

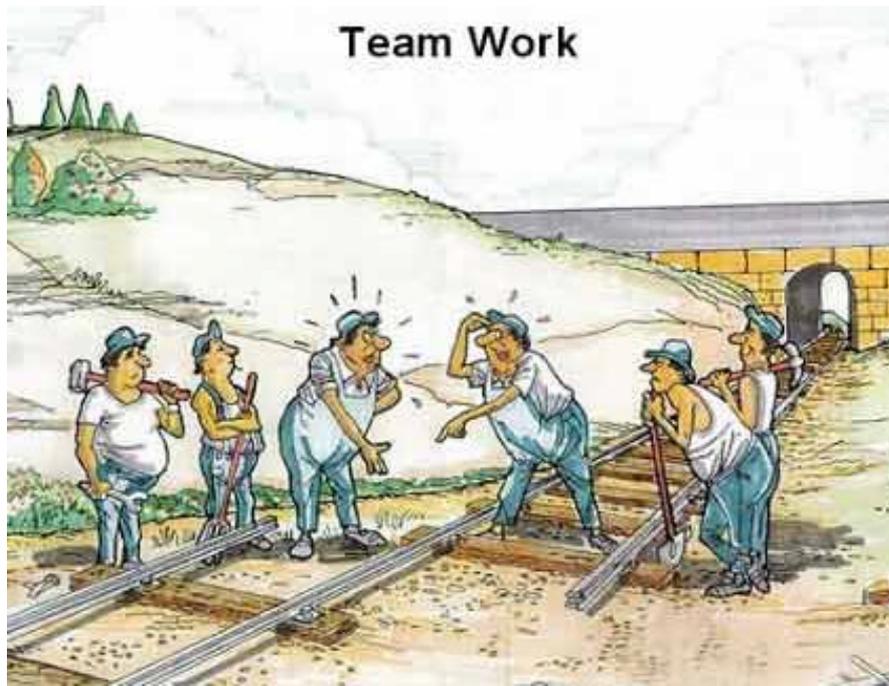
# APS All Hands Meeting

J. Murray Gibson

9/28/04

# We can take pride in our work

- Impact of APS science is outstanding
- Machine performance and reliability is outstanding
- Our users are well taken care of



- but though most all of us are dedicated and hard-working, this is not sufficient to be sure that our team will do the best job

Work planning and execution...

We can only operate if we do so safely....



We must strive for improvement....

# Why do I say this?

- Over the last couple years we have had a series of minor but disturbing problems with radiation shielding configuration control
- Recently, we had a serious incident with laser eye exposure
- We can't let these problems continue
- Safety comes first...

# What happened in configuration control?

- Four recent events have caused concern
  - 2-BM shutter event - July, 2002
  - 23-ID bremsstrahlung shutter design issue - Fall, 2003
  - Sector 1 incorrect mask installed – Spring, 2004
  - LEUTL rad stop event – Summer, 2004
- Each event by itself is of concern, but together they reveal the need for major improvements in configuration control

