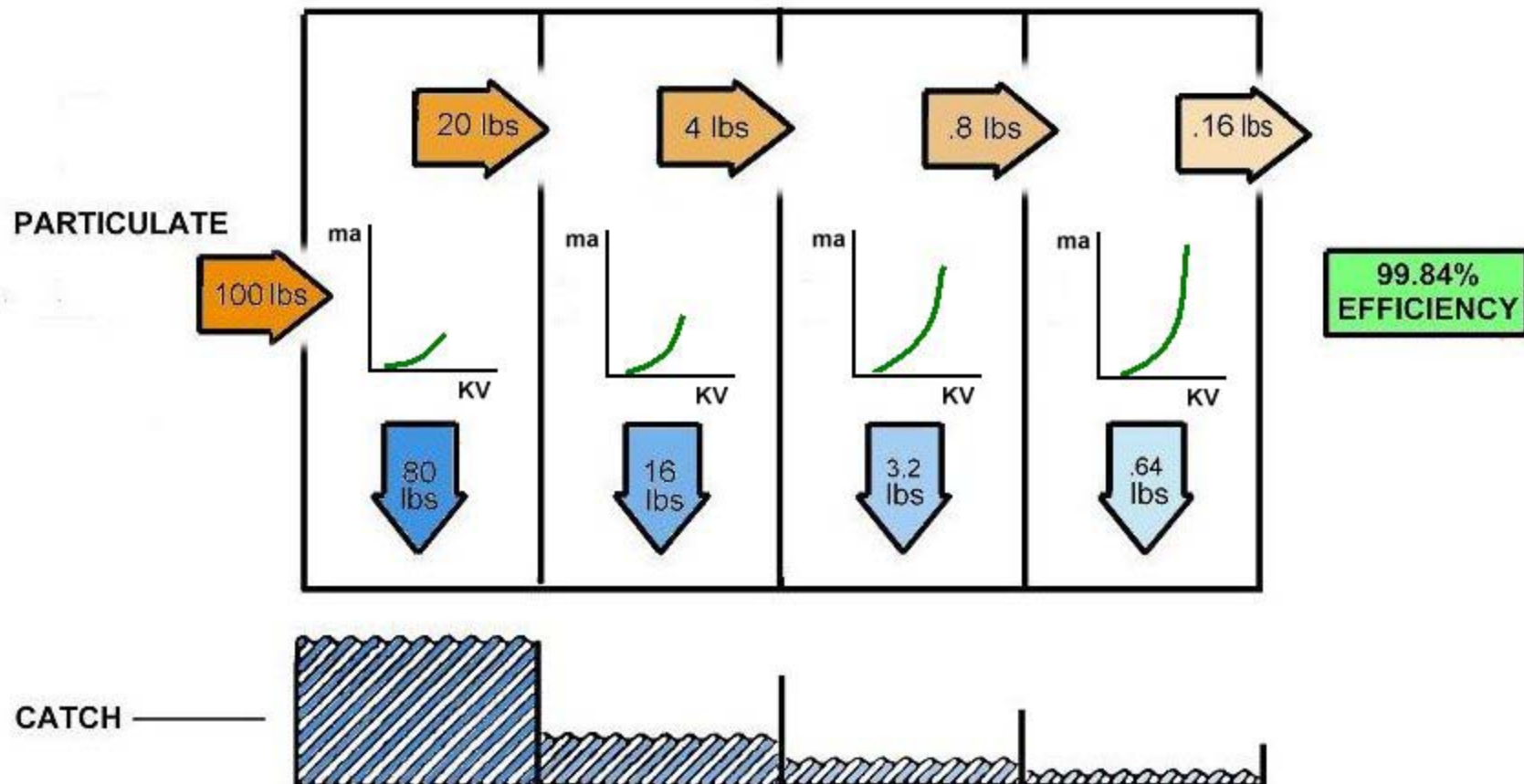
The Purpose of a Transformer Rectifier Control System

- ◆ To provide a source of high voltage DC to the discharge electrodes in an electrostatic precipitator.
- ◆ To monitor and maximize the voltage and to ensure the minimum particulate emissions under all operating conditions

