ARW 2015

Description of Session Topics

1) Welcome/Introduction/Definition of Terms **G. Dodson**

- It would be good to start out with a general introduction to ARW. A recap of how and why the accelerator community came to focus on reliability. Where we were with reliability then and where we are headed now (changes). It could then flow into a definition of terms. What do these terms mean to you? What does reliability mean to you?

2) Availability Tracking and Metrics **L. Hardy**

- We defined availability for different labs in the introduction. Now it is time to look further into the makeup of availability. We need to answer the questions of: What counts and doesn't count as available time or downtime? How do you measure it? What are the various types of downtime? Are there opportunistic downtimes vs failures? How do you track it when an opportunistic downtime overlaps with a failure? Do you care? Is it important to track that information?

3) Fault/Failure Detection and Analysis Methods **A. Ludeke**

- Efficient post mortem, see how we treat analysis and how do you come up with the root cause? Can we fix the problem for good? How do you weigh the importance of a failure? Small things… auto reset and the latched. If the auto resets can signal something is going wrong, how do you monitor and collect that information? First out counter based on time stamps and other methods. Low and medium impact versus disasters. Where do your disasters begin? Over eight hours? Why does something keep tripping? What is it trying to tell me and should I be listening? Data quality makes a difference. A good example would be machine protection issues and how data quality can make a difference!

4) What are your facilities major vulnerabilities? **D. Newhart**

- How do you determine if something is vulnerability? Did a problem crop up and present itself? How did you do analysis to determine something is or isn't vulnerable? Are your system vulnerabilities documented? Do you have a plan for failure of those systems? What amount of downtime is acceptable? Is money the reason for the vulnerability? Have you done risk analysis? Are there compound failures that can get you? We can run on our generators, what if there is no power to refuel the generators? Disaster avoidance and preparation. Things that would take down your system or facility and are too expensive to have a spare for. What do you do?
  Note: Vulnerabilities could be accompanied by intentional exploitation/sabotage – Are we sure this topic can be fulfilled without taking security "on board" – then vulnerable with respect to 1) availability, 2) safety, or both?

5) Reliability During Facility Machine Design **R. Giachino**

- Abstract: Designing new machines and equipment systems is an opportunity to consider reliability approaches from the very early stage of conception. This early phase is probably the most important one as it still allows – once identified by dependability calculations - for an easy mitigation of design weaknesses, which otherwise would turn into critical vulnerabilities of the final design which at that become very costly to mitigate. This session will try to answer how to fold reliability considerations into the early stages of system design by reviewing best practices at different facilities and comparable industrial installations. Main goals, information flows inside the facility and with the funding source are the topics to be addressed to ensure a high level of reliability for new machines.
- Topics to be considered:
    - Tools, procedures and practices to calculate and predict system reliability during the design phase.
    - What factors are not considered by dependability analysis tools (outside fabrication, testing…)?
    - What are the main goals of dependability analysis at the different facilities and who is information presented/distributed?
    - How to determine the required dependability goals for a subsystem.
    - How to provide and meet expectations of funding sources.

6) Reliability Improvements/ Upgrades **P. Sampson**

- Any changes that are made or proposed to improve reliability. How do you stage replacement so it gets tested as you continue to operate? What happens when you determine a potential failure but don't have money or time planned to upgrade it? How do you weigh the need to shutdown to upgrade with running with a known vulnerability (Risk analysis with cost benefit concerns)?

7) Invited Speaker(s) **G. Dodson**

- There were discussions on invited speakers, but it will be up the LOC to choose the correct speaker(s) based on availability and other constraints.

8) Major System Reliability **V. Toma**

- As the title suggests, this session is geared towards large in size or number systems: a large power supply or a chain of many small power supplies (PS), PS Controllers, feed-back transducers, RF, water cooling systems, compressed air, pumps, cryogenics, HVAC, etc.
- To achieve high overall reliability every system and subsystem must be highly reliable and/or quickly repairable. Which approach did your lab take, is it effective?
- Share with us problems you had/have with your major systems and the solutions you found for improving their reliability.

9) Major System Reliability (Part II) **Q. Qin**

- This is an important part of reliability and there are many systems that make up accelerators, so this is a second session dedicated to systems.

10) Poster Session and best disaster photo since last ARW **E. Takada**

- Everybody likes the poster sessions. They let people who don't like to give talks contribute. We would also like to have the best disaster poster (since the last ARW) and would choose a winner. I would be nice to have an explanation with the poster indicating if the failure came by surprise or were foreseen within the possible failure scenarios. If it had been foreseen, was it underrated? This is similar to the last ARW which we believe was successful. This contest is for fun and should not discourage anyone from participating.

11) Maintenance Considerations **D. Preddy**

- How do you optimize maintenance for availability/reliability? How do you split between running until it breaks and scheduled maintenance? No system wants to be reason for downtime, but everybody is willing to utilize other system downtime. How do you keep things running and prevent this race condition between systems? Do some groups stress their systems waiting for others to fail to capitalize on the downtime? The aging of components and impact on maintenance should be tied into discussions.

12) Special Requirements for Medical Accelerator Facilities **S. Meyroneinc**

- When you are directing a particle beam at a person, there are many more checks that need to be in place. How many checks do you do before the time pressure takes over? Do years of experience lead to shortcuts or known states? Things don't always run as scheduled, how do you make sure the machines are ready when you need them? Keeping a patient waiting has both mental and physical implications. What are the special requirements for medical accelerator facilities?

13) Open Topics for General Discussion **D. McGilvery**

- This session is a little harder to define. We will need some topics to bring up that will prompt group involvement. We should have enough topics to be able to move on should the discussion diminish.

14) Parallel Discussions **Not Assigned**

- Defined/undefined, we need to have a combination. We should have a few topics to discuss in sessions, but allow for topics that may come up during the workshop. We talked about having a poster where people could write in their topics for parallel session discussions. We would collect them during the workshop and try to organize them for later in the week.

15) Investigation of failures **D. Johnson**

- This session would be more like the case studies that have worked well in the past. We would look at failures and go through the investigation process. This could be exciting and provide insight to problems at other lab. The investigation process may be different for various types of failures. We don't want to focus on the results but on the process of getting to those results.

16) Innovative Creative Tools **M. Takao**

- Technology has made it easier to look at devices and trend them making scheduling repair possible during scheduled downtimes. Who has new ways of trending or collecting information that may help us? Maybe this can be a topic for a parallel session talk too. Maybe there are applications or new things we can use. How do we implement tools and how are they tested before implementation? We should try to make a list of old proven methods so we don't cover them again and truly hit on the new innovative tools. Maybe the old standby methods aren't so bad.

17) Workshop Highlights and Next ARW **G. Dodson**

- This is the summary of the sessions. This was done very well at the previous ARW and was appreciated
- Closing Remarks (Local Organizing Committee) **G. Dodson**
- IOC Announcing of Next Workshop **R. Giachino**

18) Application of standards in the particle accelerator community

- We can explore their current and future application. This is session that can be developed for open discussion or utilized in a future ARW.