



Idaho National Laboratory

Recent US Work and Future Plans

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Recent Work has Two Directions

- **Data collection and analysis continues. Last fall I presented a paper at the TOFE meeting about tritium component failure rate data.**
 - **Most of the component failure rates compared reasonably well; there were a few outliers. Geometric mean values were calculated from these data sets to use as generic data.**
- **More recent work focuses on DIII-D power supplies, to compare to the work Tonio is doing on JET power supplies. There are ~1,700 failure reports on the DIII-D power supplies; this work will take some time to complete, ~June 2005.**
- **The other direction is occupational/industrial safety. It is very similar to the data Tonio has collected at TFTR and JET for occupational radiation exposures. This is another aspect of facility operating experiences that can support ITER.**

US Work in Task 5

- I completed a report in January on worker injury rates at the DOE accelerators (SLAC, FNAL, Jlab), fusion experiments at PPPL, and commercial nuclear power plants. I hope to compare these results with other fusion experiments, such as JET, and use the results for ITER personnel safety.
- Some of the key results of this survey report were:
 - Both DOE fusion experiment and accelerator experiment personnel injury rates are 2x or more above US nuclear power plant worker injury rates; however, the injury severity may be less at the DOE facilities. Severity information was not available from power plants.
 - The DOE major fusion experiments and accelerators have not suffered a work-related fatality during operation or maintenance, but power plants have had fatalities. DOE facilities and power plants have both experienced construction fatalities.
 - Technicians (the hands-on workers) suffer the highest percentage of injuries at the DOE experiments; at power plants the tradespeople suffer the most injuries.
 - Some power plant equipment failures have resulted in serious injuries and fatalities; fusion experiment equipment failures have not.

Future US Work

- I anticipate that near future work will necessarily support ITER
- ITER safety needs may not require extensive component reliability work
 - Dr. Yamanishi has stated that the Japanese approach to licensing the TPL was traditional safety analysis, and they used probabilistic approaches only as reference information to the safety analysis
 - Dr. Gulden has stated that the CEA has agreed on a licensing strategy for the Cadarache site and begun work on a PSAR which would use code calculations, analyst best judgment and bounding analyses - where knowledge is lacking the PSAR authors will develop an R& D plan to resolve the issues.
- Other ITER needs might require reliability-based work, such as RAMI, and I would support such needs as well as I can.

Data Collection will Continue

- **Considerations:**
 - **Cryogenic system generic data update of the 1991 report; there have been some cryogenic system operating experience publications since that time**
 - **DIII-D diagnostic systems data analysis**
 - **DIII-D NBI systems data analysis**
 - **Review the failure experience of Tore Supra's in-vessel active cooling system**

Operating Experience Work will Continue

- I hope to compare the US occupational safety data to other fusion experiments, such as JET
- I plan to collect more data on equipment failures that endanger nearby personnel at fusion experiments and other pertinent facilities
- This work in occupational safety will support the ITER EU/JA task in personnel safety