AUGMENTED OFFGAS SYSTEM

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PURPOSE

- Explain Augmented Offgas (AOG) System Design at Oyster Creek.
- Discuss AOG challenges experienced.
- Discuss current AOG Improvement Plan.

SYSTEM FUNCTION

- Minimize the amounts of radioactive and non-radioactive gases released to the atmosphere to "as low as is reasonably achievable“.

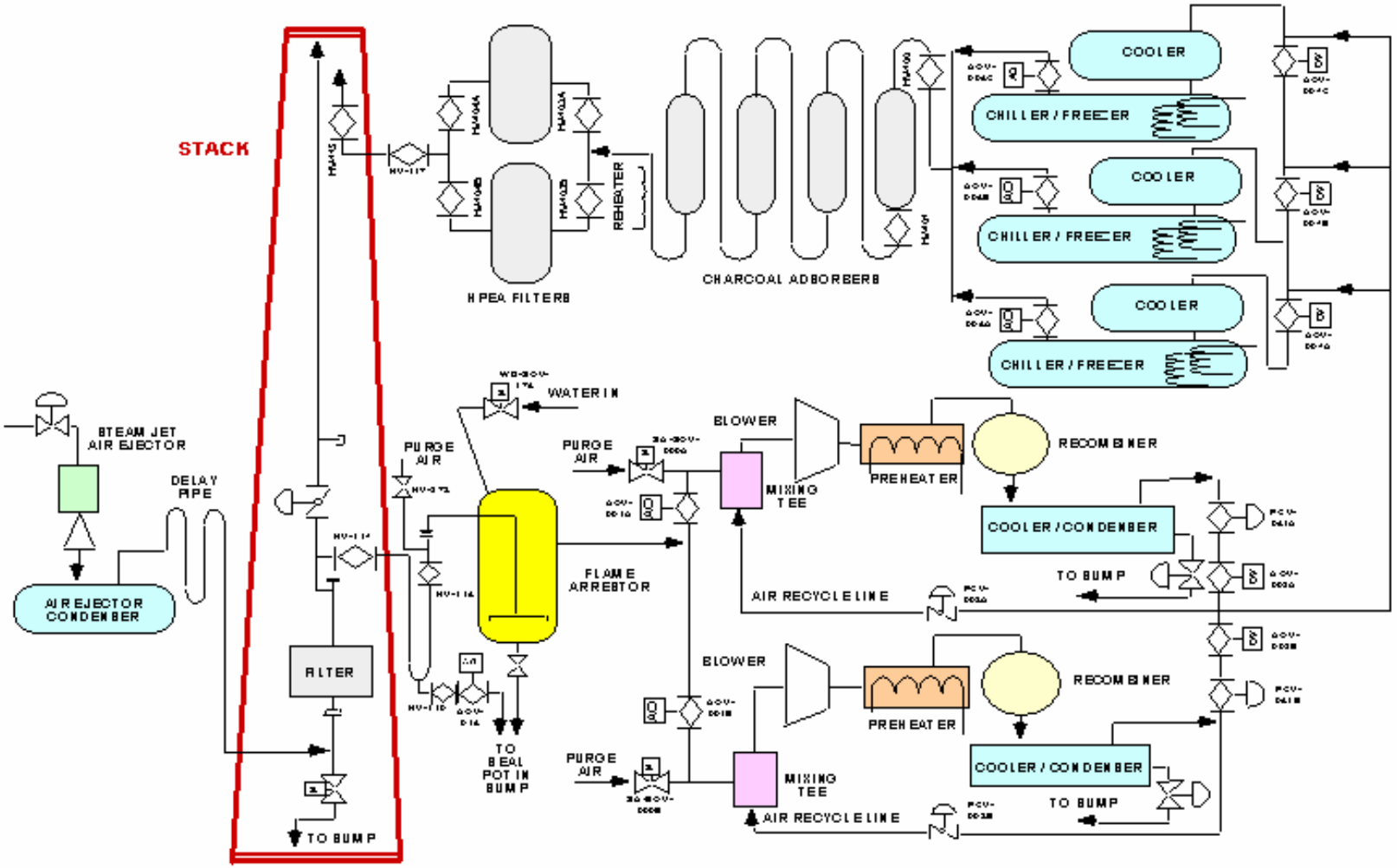
SYSTEM REQUIREMENTS

- This control implements the requirements of General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives given in Section II.D of Appendix I to 10 CFR Part 50.
- Contributes to plant effluents not exceeding 25 mrem to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