Particle Charging

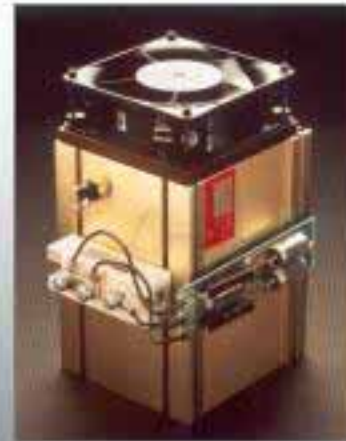


Collection by Field





Puck and Stud SCRs



Module Style SCRs

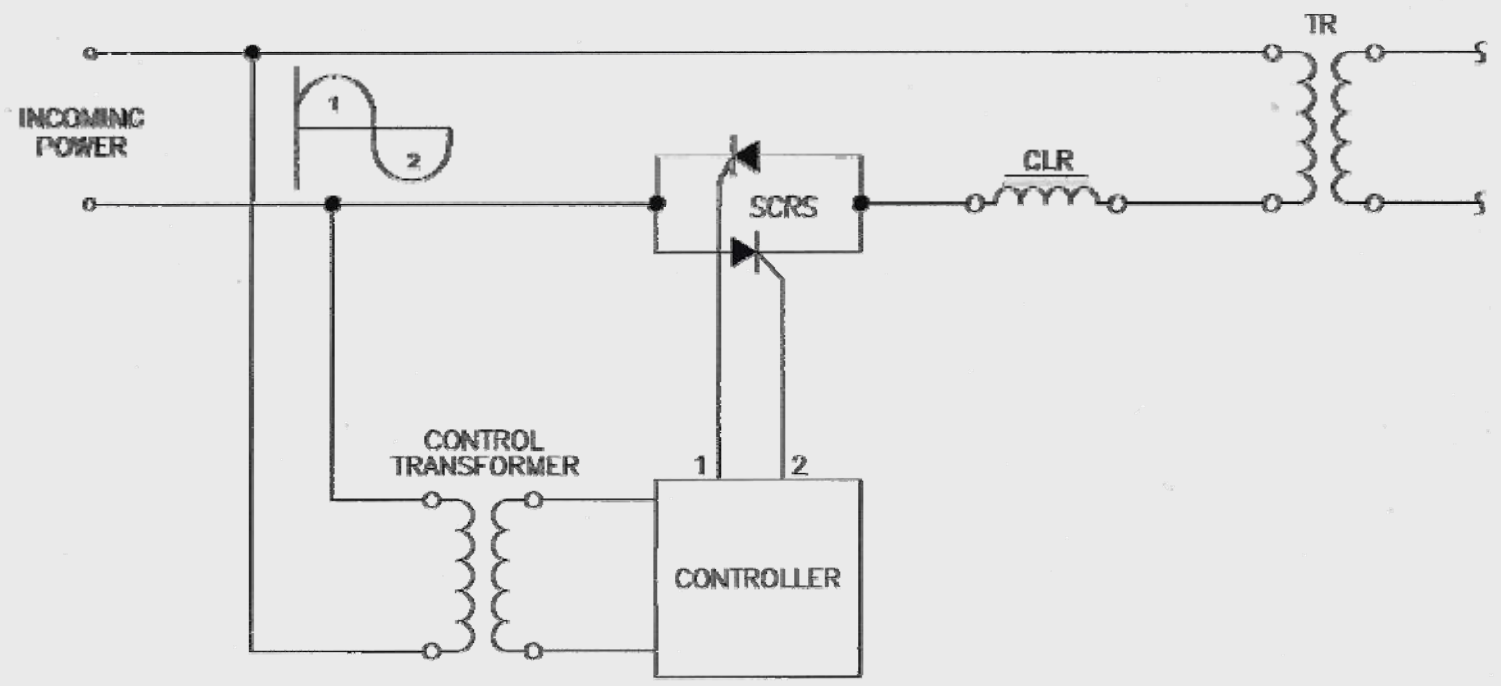
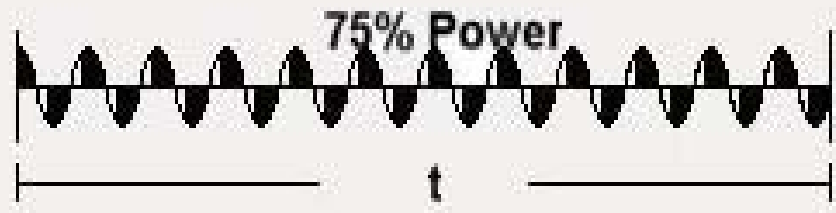
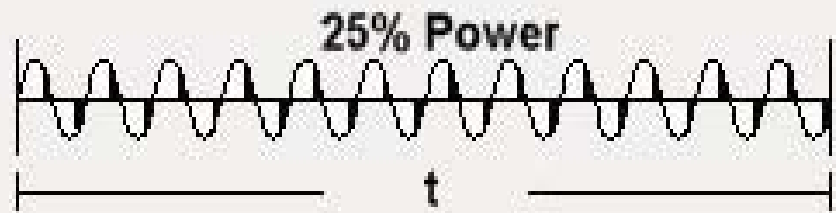