*similar*



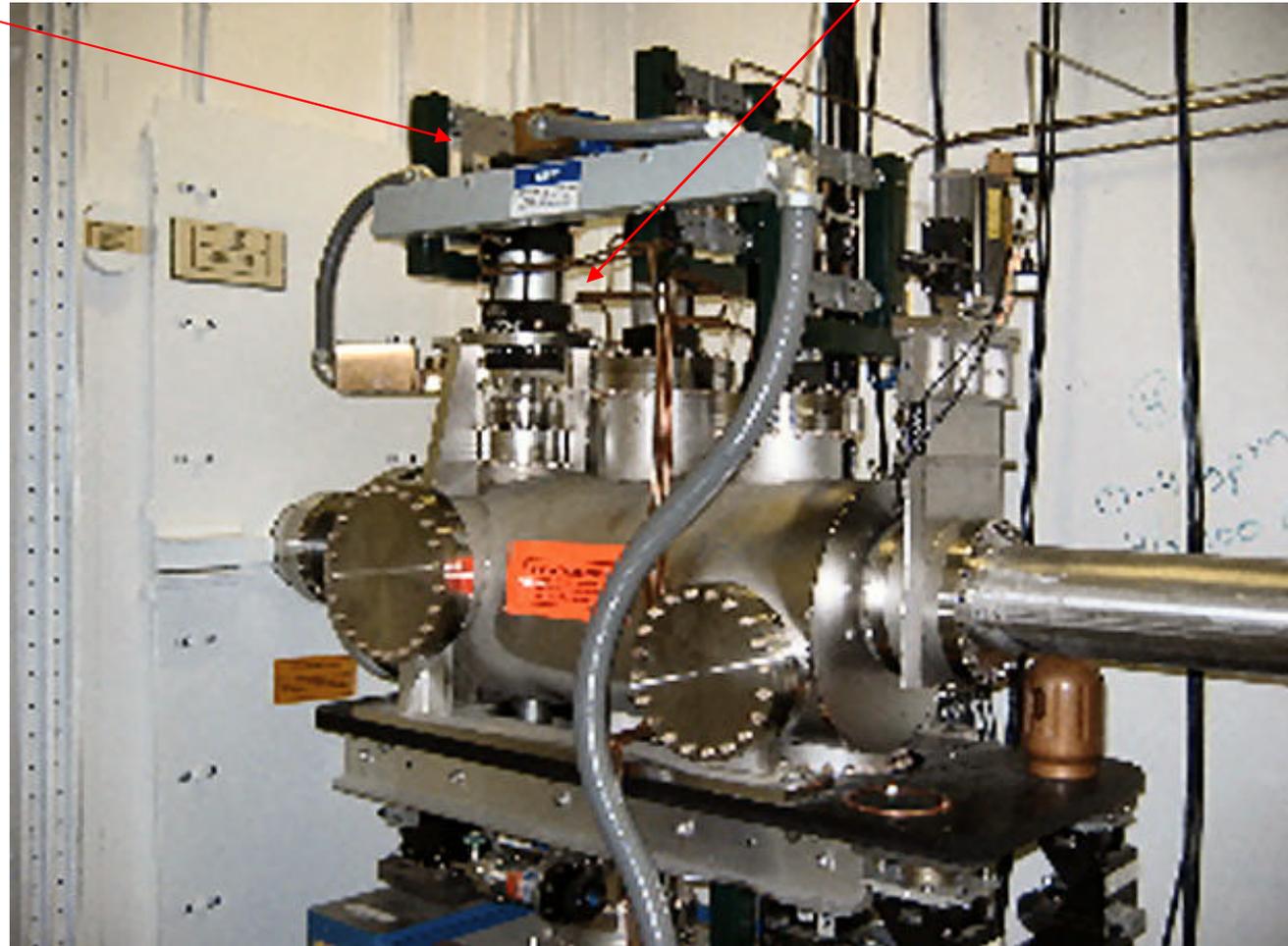
- Management takes this very seriously and is making major changes to work practices
- We are implementing these changes for radiation safety systems, but work planning and execution needs more general improvement (for safety and efficiency reasons)
  - We need help from everybody on the APS team

