

**Nuclear Regulatory Commission  
Region II  
March 10, 2003**

**Harris Nuclear Plant**

**Fire Protection**



**Attendees**

- Bob Duncan – Director, Site Operations
- Abdy Khanpour – Manager, Engineering
- Eric McCartney – Superintendent, Engineering
- Terry Morton – Manager, Support Services
- John Caves – Supervisor, Licensing
- John Yadusky – Licensing Engineer
- George Attarian – Corporate Chief Engineer
- Jeff Ertman – Corporate Fire Protection Engineer
- Steve Laur – Supervisor, PSA



H/14

## Agenda

- Overview of Fire Protection Inspection Findings
- Summary of Root Causes
- Corrective Actions
- Overview of Project Plan

other projects.  
- short.  
- medium  
- long-term.

AAA [



## Overview of Inspection Findings

- Failure to identify cables potentially affected by fires
- Inconsistency between Safe Shutdown Analysis and implementing procedure
- Some non-feasible manual actions → Fuses
- Technical compliance
  - ▶ Lighting ✓
  - ▶ Manual actions not approved ✓

SSA  
Equation Procedure

...Series  
Fire Area - Analyze Zone



Philosophy shift ⇒  
Protect 1 train any area  
later ⇒ protect train depending on fire area

1. Hengch.
2. Cable wrap

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## Summary of Root Causes

- Original licensing mid 1980s
  - ▶ Errors in analysis
  - ▶ Separation issues resolved with using manual actions as the first choice
  - ▶ Abnormal Operating Procedure (AOP) for safe shutdown was a single procedure for both MCR fire and plant area fires
  - ▶ Applied a rigorous validation process for remote shutdown manual actions
  - ▶ Original submittal did not separate remote shutdown from MCR shutdown

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*Jan 2002  
\*NGG hardware  
Aug Regan wrote  
2 CR No progress  
Not designed to  
BTP. 9.5.1*

*used a bot.*

*1 submittal  
Difficult to  
tell which 34  
34 3 areas.*

*1 AOP*

## Summary of Root Causes

- Early 1990s
  - ▶ Separated fire response into two AOPs
  - ▶ Distinction between manual actions for remote shutdown and 3.G.2 areas not made
  - ▶ Validation not done for manual actions in 3.G.2 areas
  - Assessments focused on conventional fire protection – barriers, detection, suppression, equipment impairments

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*1. Analysis error.  
2. Clear method on how to deal with MCCS. Didn't do the shutdown approach. No hot start process.  
3. No validation.  
4. Self assessment!*

*all of problems - not put together.*

*CR fire design has fire.*

*remote S/D*

*could affect other areas*

*⇒ Remote shutdown panel ⇒ solid validation ⇒ thermo-hydraulic fire  
⇒ Other procedures ⇒ manual actions - part of huge operators did not have a validation*

## Fire Protection Corrective Actions

**Interim** immediate actions completed

- Revised Safe Shutdown Procedures
- Assigned 1 Additional SSD AO To Shift
- De-energized MOVs Where Possible To Eliminate Hot Short Potential
- Removed plexiglas cover for TDAFW fuse
- Established fire watch coverage for identified issues

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*Removes control circuit of TDAFW from ACP room*

*Also LPR HPR*

*① USG BAT => Revise to use RWST*  
*② Wrong MCS*  
*③ Enhanced early detection. Set AUC => S/D eqm, early assessment*

*Control room can make early decision to deenergize equipment.*

## On-Shift Staffing

*. Most manual actions*

- Developed drill scenarios for **ACP** fire area using Plant Simulator
  - ▶ Conducted drill scenarios with spurious actuations inserted for all 5 shifts with 1 Auxiliary Operator
  - ▶ All crews successful in achieving shutdown
  - ▶ Success defined by remote shutdown time line
  - ▶ Will validate all remaining fire areas

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*\* Also included loop. Revised CCP duties to allow him to cover.*

*Gives an idea how the plant is responding. Not a thermo hydraulic & melior*  
*● No problems noted.*

*Some failures, hot shorts added - Always able to H.S. => Cold S/L 72-hours.*

*No loss of CCP/CCW. => Will be done in future runs.*



ACL room ] - recognized couldn't proceed all the way because of the manual action issue

DSSA -> Analysis complete / training / procedure.