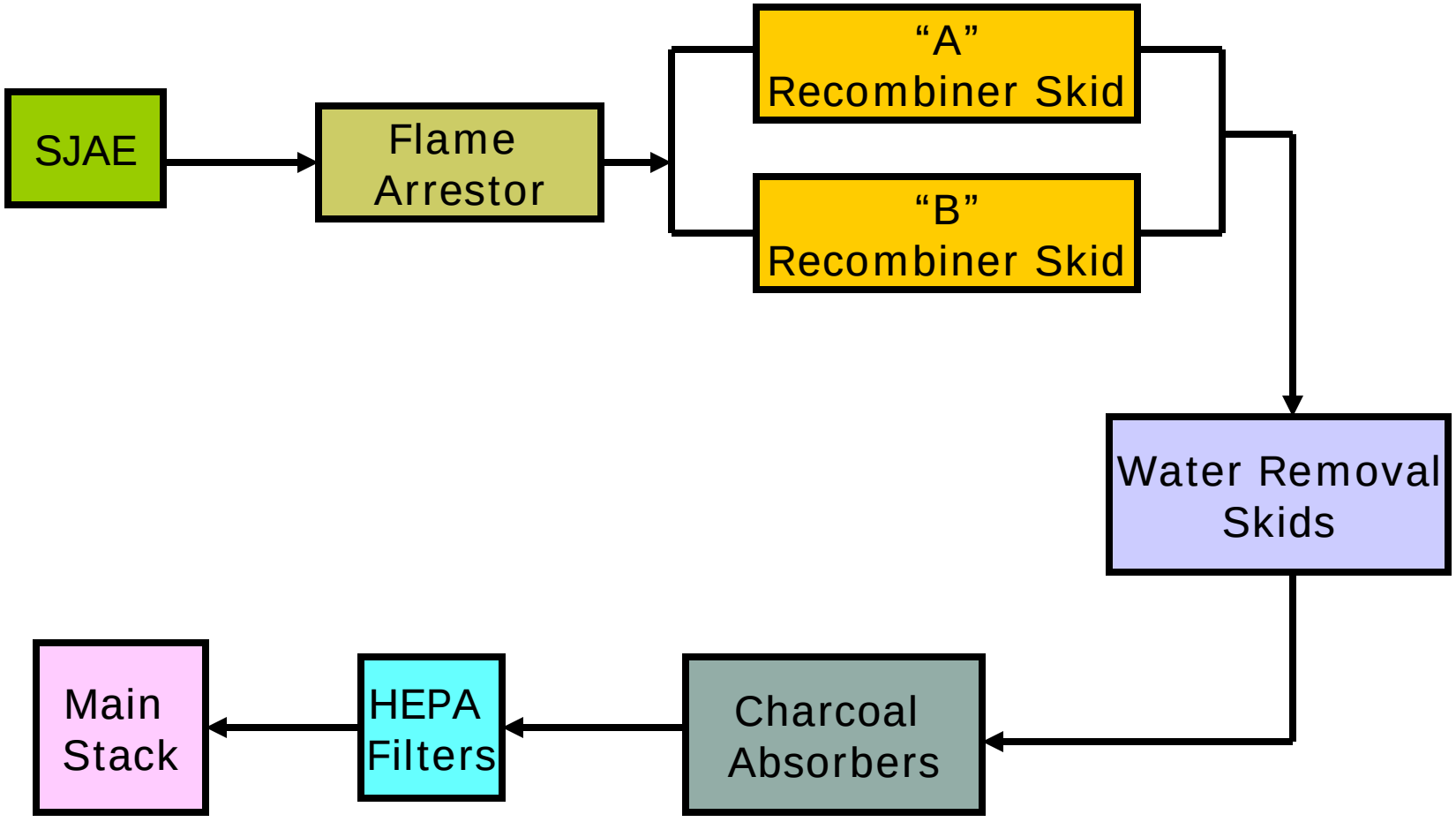
TYPES OF GASES

- Non-radioactive
  - Hydrogen and oxygen: the product of radiolytic decomposition of water under a neutron flux.
  - Air in-leakage
  - Water vapor
- Radioactive
  - Xenon gas
  - Krypton gas

AOG FLOW DIAGRAM



AOG FLOW DIAGRAM

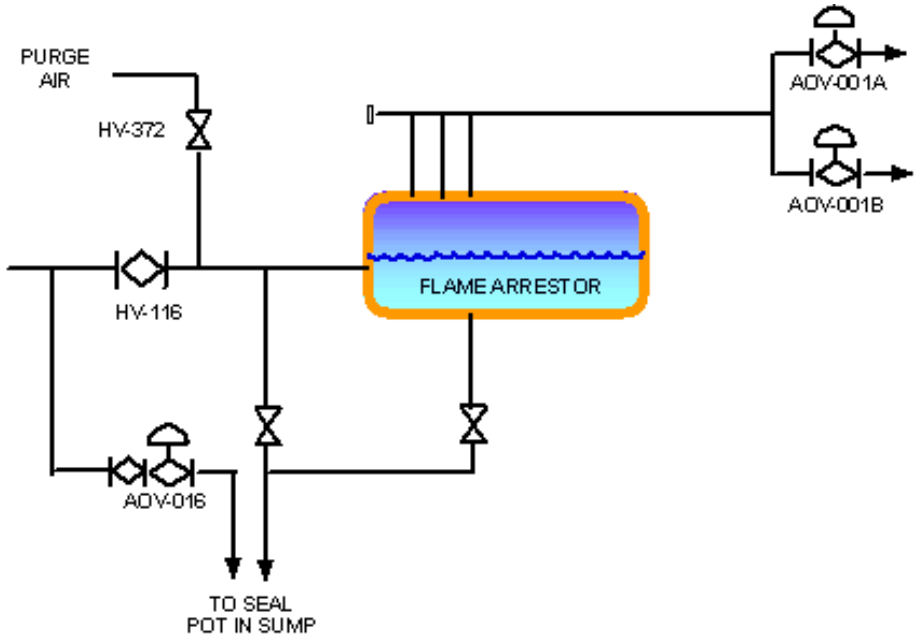


FLOWPATH

- Offgas flowpath comes from the discharge of the SJAE's into the air ejector condensers and travels through the offgas delay piping, where decay of N-16 and other short-lived isotopes occurs.
- At the base of the main stack, the offgas flow is directed through the AOG System (or out of the main stack if AOG is not available).
- Offgas is routed through the AOG pipe chase to the AOG building.

