

## Workshop summary on target systems

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This session focused on operational experience with target systems and subsequent improvements to such systems. The ISIS target failed twice in 1987 providing the unwanted, but very useful, experience of changing the target. An excellent presentation by Tim Broome and an accompanying video of the actual target changing provided a very complete description of the process, the tools required, the human interface to their remote handling cell, and the increased time required when doing work through a remote handling system. The management of the human element, particularly the personnel operating the remote handling, provided valuable information for other facilities facing a target change in the future. The process allowed ISIS to improve the tooling and the process between the two changes. They discovered that advanced planning is extremely crucial and determines the efficiency of the actual process.

The LANSCE target section presented three papers dealing with operation of the LANSCE target-moderator-reflector-shield and calculations of the heat profiles in the tungsten target material. Tom Summers discussed the electronics for controlling the liquid-hydrogen moderator. When the cryogenic system shuts down, one has about six minutes to get it going again before it vents, which then requires the eight-hour cool-down procedure. The human interface to determine the failure quickly combined with an easily understood system graphic has allowed even inexperienced personnel to recover before venting.

Alan Kernodle discussed the monitoring system based on a personal computer. The purposes of the monitoring are to both sense trends that could lead to breakdowns and provide a diagnostic history preceding a breakdown to determine the cause of failure.

The heat-transfer properties of target materials determine the temperatures reached within a system. This is complicated at LANSCE by the low-duty-factor pulsed structure of the heat source—the proton beam and subsequent spallation processes. To design higher power targets, the validity of heat-transfer calculations is crucial. These calculations are compared to operating values to develop proper calculational methods.

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