IGBTs

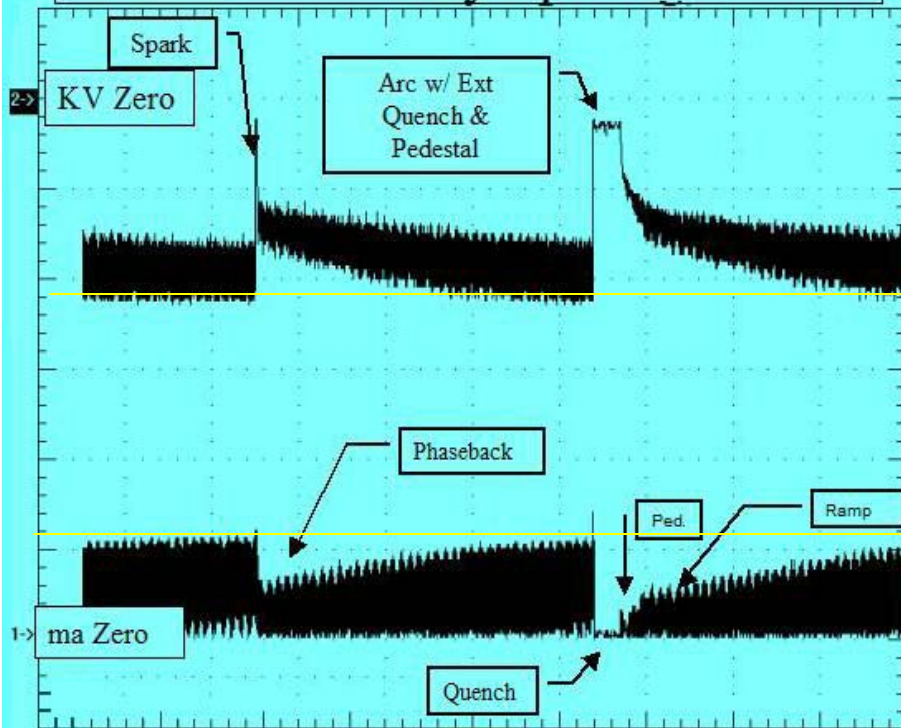


July 6, 2007

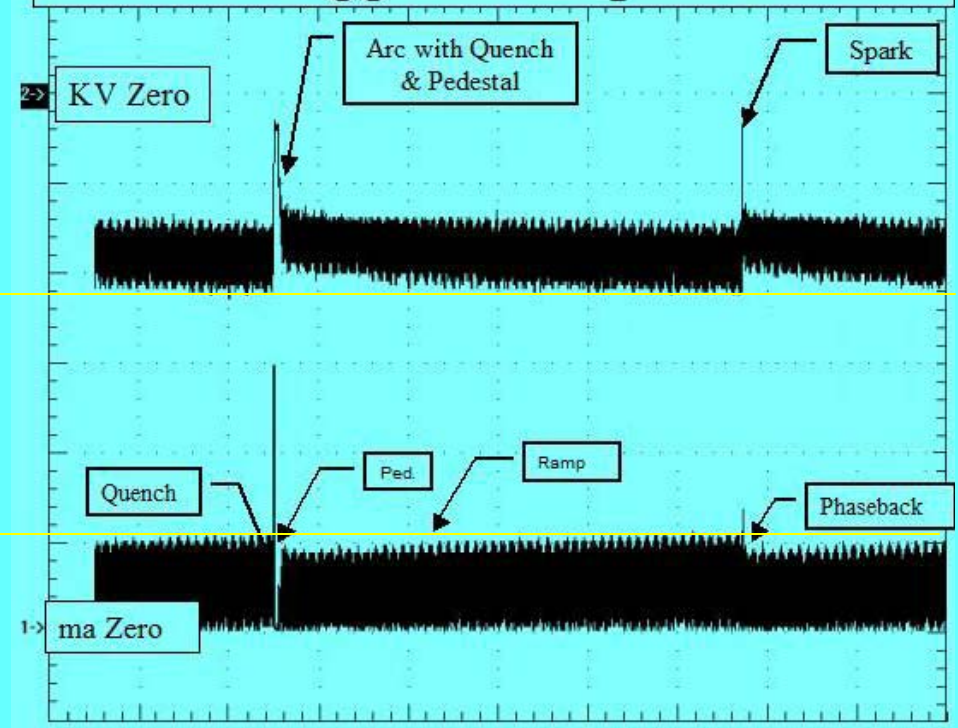
Paul Ford - Redkoh Industries

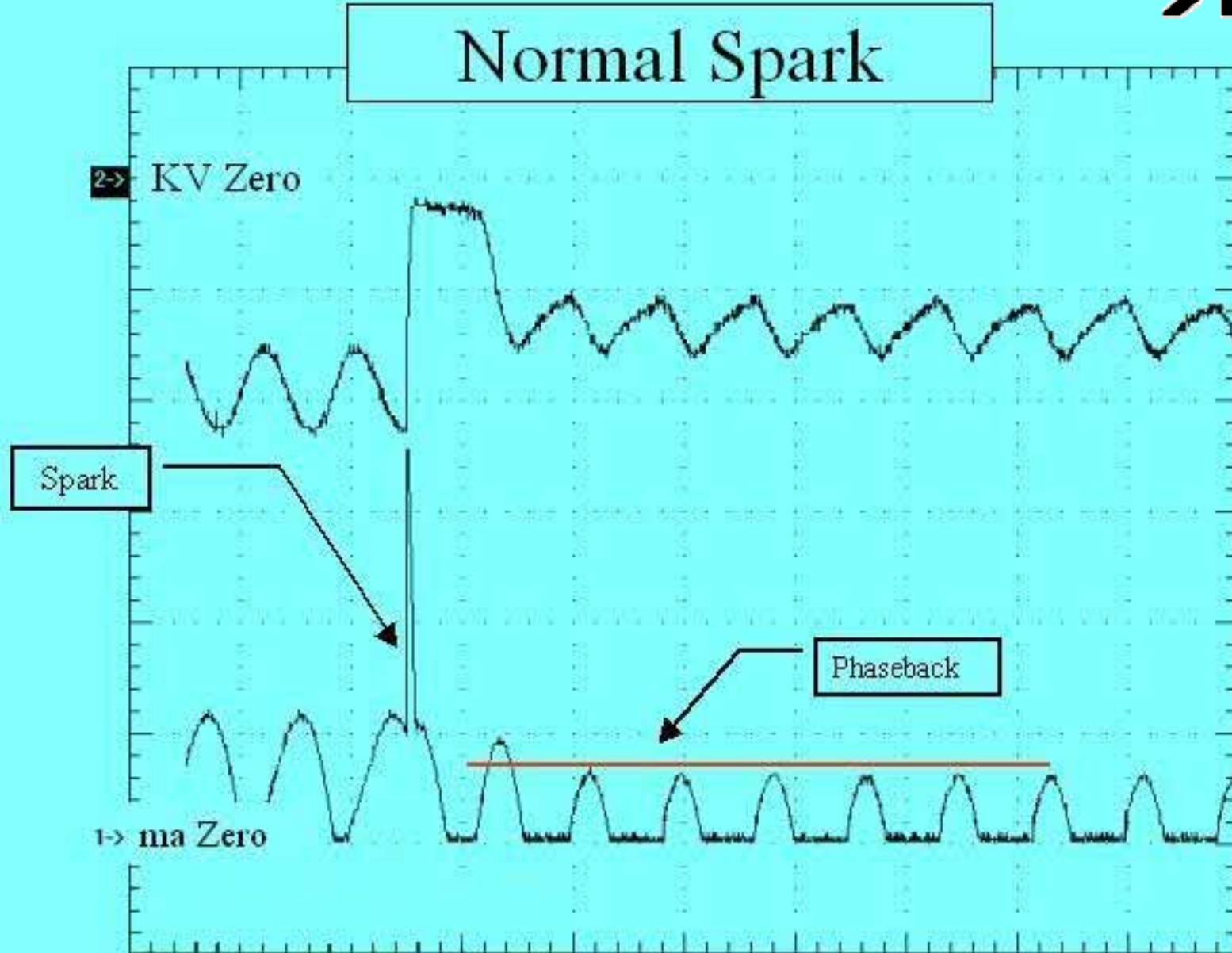


Lazy Spark



