

Tracking Radioactive Sources in Commerce

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Environmental Issue

Millions of radioactive material packages are shipped each year

- ◆ In transit, sealed radioactive sources may be vulnerable to loss or theft due to:
 - ➔ Minimal security by commercial shippers
 - ➔ Knowledge of routes routinely taken
 - ➔ Inability to track location of specific packages
- ◆ Missing sealed radioactive sources pose a significant environmental and health risk through:
 - ➔ Direct exposure to radiation
 - ➔ Contamination of the scrap metal supply
 - ➔ Production of radioactive consumer products
 - ➔ Use in terrorist activities

Scientific Approach

Effective package tracking system can prevent loss of radioactive material

- ◆ An affordable tracking system, capable of near real-time monitoring, that is able to function in the presence of radioactivity, is needed to prevent inadvertent or illegal loss of radioactive sources
- ◆ Integration of currently available off-the-shelf technologies is the most flexible, economical, and quickest approach. Selected technologies include:
 - ➔ wireless asset tracking
 - ➔ global positioning satellite (GPS)
 - ➔ radio frequency identification (RFID)
 - ➔ Local Area Network—WiFi (802.11) and Bluetooth
 - ➔ Wide Area Network—mobile phone, ethernet and/or satellite
 - ➔ security—encryption, short broadcast bursts and frequency hopping
- ◆ A modified Type A radioactive material shipping package can incorporate a hidden remote sensor tag

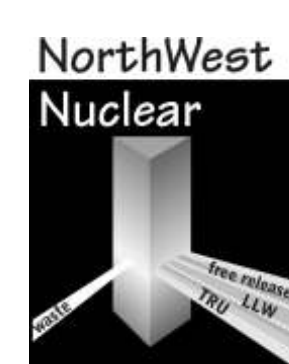
Impact of Technology

Tracking system can be incorporated into commercial shipping chain

- ◆ Enforcement of radioactive material transport regulations is increased
- ◆ Commercial shippers and carriers have greater security of radioactive material shipments
- ◆ Homeland security is improved due to ability to track location of missing shipments
- ◆ Field tests will incorporate single and multiple isotope shipments of Co-60, Cs-137, Sr-90 and Ca-252. Sched. date for shipments is July-Sept., 2004

Partnerships

- ◆ U.S. Environmental Protection Agency Office of Radiation and Indoor Air
- ◆ U.S. Department of Energy Facilities & Materials Reuse Division
- ◆ Oak Ridge National Laboratory Computational Sciences and Engineering Div.
- ◆ NorthWest Nuclear, LLC.



Wireless Reader Tag
Approx. size: 2.5 by 1.75 inches



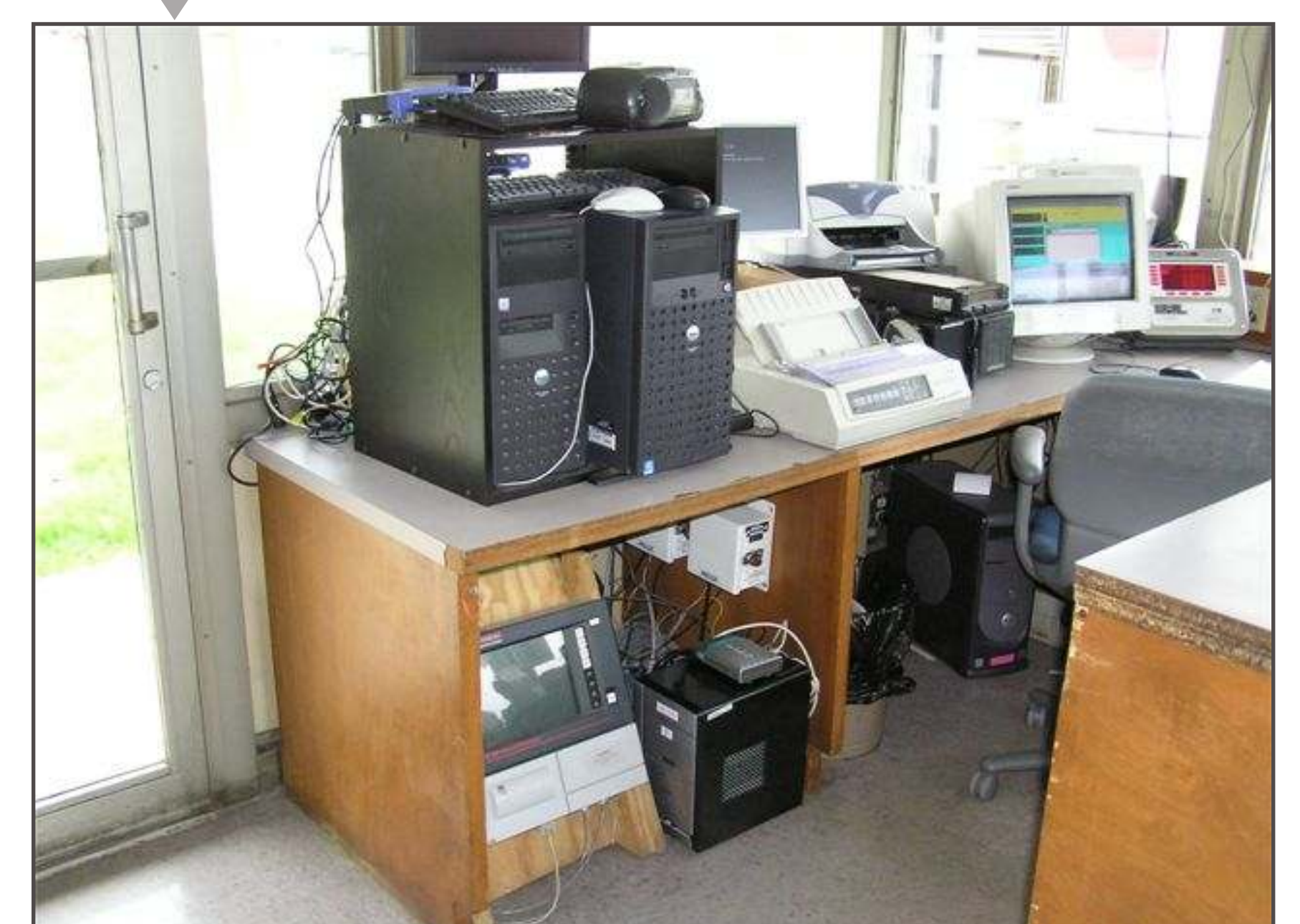
10 meters

Modified Type A Radioactive Material Shipping Container: Wireless tag embedded in wall



100 meters

Radiation Monitors and Gateway Communicator device at truck weigh station



Network Interface
(LAN/WAN, cellular, internet)