Five watch - present -> Roving

Recognized needed NRP permission

Risk to prioritize

Wrap cables  
Minimize man  
actions -

### Project Plan Goals

- Restore compliance for identified deficiencies
- Fire Hazards Analysis design validation
  - ▶ SSA validation
  - ▶ Clear documentation of compliance
- Validation of fire response
  - ▶ Design adequately reflected in operational response procedures
- Training



100% validation of SSA.

Operators / Actions

Will also validate process for safe shutdown

Needs to be more focused on areas -> faults -> responses. Eliminate equipment failures not possible for fires in that area

### Project Plan Goals

- Improve system reliability
  - ▶ Validate QA program -> Fall down.
  - ▶ Optimize surveillances and testing
- Reduce plant risk for operational implementation
  - ▶ Reduce operator manual actions to the greatest extent possible
- Improve self-evaluation
  - ▶ Establish program health monitoring schedule that verifies design basis through implementation on a periodic basis



Operators can generate plant from manual actions.

vertical slice never done on this program

*Charlie Payne*

*Fire pump fire?  
Not covered.  
Fire brigade response*

*Loop* } *Not assessed  
validated*

*5 years*

*Electrical book  
Circuit analysis  
guidelines  
want to be in  
front of this  
issue.*

**Project Plan Scope**

- Results of root cause analysis
- Corrective action program trends
- Industry issues
- Identified 14 tasks to be included in plan
  - Design modifications
  - Benchmarking } *Start safety & compliance*
  - Administrative control upgrades } *in particular transient combustible*

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**Project Plan Schedule**

- SSA validation
  - Contractor selection in progress
  - Begin prior to R11
  - Expected completion in mid 2004

*Expect some discovery.*

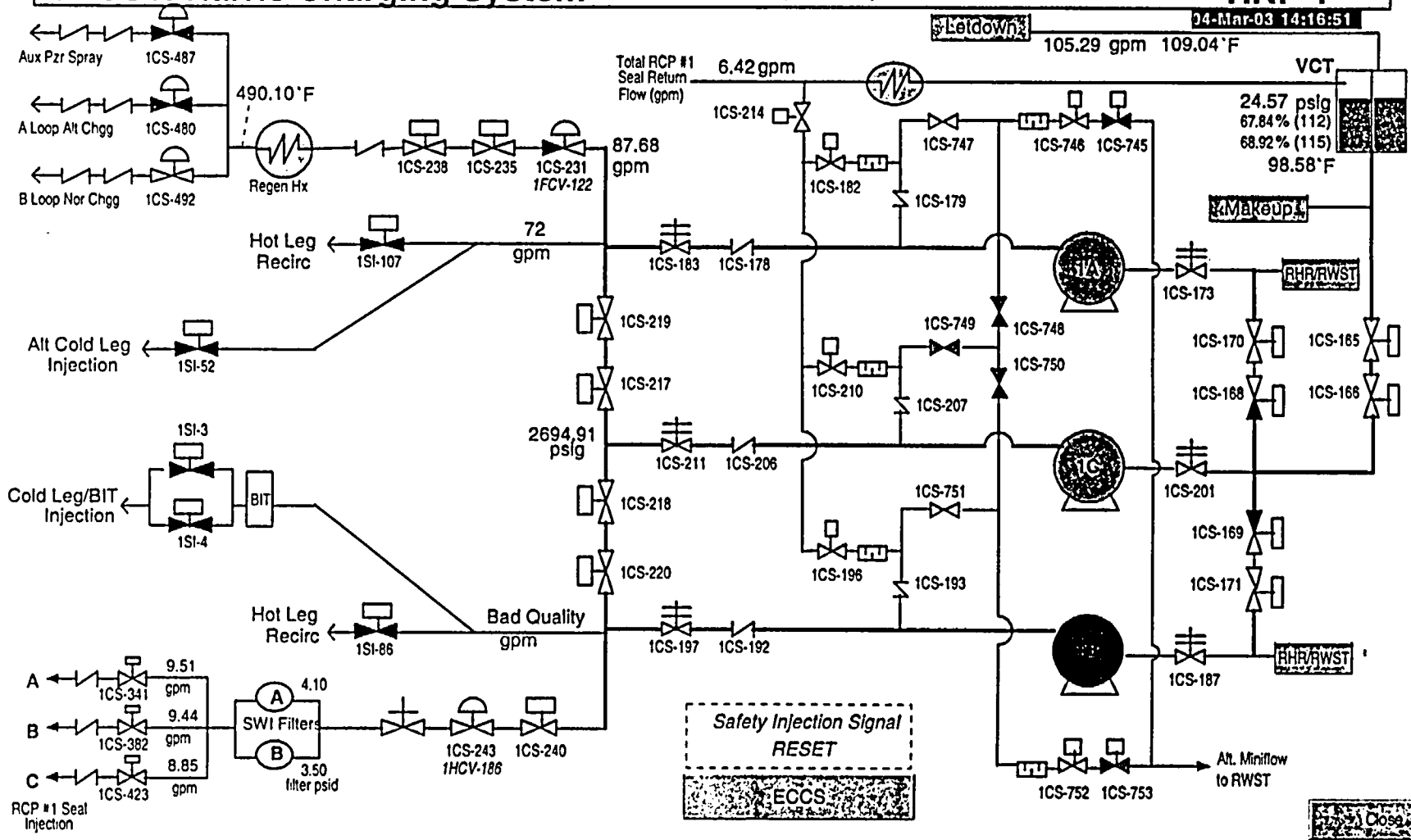
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# CVCS1: Harris Charging System

