Safety and Emergency Management at Nuclear Power Plants: Education and Training Using Virtual Reality and 3D Gaming Technology

Executive Summary

<u>Goals</u>: Taking advantage of recent developments in virtual reality and 3D, computer/video game technology, develop several modules to teach and train the essentials of nuclear safety and emergency management. All modules developed will be suitable for special purpose immersive equipment, as well as for standard PCs. [This is an extension request. Last year's focus was on security and ALARA modules.]

<u>Expected Output or Product</u>: Four 3D, immersive and interactive modules for role playing connected with nuclear safety as well as with those associated with emergency management will be developed. Safety-focused modules will address topics such as training of students, NPP personnel and first responders under abnormal conditions (fire, security threat, etc), while emergency-management-focused modules will, for example, allow training in virtual radioactive environment (visible radiation) to respond to emergency scenarios. A total of eight scenarios or case studies (such as a fire drill and radiation leak) will also be developed. Modules will be integrated in courses at UIUC. Equally importantly, these modules will also be available to utilities as well as to other agencies, such as national labs, for education and training purposes.

<u>Benefits</u>: Educational infrastructure will improve via the introduction of new modules that will be integrated in existing courses and short workshops. Teaching competency is likely to improve significantly. Short videos of these modules shown in lecture classes, followed up by short computer labs in which students, workers and even periphery workers such as firefighters or homeland security personnel will get a hands on experience and be familiarized with the environment before even setting foot there. [Building upon the models developed last year, this year's models will have the "visible radiation" capability.]

The introduction of emergency scenarios in virtual reality modules in the radiation protection and shielding course and security-focused modules in special topics seminars and other courses will significantly help the instructors convey the salient concepts in reactor security and radiation protection. It will allow instructors to provide realistic scenarios to compliment the theory on platforms that are increasingly populating reactor control rooms.