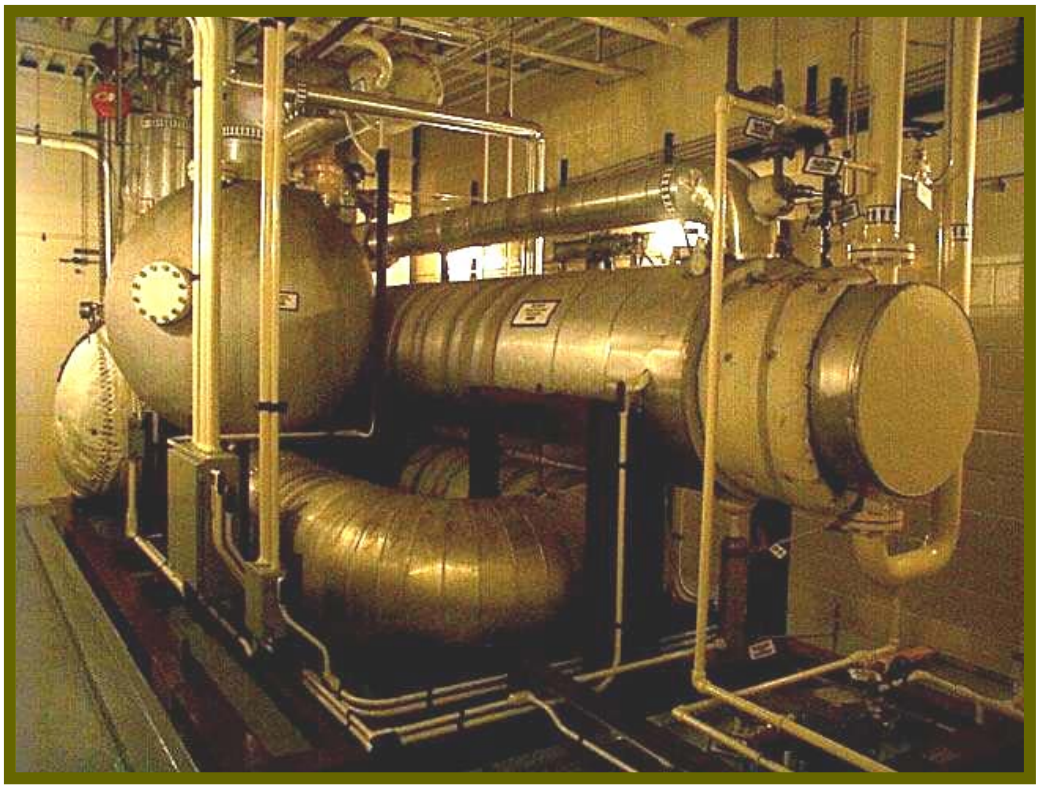
FLOWPATH

- Offgas enters the Flame Arrestor through AOG building manual isolation valve OG-HV-116.
- Downstream of the Flame Arrestor, offgas flow is routed through either AOV-001A or B to one of two identical Recombiner trains.

