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### **Nuclear Weapon Testing Limitations and Monitoring Low Level Radioactivity**

JAY ZUCCA, Lawrence Livermore National Laboratory

Collection of radioactive aerosols or noble gasses from a nuclear explosion is normally considered necessary to identify an explosion as nuclear—particularly for smaller explosions. Radionuclides can be collected at the particulate or noble gas stations of the International Monitoring System (IMS) or during an on-site inspection (OSI) which could be authorized under the Comprehensive Nuclear-Test-Ban Treaty after its entry into force. Nuclear explosions in the atmosphere will release large amounts of radionuclides which will be detected by the IMS with high probability. For detection of underground nuclear explosions, radionuclides need to be released to the atmosphere by a subsurface transport mechanism that can range from a dynamic venting of a major fraction the nuclear explosion fission products to only a small amount of radioactive noble gasses. Small releases may only be detectable during an OSI. Modern detection systems are very sensitive and detect background sources of radionuclides in addition to nuclear explosion related radionuclides. Techniques which require the measurement of several isotopes may be necessary to discriminate between benign and nuclear explosion-related radionuclides.

In collaboration with: Charles Carrigan, Lawrence Livermore National Laboratory and Brian Milbrath, Pacific Northwest National Laboratory.