Aggressive Spark





1st Field



2nd Field



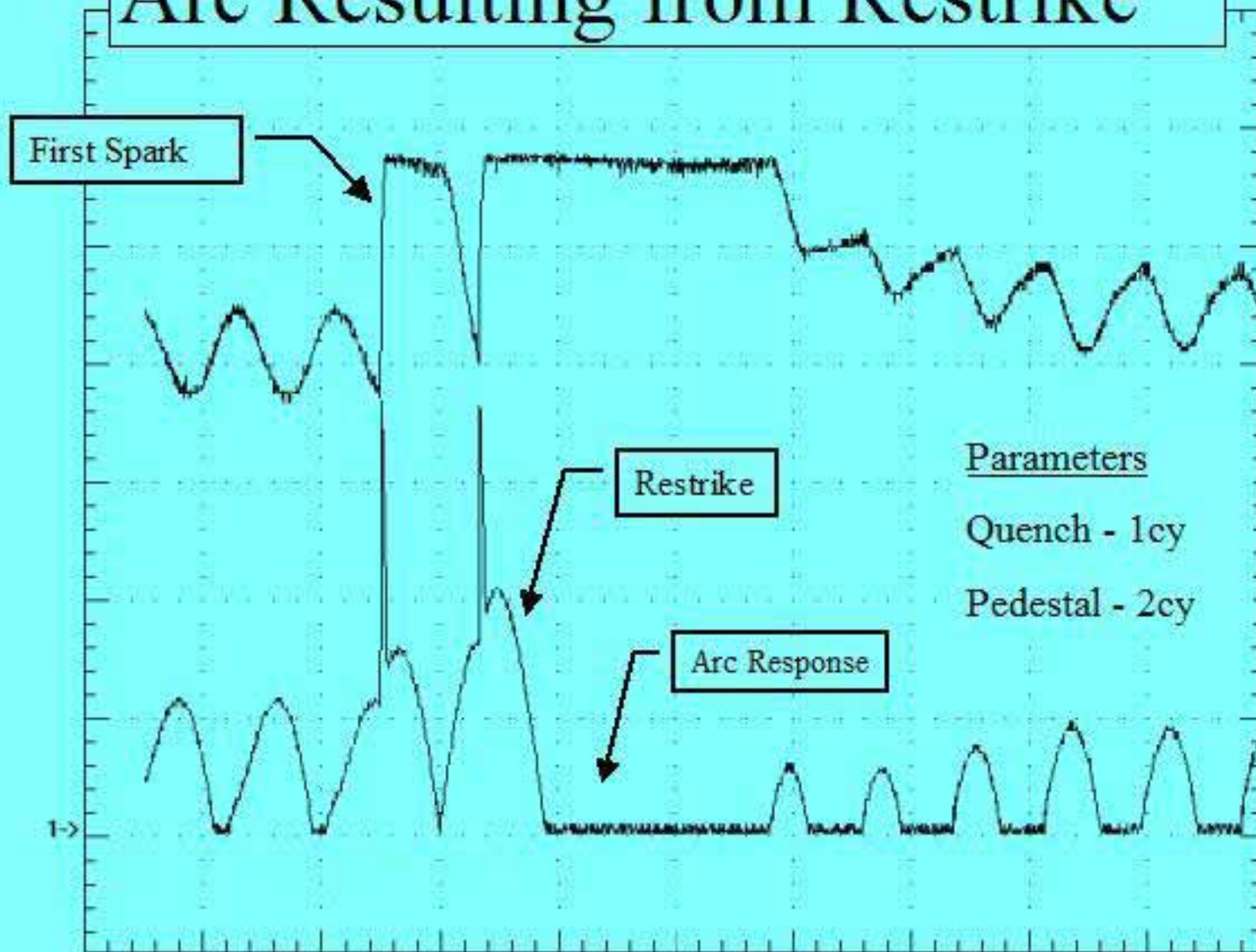
3rd Field



4th Field

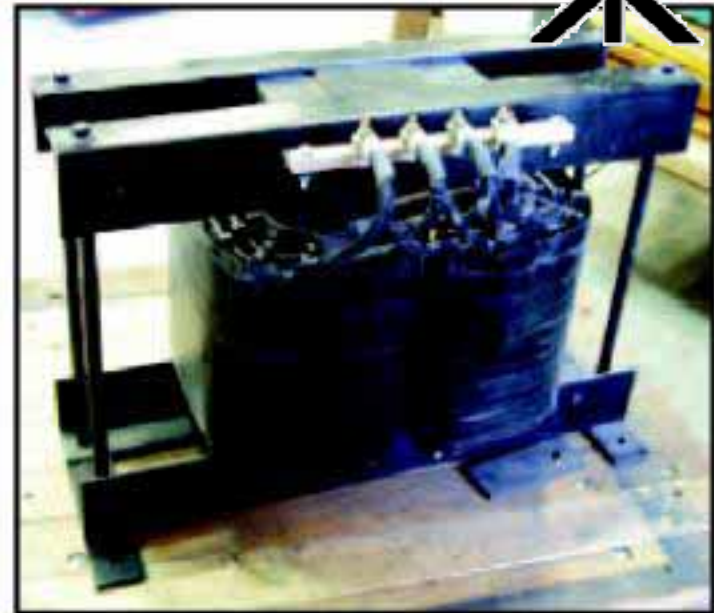
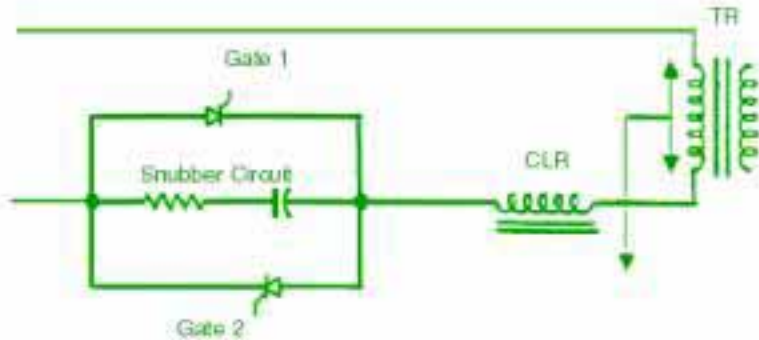


Arc Resulting from Restrike



CLR

Current Limiting Reactor



Current Limiting Reactor

Time	Primary Volts	Primary Amps	Secondary Voltage (KV)	Secondary Current (ma)	Conduction Angle (degrees)
1	399	238	45	1500	155
2	395	236	44	1507	158
3	392	234	43	1500	162
4	382	228	42	1460	162
5	376	224	41	1430	162
6	362	215	40	1367	162
7	358	213	39	1350	162
8	338	202	37	1274	162

