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Implementing Partnerships in Nonreactor Facility Safety Analyses

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Faculty and students from Louisiana State University (LSU) have been participating in nuclear safety analyses and radiation protection projects at Argonne National Laboratory's site (ANL-W) at the Idaho National Engineering Laboratory since 1973. Over the years, a mutually beneficial relationship has evolved that has resulted in the generation of safety-related studies that have been acceptable to Argonne and Department of Energy (DOE), Nuclear Regulatory Commission (NRC), and state regulatory groups. Most of the safety projects have involved the Hot Fuel Examination Facility (HFEF) or the Fuel Conditioning Facility; both are hot cells that receive spent fuel from the Experimental Breeder Reactor-II (EBR-II). Table 1 shows some of the major projects at ANL-W that involved LSU students and faculty; many other short-term studies were also completed. Activities have resulted in Masters degree theses, journal publications, and papers delivered at meetings of professional societies.

Successful university-laboratory partnerships require that the parties engage in open and frank exchange on the objectives of any project and agree on the schedule and methods to be used. This is a challenge because the partners have different responsibilities to their employers and each are evaluated by disparate criteria. Facility operation and maintenance is a full time job at ANL-W; any

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project, no matter how pressing, is a part time assignment for faculty or student. Faculty have the time and motivation to advance their careers by publishing; time is a luxury that is less available to laboratory personnel involved with the pressures of maintaining operating facilities. Joint university-laboratory authorship of articles published in peer reviewed journals helps the credibility of the work with regulators and with the public. Laboratory sponsorship of faculty and student travel to present technical papers and staff travel to give on-campus seminars strengthens academic programs and demonstrates the value of off-campus activities to university administrators. Establishment of a long-term relationship with a faculty member allows continuity and minimizes the time spent in meeting training and access requirements. Faculty have the obligation to screen and guide the students who contribute to the studies; this is especially important if the student works at the ANL-W site.

Students and faculty benefit from experience in developing practical solutions to design and operational problems that reflect the current safety concerns and missions of DOE. Opportunities to participate in the spectrum of safety activities are especially important for universities like LSU that have small nuclear programs. Faculty gain first-hand experience and access to information that provides guidance in conducting safety studies.^{1,2} Students who participate at the ANL-W site gain a head start on their careers because of the contacts they make and their exposure to an operational rigor usually not found on campus. Even the students who remain on campus benefit because current methods and data used in safety analyses are incorporated into classes, design projects, and theses with minimum delay. Experience in the art and science of completing a study within the time and financial constraints provides our students with a competitive edge in a shrinking job market for recent graduates in nuclear science and engineering.

Argonne benefits by gaining access to individuals who can provide independent design, analysis, and review services at a minimal cost. Savings in fringe benefits and overhead are considerable, and management has great flexibility in matching expertise with the problems at hand. The financial aspects have become even more important in these years of declining budgets for nuclear activities in the DOE laboratory system and universities. A symbiotic relationship that takes advantage of the strengths of the partners makes more efficient use of limited resources. The DOE sponsors a number of programs to bring members of the academic community into their various laboratories. Such programs provide the introductions; development of successful partnerships requires commitment from the laboratory staff as well as the faculty involved. Individuals at ANL-W and LSU have worked hard to assure that a productive relationship has endured for over twenty years of programmatic changes.

References

1. J.E. Ayer, et al., **Nuclear Fuel Cycle Facility Accident Analysis Handbook**, US Nuclear Regulatory Commission Report NUREG-1320 (May 1988).
2. US Department of Energy, **Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities**, DOE-HDBK-3010-94 (December 1994).

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Table 1

Safety Related Projects at ANL-W Involving LSU Personnel	Years
Contamination Transfer Between EBR-II and Fuel Conditioning Facility	1973-74
Fixed Air Sampling System Design and Data Analysis	1975-82
Radiological Safety Analysis of the Fuel Conditioning Facility	1982-85
Decontamination of the Argon Cell at the Fuel Conditioning Facility	1983-86
Design of Shields for a Hot Repair Facility	1985-92
Shield Design for the Transuranic Waste Characterization Chamber	1991-92
Criticality Safety Calculations Supporting Remote Fuel Processing	1991-93
Radiation Safety Aspects of Waste Characterization Operations	1992-94
Transportation Accident Safety Analyses for Spent Fuel Shipments	1993-94
Shield Test Program for the Fuel Conditioning Facility	1994-95
Offsite and Onsite Dose Estimates for Plasma Hearth Operations	1994-95
Development of the Nonreactor Facility Radiological Risk Index	1992-96