For Information Purposes Only

# HNP 1

04-Mar-03 14:16:51



*Design in progress  
to wrap  
these valves.  
Bry*

*JR LAM ⇒ GL 86-10 Testing  
# Eight weigh*



## Resolution

### ● Immediate Design Changes

- ▶ Design in progress
  - ◆ VCT outlet valve cables, 1CS-165 & 166
  - ◆ Protect CSIP flow paths in all fire events
  - ◆ Eliminate manual actions in ACP fire area
  - ◆ Utilize Interam fire wrap, qualified to GL 86-10, Supplement 1 standards
- ▶ Evaluating MCC hot short solutions
  - ◆ Cable reroutes
  - ◆ Valve interlocks

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May need to  
reroute power  
supplies.  
R-12.

## Design Validation

### ● Validation of SSA

- ▶ Develop safe shutdown equipment list
- ▶ Select SSEL cables
- ▶ Load cable database
- ▶ Utilize automated software analysis methods
- ▶ Revise safe shutdown procedure

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Proven track  
history.

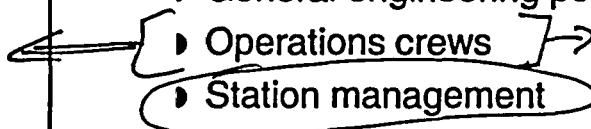
Iterative  
process

Will look  
to ~~revisit~~  
use them

## Additional Program Improvements

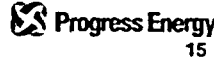
- Administrative controls
  - Transient combustibles
- Training and Qualification
  - Program manager
  - General engineering population
  - Operations crews
  - Station management

*Continuing*



*don't always have SSA in mind.*

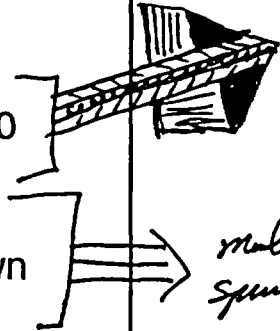
*Very little outside influence*  
*Safe s/p not well understood.*  
*Need to consider strategic thinking.*



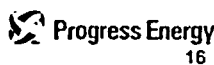
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## Risk Insight

- Fire areas identified in findings, except ACP room, have full detection and suppression
- Affected cable routes are greater than 20 feet from fixed ignition sources
- Multiple hot short spurious actions are required to cause loss of a safe shutdown function



*multiple spurious & some fire available.*



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## Summary

- Original design used manual actions instead of separation
- HNP now understands regulatory requirements and safety impact of manual actions
- Aggressively pursuing resolution of known issues and validation of remainder of analysis
- Propose quarterly update meetings with Region II
- HNP will update LER as necessary to include additional discovery

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85, 87, 90  
70's

will try to eliminate.

⇒ NEI NRC alternative board.

Hinnant ⇒ Fleet problem.

Cultural transition progress