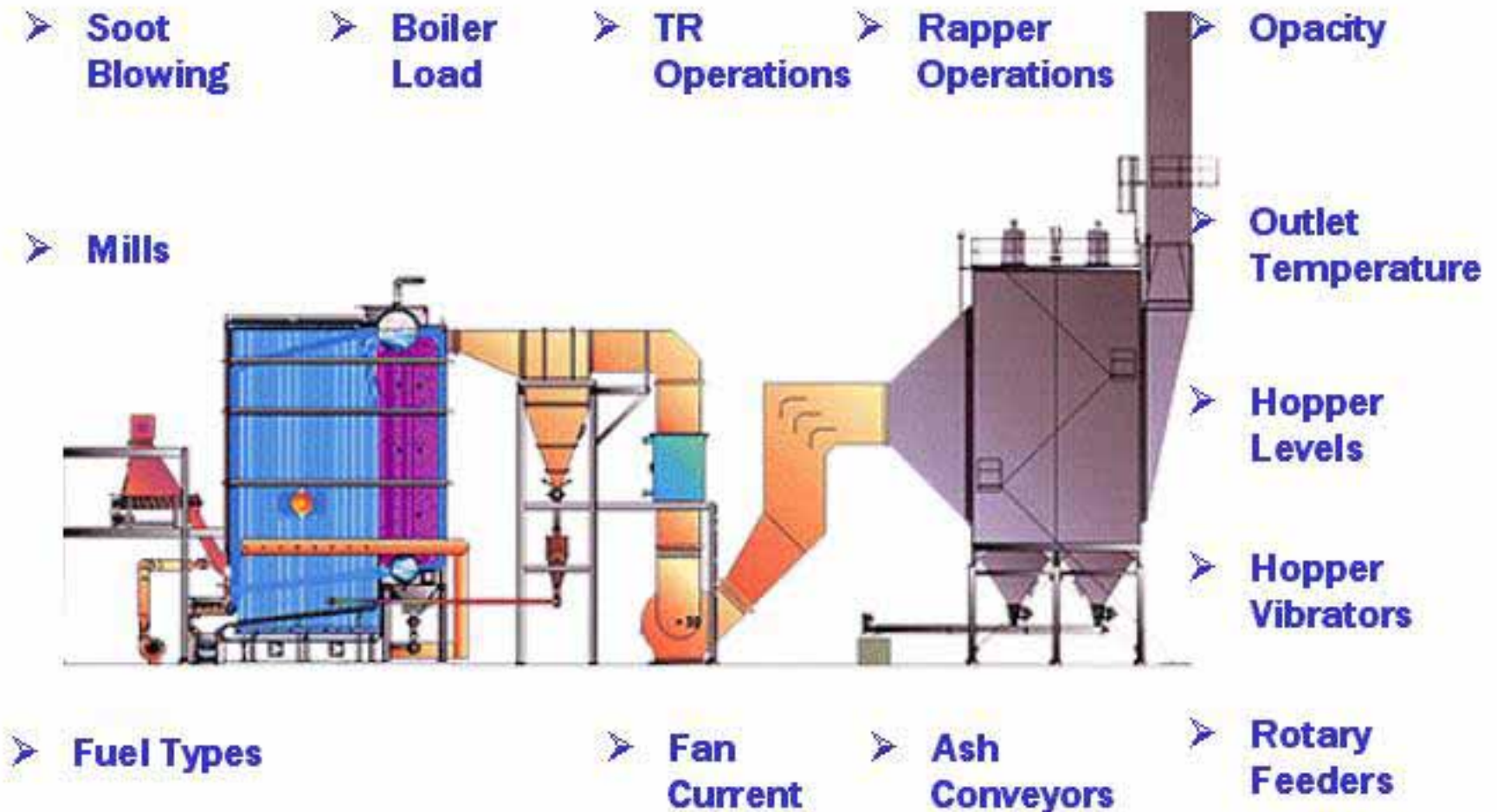
Electrical readings that indicate a CLR failure

