ELEVENTH TECHNICAL INFORMATION EXCHANGE (TIE) WORKSHOP

INEEL LSDDP

FUEL STORAGE CANALS AND ASSOCIATED UNDERGROUND AND UNDERWATER FACILITIES

PROJECT MANAGER

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DECONTAMINATION AND DECOMMISSIONING AT THE INEEL

- Decommissioning Operations
  - Started in 1978
  - 52 reactors and associated facilities
  - About 100 buildings decommissioned to date
  - Number of projects currently underway

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LARGE SCALE DEMONSTRATION AND DEPLOYMENT PROJECT STATUS

- 130+ Technologies Reviewed
- 27 Selected for Detailed Evaluation
- 21 Approved for Demonstration
- 8 Demonstrated
- 3 In Process of Being Demonstrated
- 2 Scheduled to Start

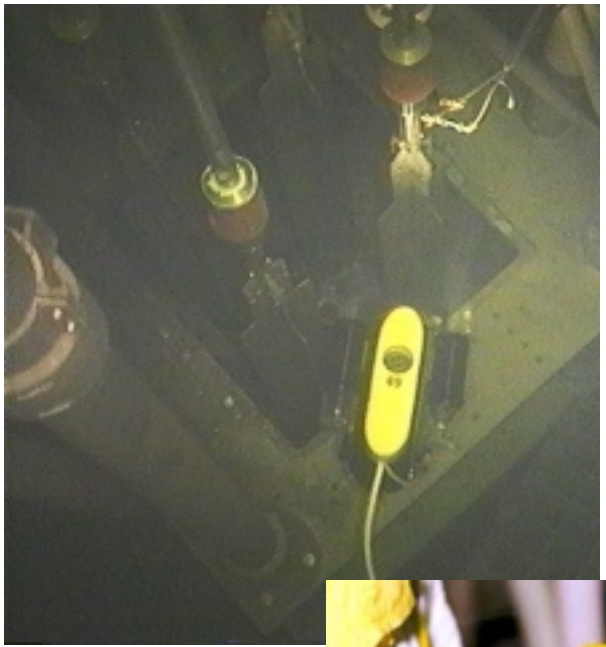
LARGE SCALE DEMONSTRATION AND DEPLOYMENT PROJECT STATUS

- Technologies Demonstrated
  - Remote Underwater Characterization System (RUCS)
  - Soft Sided Waste Packaging System
  - NITON® 700 Series Multi-Element Spectrum Analyzer (LPA)
  - Automatic Locking Scaffold System
  - NITON ® XL-800 Series Analyzer (Alloy Analyzer)
  - Paint Scaler
  - Electromagnetic Radiography
  - Global Positioning Radiometric Scanner System (GPRSS)
  - Spectro Xepos Analyzer (PCB Analyzer)

LARGE SCALE DEMONSTRATION AND DEPLOYMENT PROJECT STATUS

- Technologies Currently Being Demonstrated
  - In Situ Object Counting System (ISOCS) for Free Release
  - Copper Recycling
- Technologies Scheduled to Start
  - En-Vac Robot Blasting System
  - 3D Laser Scanning

REMOTE UNDERWATER CHARACTERIZATION VEHICLE (RUCS)



- Characterized the ARMF/CFRMF reactors in August 1998
- Identified radiation levels higher than previously detectable
- Identified objects on the pool floor previously not visible due to restricted access
- Inuktun Services Ltd.
- Modified by INEEL
  - added auto-depth control
  - integrated gamma radiation detector