# 2-BM Integral Shutter – July 2002

PSS switches

Air cylinder lines

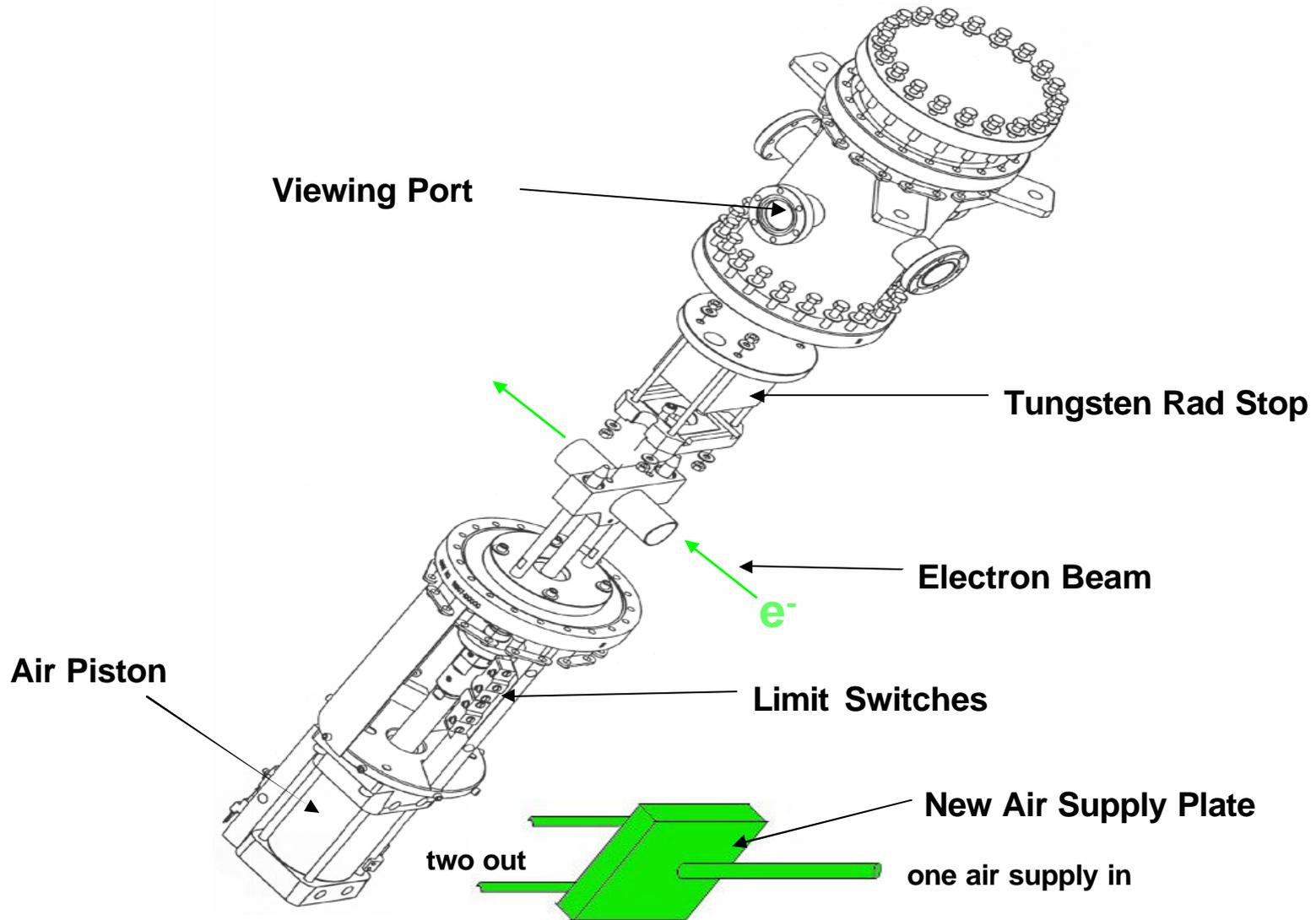
- Air lines to the pneumatic cylinder were reversed *then* PSS switches were reversed



# 2-BM Recommendation

- One recommendation of our 2-BM incident review was “consideration should be given to installing unique fittings, for the air supply and return lines, to eliminate the possibility of reversing lines”
- Serious changes were made to configuration control of shutters on beamlines and front ends
- Ironic - in taking proactive action for improvement on the accelerator side, the LEUTL event occurred...

