wood-polymer composites. However with the cesium contamination of the irradiator at Decatur, Georgia in 1988, that irradiator is shut down and a second one has converted back to cobalt-60; the third irradiator continues to operate with cesium-137. There is still about 60 MCi of encapsulated cesium-137 at Hanford. Because this is equivalent to only about 10 MCi of cobalt-60, its long term contribution to irradiation technology is small except for special applications requiring the lower gamma energy (0.66MeV) or longer half-life. The half-life of cesium-137 is 30.2 years; that for cobalt-60, 5.27 years). One such application is blood irradiators for hospital use.

Radioluminescent (RL) Photonics Advances

Very recently, the U.S., Canadian, and U.K. scientific, technical, and user community gathered in Annapolis, Maryland, in a unique technology transfer meeting sponsored by DOE's Office of Technology Policy.[12] The purpose of the meeting was to present recent advances in RL technology developed by the nuclear weapons laboratories that could be transferred to the private sector for peaceful applications as directed by the Congress. For several decades RL, low-intensity, tritium gas-tube light sources have been used routinely both here and abroad in aircraft exit signs, chronometers, and emergency egress signage in public buildings. In the past few years, the DOE has been conducting a program on aircraft runway lighting in cooperation with the State of Alaska, the City of St. Petersburg, Florida, and several U.S. Government and Canadian agencies. RL technology has been either studied or successfully demonstrated in runway lighting, airport signage, enclosed space, emergency, security, medivac, mine safety, ship safety, and other applications. Operating experience on airport signage in Florida, runways in rural Alaska, helicopter medivac pads in Ontario, and studies of naval safety applications were presented at the technology transfer meeting.

In 1988 the nuclear weapons laboratories, Sandia National Laboratory (SNL), and EG&G Mound Laboratory (ML) formed an R&D team to develop a solid state, photonic light source to enhance the brightness, safety, adaptability, and manufacturability of light sources. The laboratories set a goal to surpass RL gas tube technology which has plateaued at a brightness output of about 1 foot-lambert and to develop a more efficient solid state photon source that immobilizes the tritium in a molecular structure. They reported on their experiments where the tritium, phosphor, and various matrices produced brightness well in excess of their goal and indicated that a brightness of 10 foot-lamberts might be achieved. The future potential of a higher intensity recyclable tritium photon source, having a possible lifetime of a decade and capable of variable photon energies by varying the phosphor, offers a myriad of high technology opportunities in addition to the applications already proven with gas tube technology. SNL has studied the coupling of a light source and photovoltaic converter to produce a milliwatt-level, self-contained, and long-lived electrical power source.

Advanced electronics technology is applying photonics to replace electrical signals on wires with light signals on optical fibers. In this way RL light could someday be converted to electricity directly on a computer chip or could serve as the main light source for the optical computer. President Eisenhower's 1950s initiative to "turn weapons into plowshares" could be literally reborn in the 1990s as the principal ingredient of H-bombs is used to enhance the quality of life of mankind as disarmament proceeds.