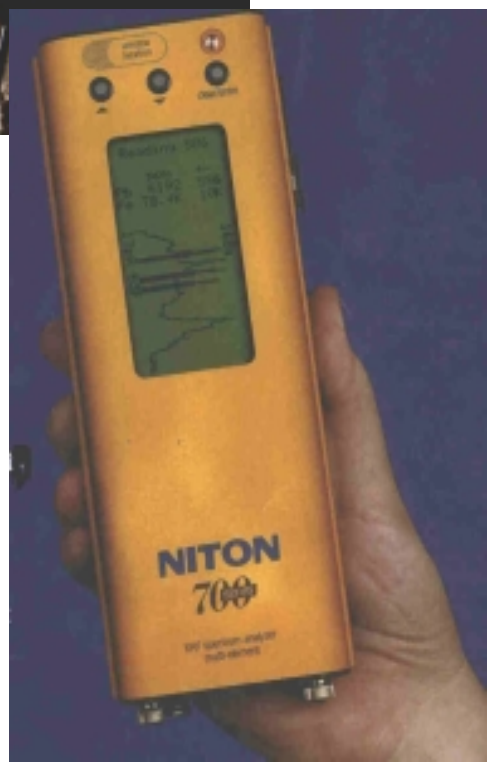
SOFT SIDED WASTE PACKAGING

- Packaging of Low Level Waste/Debris
- Reduces cost significantly
  - 260 cubic foot capacity compared to 96 cubic foot
  - $380 per container vs. $750 for metal boxes
  - Decreases total cost by 69%
- Molds around itself for void volume reduction
- DOT IP-1 Approved

SOFT SIDED WASTE PACKAGING

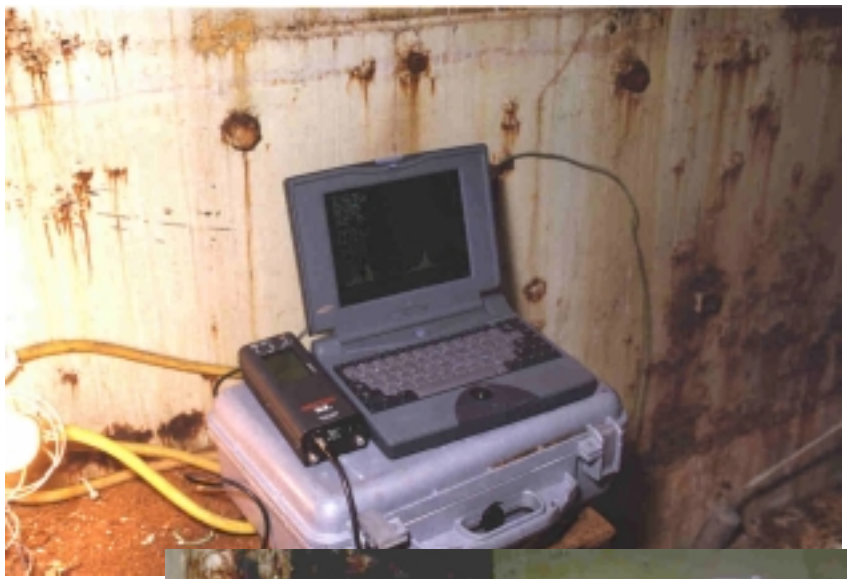
- Baseline 4’x 4’x 8’ FRPs, 125Bs, and metal boxes
- 40 mil high density polyethylene inner liner
- 25 mil woven polypropylene outer shell
- Web straps and overlap closure

NITON® 700 SERIES MULTI-ELEMENT SPECTRUM ANALYZER (LPA)



- Small, light, hand held, battery-operated unit
- Uses x-ray fluorescence spectroscopy to analyze 25 elements including lead
- Results in 20 seconds
- In-situ detection of lead based paint
- Baseline technology is scrape and send to a laboratory

NITON® 700 SERIES MULTI-ELEMENT SPECTRUM ANALYZER (LPA)



- $25,000 for analyzer compared to $1,000 per lab sample
- Baseline sampling methods often contaminate the sample
- Analysis within minutes compared to 30 - 90 days for lab analysis