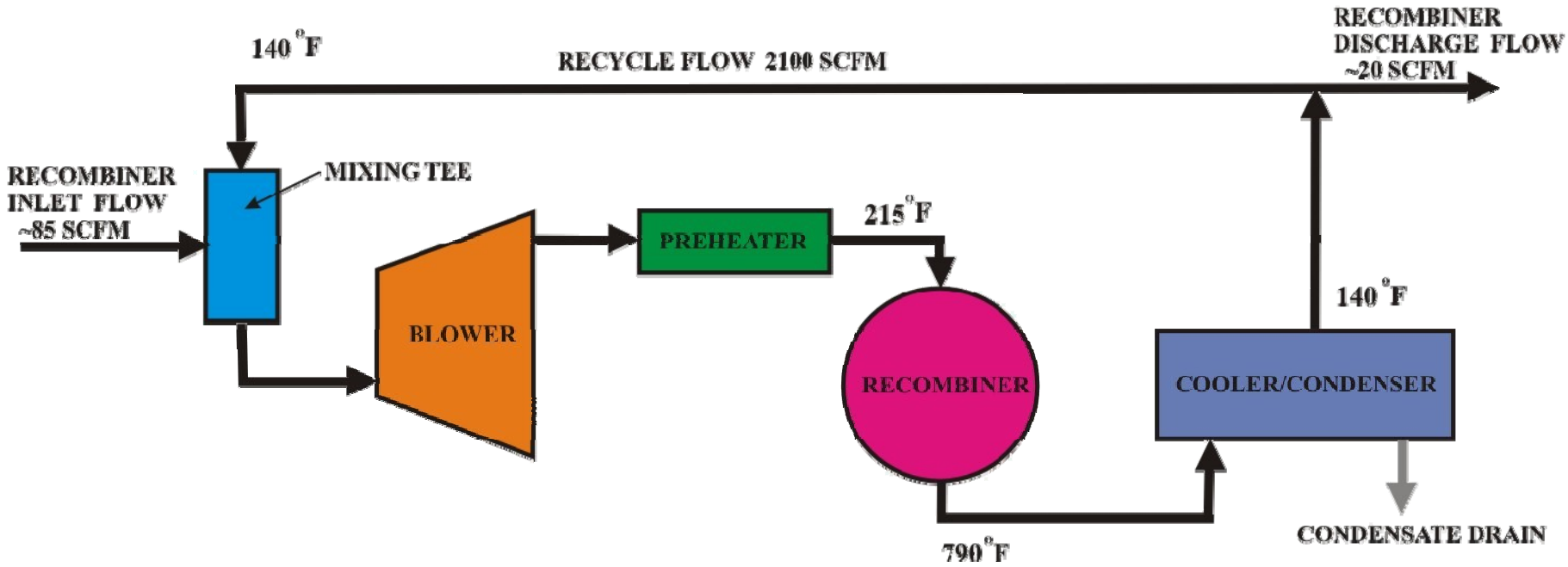


FLOWPATH

- A Recombiner train consist of: a blower, preheater, recombiner vessel, and cooler condenser.

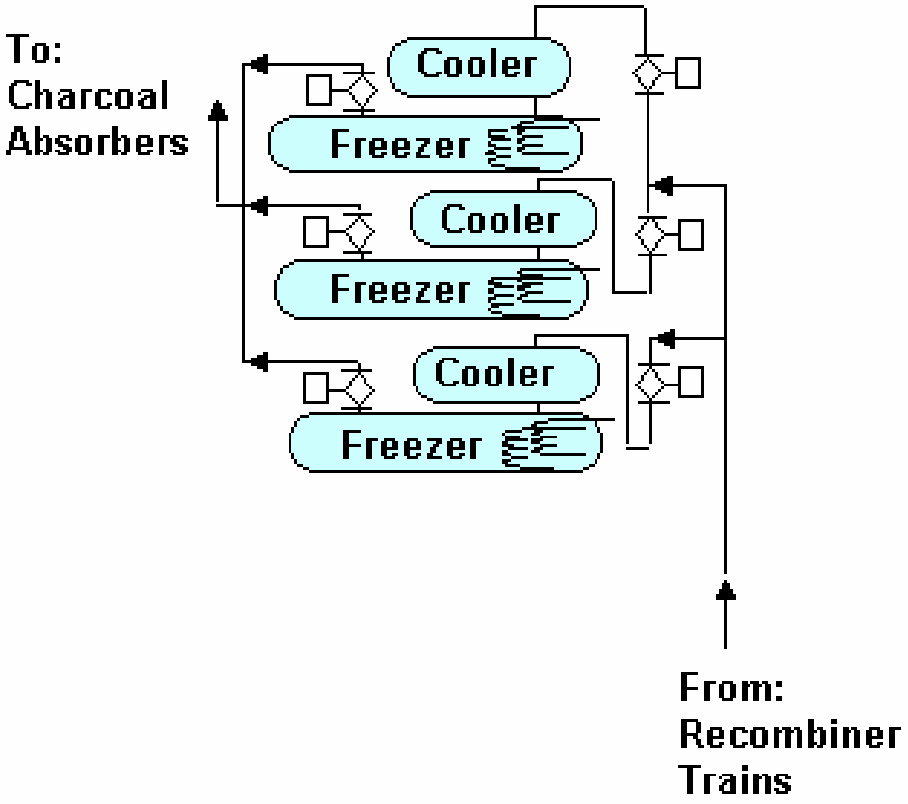


FLOWPATH


140 °F
RECYCLE FLOW 2100 SCFM
RECOMBINER DISCHARGE FLOW ~20 SCFM
RECOMBINER INLET FLOW ~85 SCFM
MIXING TEE
BLOWER
PREHEATER
215 °F
RECOMBINER
140 °F
COOLER/CONDENSER
790 °F
CONDENSATE DRAIN