# LEUTL Rad Stop

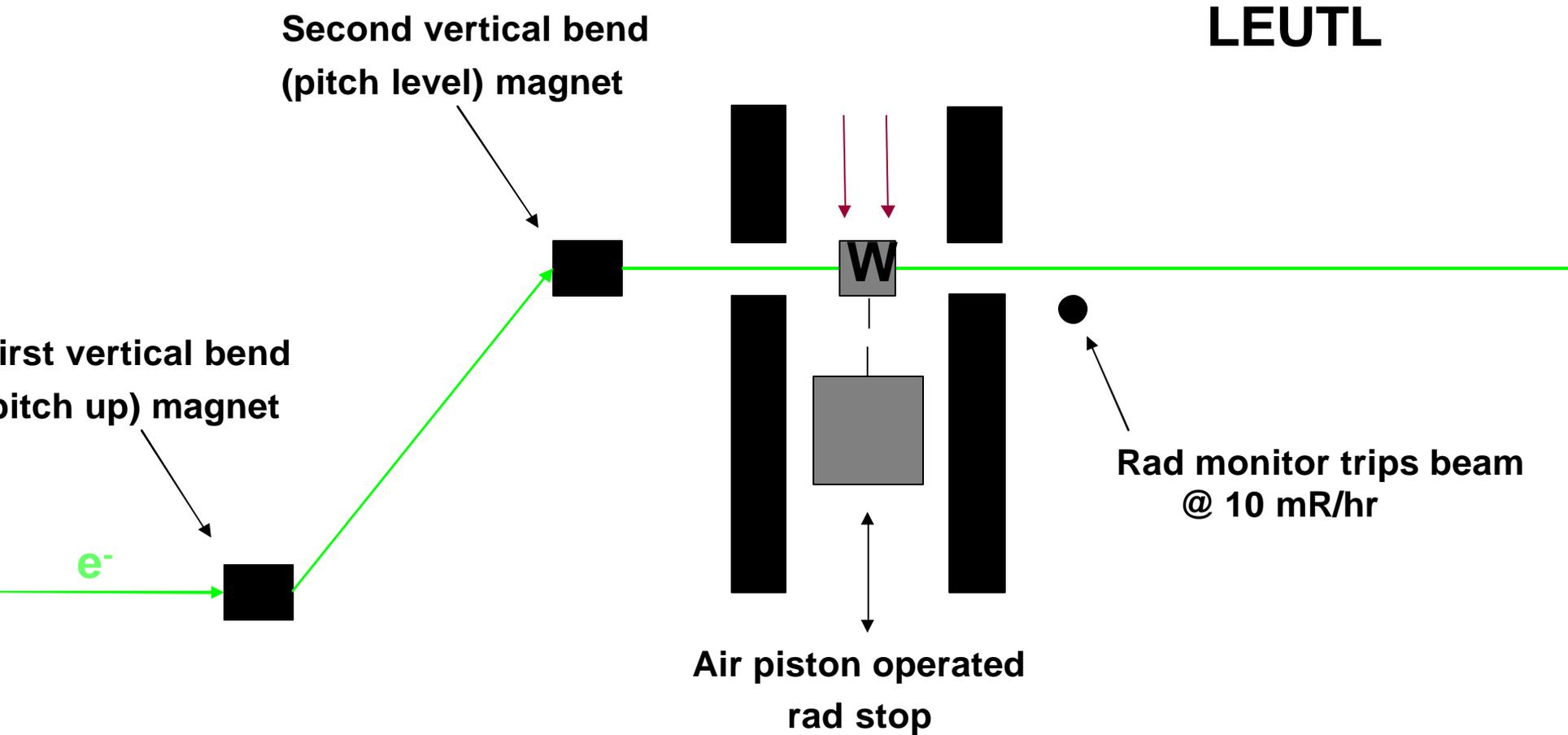


# LEUTL Event Summary

1. Wrong part ordered
2. Wrong part installed upside down
3. Therefore air cylinder air lines reversed
4. ACIS limit switches were reversed to accommodate the reversed air lines
5. ACIS validation was done by the same person who did the electrical ACIS work and the validation procedure was inadequate

Result rad stop opened when commanded to close

# LEUTL Drawing



# Multiple Barriers

**Much went wrong BUT our multiple (in series) barriers still kept us safe. Even though the rad stop was installed wrongly human harm was not possible because:**

- A radiation detector would have had to fail to trip;
- The pitch up and pitch level magnets would have had to malfunction;

# What's Wrong

- Work planning and execution inadequate
- Robust procedures, checklists and independent validation (which does not rely on individual's prior knowledge) needed for critical work
- Follow-through and communications from management on lessons learned was inadequate
- Multiple redundant barriers protected us
  - but cascading failures are a particular concern