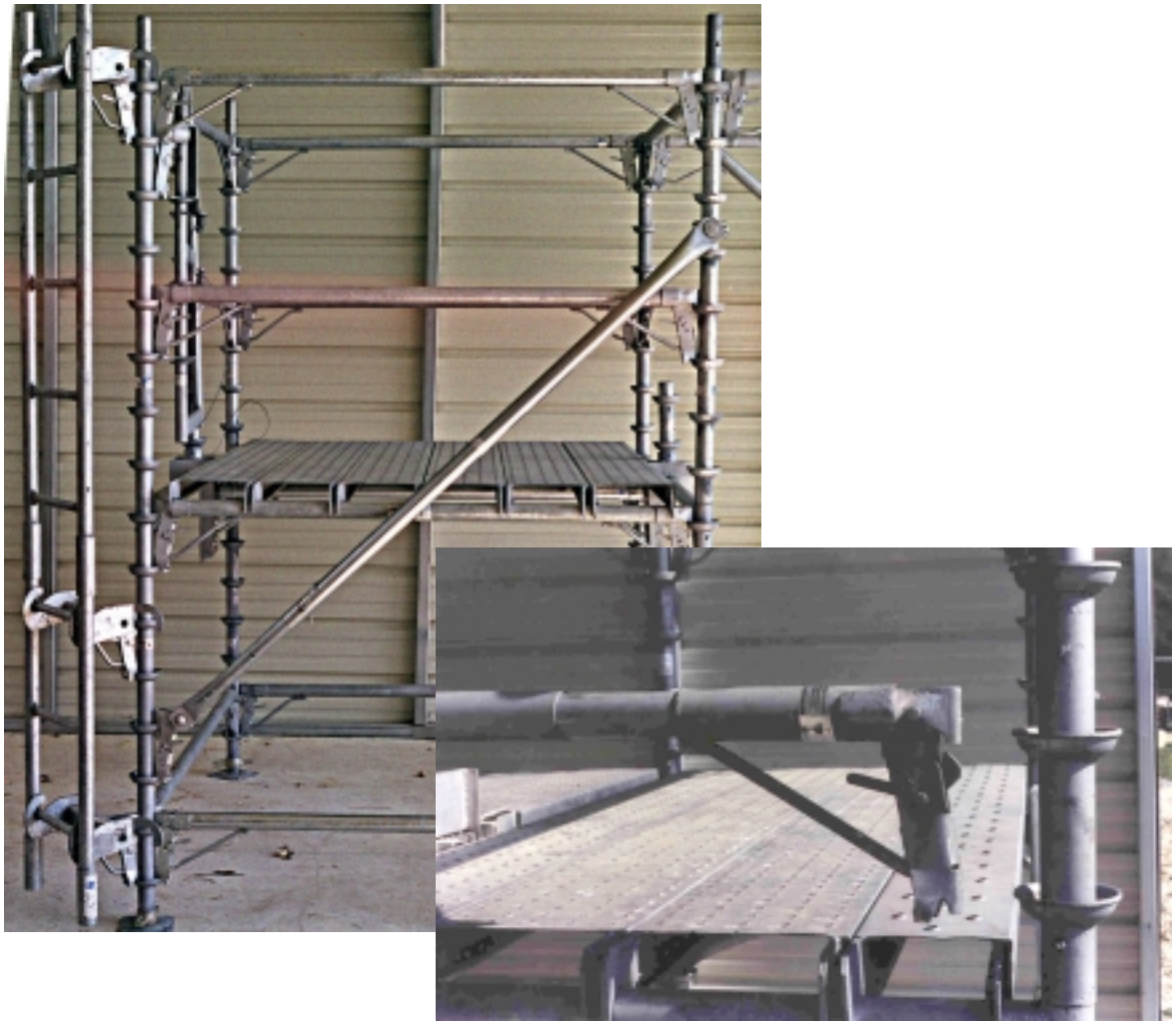
NITON® XL-800 SERIES ANALYZER (ALLOY ANALYZER)

- X-ray fluorescence analyzer
- In-situ metal characterization
- Alloy characterization within seconds
- $20,000 for analyzer compared to $4,500 per metal sample
- Data in seconds compared to 90 days for lab analysis