Size a reactor

Spot a failing reactor

Failure modes

Data Management

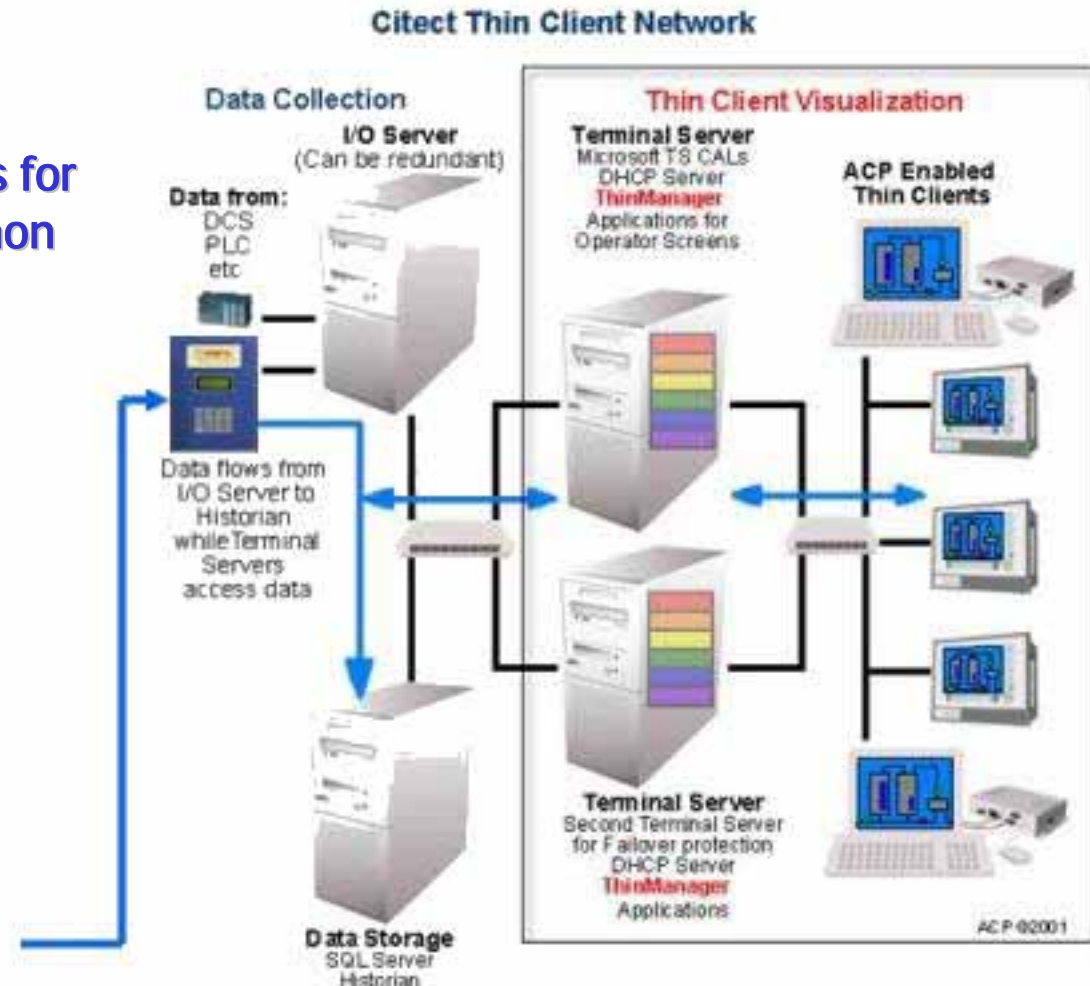


Central System Data Flow

- Keep the Serial Data Links for the TR's and Rappers common



- Check out the benefits of using both your own DCS and the vendors PC based systems



Reasons To Keep your Controls up to Date

- Stricter enforcement of the Clean Air Act
- Greater flexibility in fuel purchase/process operation
- Need for remote control/data acquisition
- Reduce energy usage and cost
- Standardization of controls
- Controls are old and unreliable
- Obsolescence



Is ESP Controls Training Important?

- The output of your operation depends on the cleanliness of your stack.
- The cleanliness of your stack depends on the ESP operating at optimum efficiency.
- Optimum efficiency will not occur unless the controls are optimized.

YES it is important!



Many Thanks

July 6, 2007

Paul Ford - Redkoh Industries

The Trend to High Frequency

- Reduce the equipment physical size
- Reduce the mains power consumed
- Increase the average voltage and hence current draw capability