# RADIATION SAFETY SYSTEMS

## Action Items

Task No.	Description	Accountable Individual	Individual(s) working on task	Due Date	Completion Date	Notes
<b>2</b>	<b>Immediate Follow-Up</b>					
2.1	Submit Leuti incident report to ALD	Gerig	Gerig, Carwardine	8/13/2004	8/13/2004	
2.2	Audit management response to 2-BM incident of Aug 2002, with response to ALD	ESH Coordinators	ESH Coordinators	8/13/2004	8/13/2004	
2.3	Implement a work suspension on all critical components until satisfactory policies are in place (Essential work can be approved with DD approval)	Gerig, Ruzicka		7/22/2004	7/22/2004	
<b>3</b>	<b>Incident Corrective Action Plan</b>					
3.1	Develop a general incident reporting and corrective action plan	Hislop		10/31/2004		
<b>4</b>	<b>Listing and Categorization of Radiation Safety Systems</b>					
4.1	Define, identify, and categorize all Radiation Safety Systems in beamlines, front-ends, and accelerators. Assign QA consequence levels to each component, and risk levels to different types of work (design, installation, maintenance, engineering change, validation).	Hawkins	Hawkins		9/24/2004	8/23/2004 -- Hawkins delivered to OPS Directorate 9/21/04 -- Feedback from DDs due to M. Gibson
4.1.1	Hawkins present draft to Ops-Dir			8/23/2004	8/23/2004	
4.1.2	Feedback from DDs due to M. Gibson			9/21/2004	9/21/2004	
4.2	Implement database of all Radiation Safety Systems and related information, each component having a unique serial number	CCSM				On hold till 4.1 is complete
<b>5</b>	<b>Engineering Process</b>					
5.1	Approve APS Design Review Procedure	ALD, DDs	Gerig, Ruzicka, Gluskin		9/14/2004	<ul style="list-style-type: none"> <li>Ruzicka will make final changes</li> <li>S. Davey drafting announcement for ALD approval -- Info to be sent by 9/23/04</li> </ul>
5.1.1	Final Draft Delivered to M. Gibson			8/17/2004	8/17/2004	
5.1.2	Approval and Distribution			9/14/2004	9/14/2004	S. Davey has been assigned responsibility to review any future revisions
5.2	Add to Design review checklists that shutters and beam stops incorporate indelible markings of functional states (e.g. 'open,' 'closed')	Gerig		8/17/2004	8/17/2004	It is incorporated into procedure in the charge to the safety committee
<b>6</b>	<b>Work Process</b>					
6.1	Implement interim APS-wide policy for work on Radiation Safety Systems to apply to work performed during the Aug/Sept 2004 shutdown.	DDs		8/25/2004	8/25/2004	done
6.2	Apply labels identifying Radiation Safety Systems.	CCSM	Ramanathan		12/1/2004	
6.3	Develop Draft APS Radiation Safety Systems work policy and procedure	Noonan		10/1/2004	on-going	
6.4	Approve APS Radiation Safety Systems work policy and procedure	ALD, DDs		11/5/2004	on-going	