NITON® XL-800 SERIES ANALYZER (ALLOY ANALYZER)

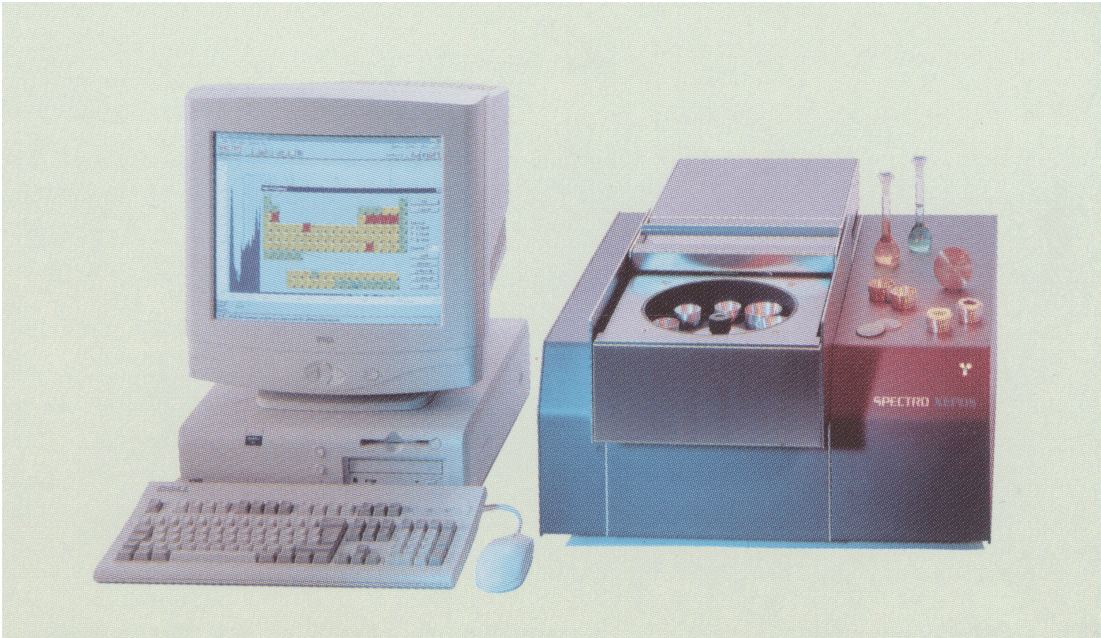
ELECTROMAGNETIC RADIOGRAPHY (EMR™)

AUTOMATIC LOCKING SCAFFOLD SYSTEM



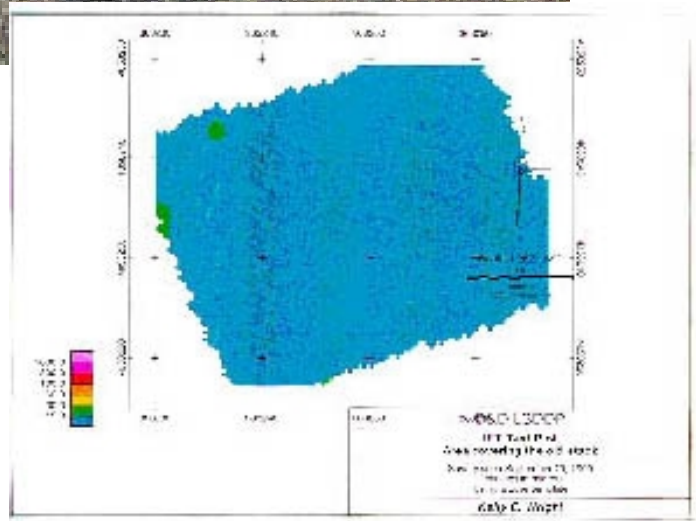
- Easy to use
- Assembles six times faster than baseline
- Automatic locking mechanism
- No tools required
- Uses 40-45% fewer parts

SPECTRO XEPOS ANALYZER



- Will be used to perform elemental analysis on samples.
- Samples will be analyzed for the presence and concentration of the chloride ion to aid in the detection of PCBs.
- It uses low power x-ray tubes as the radiation source for PXRF.