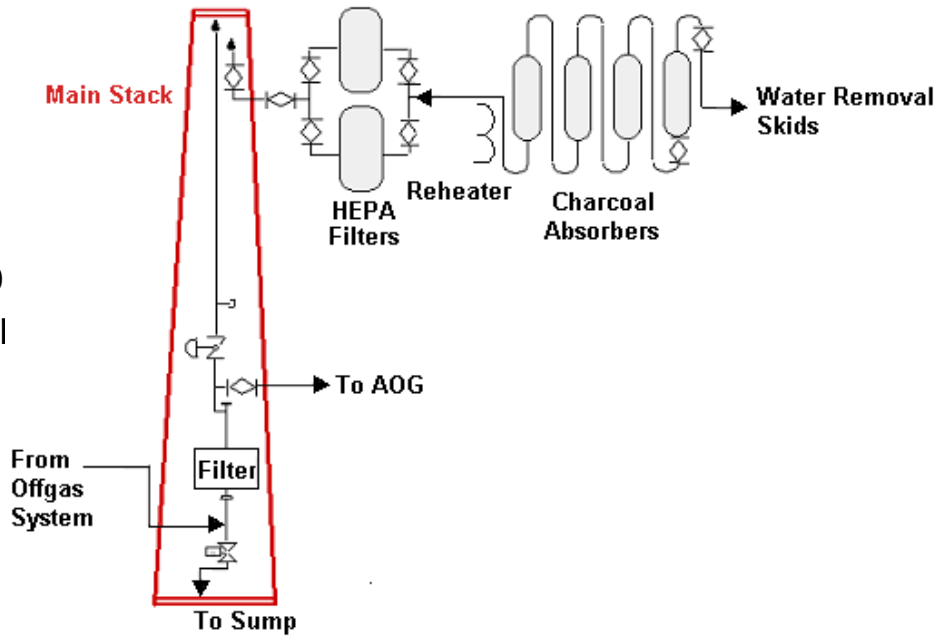
FLOWPATH

- Recombiner train outlet gas is piped to either of three water removal subsystems (trains). All residual moisture is removed from the gas stream



FLOWPATH

- Processed gas from the water removal trains enters a series of (4) charcoal absorbers units followed by a Reheater and HEPA filter
- Radioactive particulates adhere to activated charcoal
- AOG outlet flow is returned to the stack thru AOG HEPA filter outlet valve OG-HV-117 and manual outlet isolation valve (OG-HV-115).
  - HEPA filter removes particles larger than 3 microns in diameter from the offgas stream.



PREVIOUS OPERATING EXPERIENCE

- The AOG system was installed at OC in 1977
  - Following system startup, two hydrogen detonations occurred during August, 1977 and March, 1978.
  - The system was modified to minimize possibility of future detonations by installing additional isolation for flame propagation between the AOG System and the SJAEs discharge delay line.

PREVIOUS OPERATING EXPERIENCE

- An offgas line ignition occurred in 2002 while performing troubleshooting to determine the source of air in-leakage into the "A" North Main Condenser
- A spark or electrical discharge developed during the test equipment setup, causing an offgas ignition.

RECENT OPERATING EXPERIENCE

- On 02/13/2006 AOG detonation occurred.
- New catalyst bed was loaded on October 2005.
- Troubleshooting activities identified the volume of catalyst to be insufficient.

IMPROVEMENT PLAN

- The following actions are in progress:
  - Return to service “B” Recombiner train to service by loading sufficient catalyst.
  - Inspect “A” Recombiner to identify current catalyst condition.
  - Improve current material condition of the system by upgrading and replacing degraded and obsolete components (i.e. Hydrogen Analyzers).
  - Resolve system design deficiencies (i.e., flame arrestor, blower/motor design).

QUESTIONS