# RADIATION SAFETY SYSTEMS

## Action Items

Task No.	Description	Accountable Individual	Individual(s) working on task	Due Date	Completion Date	Notes
6.5	Develop pre-work and post-work checklists for all work performed on Radiation Safety Systems.	Noonan, CCSM			on-going	
6.6	Modify work request system to trigger additional approvals and work processes for Radiation Safety Systems. This will depend on the category of the component to be worked on and the type of work to be performed.	Ramanathan	Mohan		on-going	
6.7	Incorporate Critical Component Work Permit into electronic work request system.	Ramanathan	Mohan		on-going	
<b>7</b>	<b>Validation Process</b>					
7.1	Label functional states (e.g. 'open,' 'closed') for all existing shutters and beam stops where appropriate	CCSM		on-hold	on-hold	<ul style="list-style-type: none"> <li>•Need to clarify whether this would be possible and not lead to additional mistakes</li> <li>•Need to discuss in "Policy of Work" Task No. 6.4</li> </ul>
7.2 & 8.2	Assign responsible individual(s) authorized to perform independent verifications	DDs	DDs	by next shut-down		
<b>8</b>	<b>Assignment of Responsibilities</b>					
8.1	Assign responsible individuals for each safety-critical equipment	DDs	DDs	by next shut-down		
8.2 & 7.2	Assign responsible individual(s) authorized to perform independent verifications	DDs	DDs	by next shut-down		
8.3	Resolve conflicts on interfaces and responsibilities between ASD SI Group, ASD Vacuum Group, and XFD Engineering Group for front-end and beamline shutters.		on-going	9/28/2004		VAC and XFE interface defined
8.4	Define Role of CCSM	Ruzicka				Will be identified in policy when it is developed
<b>9</b>	<b>Communication</b>					
9.1	Implement a single location (eg webpage) for Radiation Safety Systems where employees can go to get the official list of controlled components, policies, procedures, drawings, etc	Gerig to start, then CCSM				Will be part of the Safety Web Pages and will include drawings
9.2	Hold all-division/all-hands meetings where leutl event and new policies & procedures are discussed.	ALD, DDs		9/28/2004		Hilsop and Gibson will meet to structure Mtg. (topics will include work planning execution)
9.3	Release document to APS employees describing the leutl incident and the resulting Management Action Plan.	DDs		9/28/2004		Will be released at the all-hands mtg.
9.4	Implement periodic training for all employees that work on safety-controlled devices. Training will provide information on what is considered a safety-controlled device, QA rigor applied to work processes, responsibilities of employees and management. Make training mandatory on periodic basis (eg every 6 months).	Carwardine/Noonan		12/1/2004		

## RADIATION SAFETY SYSTEMS

### Action Items

Task No.	Description	Accountable Individual	Individual(s) working on task	Due Date	Completion Date	Notes
<b>10</b>	<b>Documentation</b>					
10.1	Define minimum documentation requirements for Radiation Safety Systems (eg engineering drawings, procedures, technical description)	CCSM				
10.2	Audit existing documentation for Radiation Safety Systems against newly defined requirements	CCSM				
10.3	Develop missing documentation, collate documentation packages for easy reference and easy access.	DDs				
10.4	Update APS QAPP to incorporate policies and process for Radiation Safety Systems	Hislop		1/1/2005		
10.5	Update and centralize all policies deleting those that are no longer active	Davey			on-going	●9/21/04 - Status Report due from S. Davey

# Radiation Safety Systems – Action Items

- Immediate Follow-up 
  - Suspend work on RSSs, Write incident reports, Interim policy for shutdown and maintenance
- Incident Corrective Action Plan
  - Develop a general strategy for incident follow-up
- Listing and Categorization of Radiation Safety Systems
  - Ensure that the APS has defined which systems protect people from radiation hazards, and if appropriate categorize them for purposes of identifying graded work processes within policies and procedures.
- Engineering Process
  - Define and approve the procedure for APS design reviews (this was well underway; the goal is have a common design review approach across the APS) 

# Radiation Safety Systems – Action Items

- Work Process
  - Develop policies, procedures and checklists for working on RSSs. Use the “Work Request System” to trigger the generation of checklists where possible.
- Validation Process
  - Ensure that validation states (e.g., open vs. closed) are unambiguous
  - Ensure that post-work validations are done by someone other than the person who did the work
- Assignment of Responsibilities
  - In writing policies and procedures, clarify roles and responsibilities

