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IPRO 303: Failure Prediction Modeling of Power Plant Emission Control Systems

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Professor: Ed Feldy

Sponsor: SmartSignal

Statement of Problem

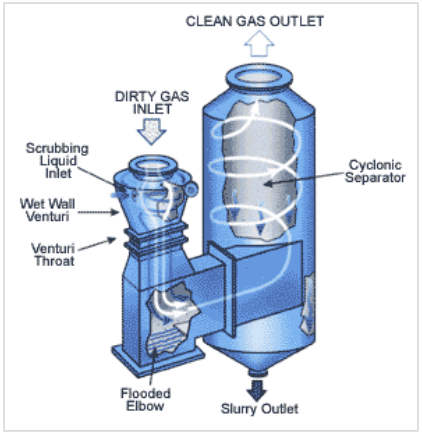
- Our IPRO is based on SmartSignal's software that predicts failures in power plants.
- SmartSignal currently monitors the generation side of power plants and wants to expand into the pollution control side.
  In order to accomplish this, SmartSignal would like us to investigate:
  - What are the regulatory drivers?
  - What types of systems are being deployed to remove what pollutants?
  - How much instrumentation is available on these systems?
  - How do these systems fail?
  - How can the available instrumentation be used to remotely monitor and detect developing problems?
- Early failure prediction can save companies millions of dollars and prevent catastrophic accidents and save lives.

Organization of the Team

<u>Wet Scrubbers</u>
Insiyah Arastu
Brett McQuillan
John Bouikidis
Jay Patel

<u>ESPs and Baghouses</u>
Zachary Capps
Lavesh Mohinani
Satyam Kaneria

<u>SCRs</u>
Sean Irish
Cari Hesser
Dave Belanger



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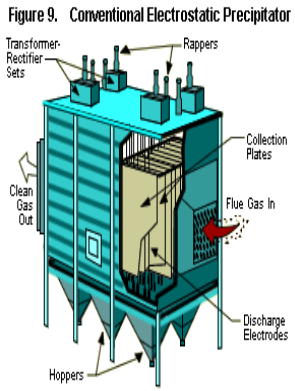

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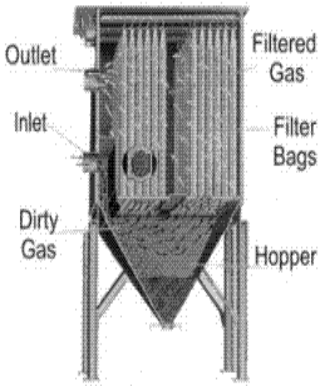

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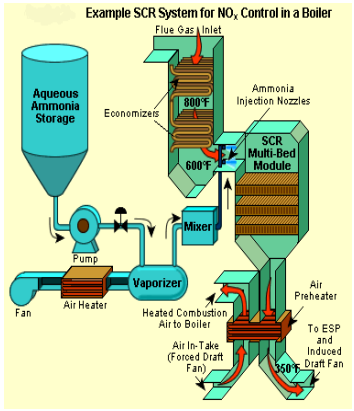

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*1,2,3,4 See reference Slide

Goals of the Project

- Investigate types of systems used to remove pollutants. (SCR's, ESP's, etc)
- Investigate laws that various government bodies place on the emissions.
- Investigate the frequency and reasons for failure of various treatment systems and understand how their failure affects the emissions.
- Investigate the available instrumentation on systems and see how they can be used to remotely detect developing problems.

Progress towards goals

- Organizing teams
- Preliminary research on treatment systems.
- In the process of setting up a power plant visit and contacting treatment system manufacturers.

Problems and Resolutions

- PROBLEMS:
  - Clarifying the goal set by SmartSignal for our IPRO
    - Time delay
    - Sub-team organization issues
- RESOLUTIONS:
  - Conference call with David Farrell – project manager at SmartSignal
    - Goals were clarified
    - Sub-teams were organized
    - Research got underway

Future Issues and Solutions

- FORSEEABLE ISSUES:
  - Getting power plants to let us visit them
  - Hearing back from power plants we've contacted
  - Compiling the data into a cohesive document ready for presentation to SmartSignal
- POTENTIAL RESOLUTIONS:
  - Contact many power plants to increase the likelihood of securing visits
  - Create a general format for documenting research to make the compilation process easier in the end

Questions

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References

1. http://www.mikropul.com/products/wscrubber/venturi.gif
2. http://www.epa.gov/apti/bces/module6/matter/control/images/fig09.gif
3. http://www.princolevelcontrols.com/images/baghse.gif
4. http://en.wikipedia.org/wiki/File:SCR2.GIF