# Radiation Safety Systems – Action Items

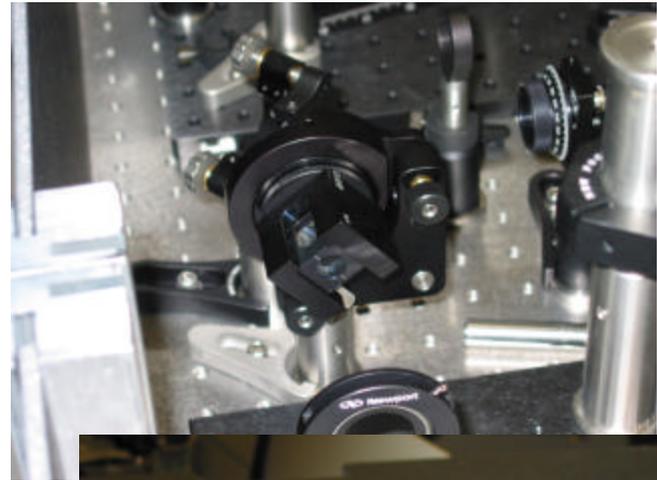
- Communication
  - Let all employees know about these incidents and what we are doing to prevent them from occurring again
  - Communicate importance of safe work practices
  - Encourage broad communication when planning and conducting work
  - Provide training for working on RSSs
- Documentation
  - Continue to get as-built drawings completed and available to all involved in performing work
  - Ensure that policies and procedures are current and available

# Stop work....

- Carelessness in the presence of danger is unacceptable.....



# Laser eye injury



Experienced APS employee was aligning a new set-up

# Complacency is danger

## Integrated Safety Management:

Define the Scope of Work

Analyze the Hazards

Develop and Implement Hazard Controls

**Perform the Work within Controls**

Feedback and Continuous Improvement



**Always be vigilant and work within hazard controls**

# A treasure at APS: a culture of honesty

- APS is a very open environment where people should not be afraid to speak-up and admit mistakes
- Recently the light has shone more brightly on us, but that's healthy if we respond to challenges by improving

# Changes we must make

- Individuals
  - Take responsibility for ISM at all levels
  - Work within hazard controls
- Supervisors and management
  - Develop and promulgate new approach to work planning and execution, especially for radiation safety systems
  - Involve everyone in work planning and execution – we can't afford to waste the talents of all members of our team

# The importance of teamwork



Morrie Roberts (technician) and Roy Emerson (engineer), both ASD-SI, at 30-ID.



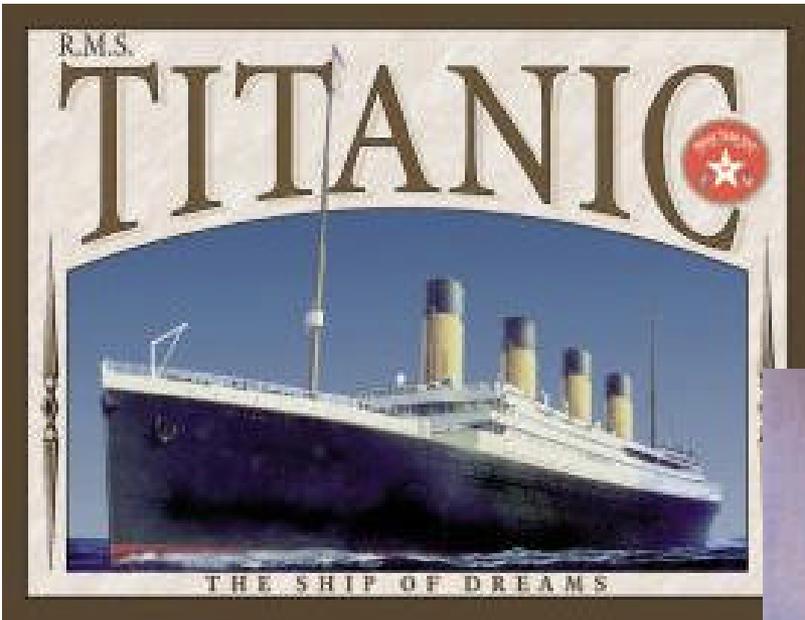
Left: Try Leng Kruiy (engineer); right: Christen Sarne (technician); both ASD-VAC.

# Vigilance at work...

- Mike Lilge (APS Health Physics) who, after several years of routine trash surveys, identified a contaminated piece of chewing gum at the bottom of trash gurney which resulted from an employee's nuclear medicine procedure.
- Russell Otto (XFD-XFE) who identified a zinc brick amongst a pile of lead shielding bricks.
- The APS TMS Representatives who, through their continuous perseverance, have raised and consistently maintained the APS training completion percentage above 99.5%.
- Debbie Erickson-Bubulka who found a frayed cable in the equipment lift in the EAA during shutdown operations and got it fixed before it caused a problem.

Many Pacesetter Awards are given for safety related work..

Assumptions (i.e., “This ship is unsinkable!”)  
**often lead to disaster** –  
esp. when one is confident that  
the assumptions are correct.



# Speak-up...and listen



Everyone's responsibility



# Work planning and execution



George Washington in battle...

# Work planning and execution

- Need a uniform, simple, improved approach
- Need everyone to understand the approach (training)
- Need a graded approach, Radiation Safety Systems is part of the bigger picture

In the next few months, Richard Hislop and ESH/QA coordinators will draw on your collective input to make recommendations about an improved work planning and execution process

# The importance of good supervision

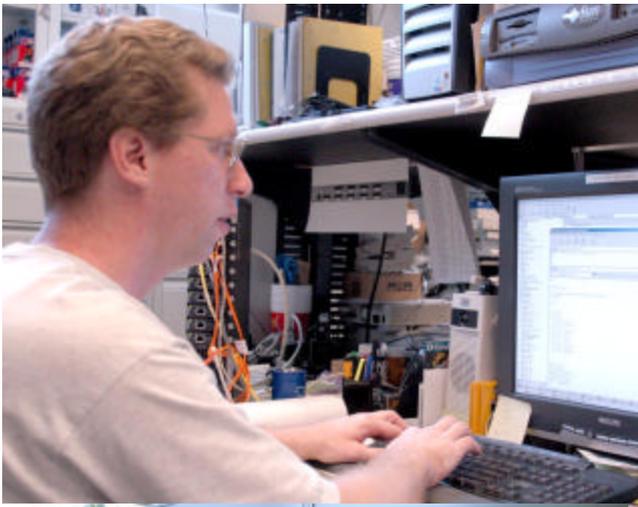
- A good leader leads, but listens



no one is smart enough to go it alone

# Who's responsibility is it?

- Everyone of us..
- Management –we are committed to improve procedures and oversight
- Everyone should think smart, question assumptions, but follow procedures (raise a question if concerned)
- Everyone involved in a critical job should know the “big picture”



# Supervision and Diversity



Inclusion of our diverse population is critical to our success as an organization

Supervisors can play a prominent role

...by encouraging employees to speak-up to help solve problems and create a better working environment

# APS Diversity Committee

Julie Alderman (AOD)



Joann Brown (XFD)



Kathy Harkay (ASD) – Chair



Leonard Morrison (ASD)



Nena Moonier (AOD)



Liz Moog (XFD)



Rod Salazar (AOD)



Greg Wiemerslage (XFD)



"Investigate and study issues relating to diversity in the APS workforce. Provide recommendations to APS management to improve the work environment and assist in recruiting, where possible. Work to promote an effective and diverse workforce."

# Diversity Group Actions

- Follow-up on employee survey
- APS management “Managing Inclusion” training
- Focus on recruiting and retention
  
- Please use your imagination to understand what an “inclusive” environment means

# Bottom-line

- I would rather be telling you about all the great things going on
- But safety comes first, and we need to improve
- And we want to have a better, more inclusive, workplace
- It's everyone's responsibility
- Be vigilant, ask questions and do not be afraid to stop work..
- It's not just safety, it's efficiency and quality
  - a safe organization is a successful one

# Good news

- Reliability and MTBF – fantastic
- Strategic planning – exciting opportunities for the future
- And much more...



Great organizations are those that respond positively to challenges



Top to bottom:

Ralph Bechtold (ASD-ME)

David Meyer (ASD-RF)

Jiyong Zhao (XFD-HRX)

Edmund Elroy Chang (AOD-ADM)

Jennifer Linton (XFD-BES)

Christa Benson (XFD-XFE)

Linda DeVito (AOD-ADM)

Janet Anderson (ASD-CTL)

APS Employee  
Advisory Committee

# Rewarding outstanding supervisors



# Pacesetter APS TMS Representatives

Diane Morgan – XFD

Jane Pransky – AOD

Sandy Tummillo – ASD

Judy Walden – APS/PA

Documentation relating to configuration control incidents at the APS and follow-ups.