GLOBAL POSITIONING RADIOMETRIC SCANNER (GPRS) SYSTEM



- Large area surface radiological mapping system
- 80% reduction in labor
- 100% coverage as opposed to gridded surveys
- Real time, in-situ, reproducible
- Increased accuracy
- Versatile over any terrain
- No surface preparation required
- Graphical representation

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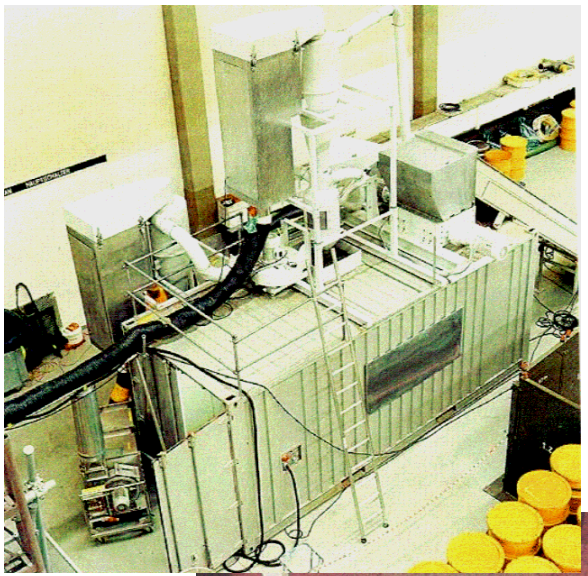
PAINT SCALER

- Collect samples from lead, paint, and tarred surfaces
- Baseline - manual chipping and scraping
- Reduces worker fatigue
- Reduces worker exposure in radiological environments
- Provides cleaner samples
- 2 to 5 times faster
- Cost $800

COPPER RECYCLING



- Developed in Germany NUKEM Nuclear Technologies
- Contaminated and non-contaminated
- Separates insulation from copper
- Free release copper for recycling
- Dispose of contaminated insulation as dunnage
- Scheduled for November demonstration

ISOCS FOR FREE RELEASE (IFR)

- In-situ object counting system (ISOCS)
- Field portable gamma detector
- Used to free release a building or room
- Baseline - grid and scan with hand-held monitors
- Benefit - 100% survey
- Reduced labor

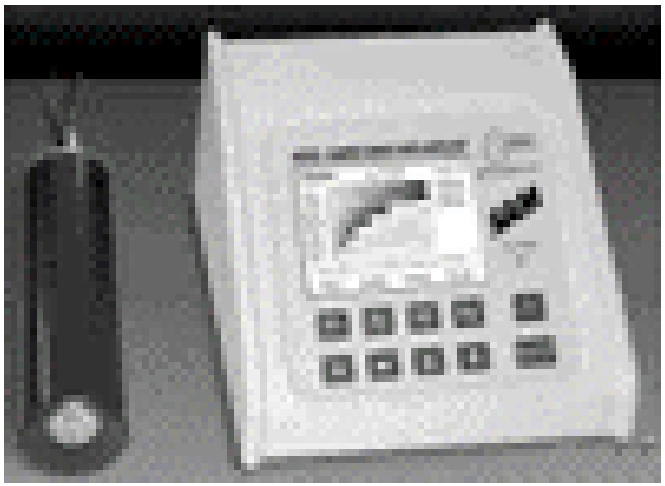
3D LASER SCANNING

- 360degree laser scanning system
- 3D computer-aided design (CAD) models
- $6,000 for laser scanning compared to $30,000 for manual as-building and modeling
- 7 days compared to 4 months for results

GAMMA LOCATOR DEVICE (GLD)

- Robotic gamma radiation sensor provided by Russian based NIKIMT
- Radio frequency controlled battery operated (no tether)
- Uses distance measurement method to determine activity density
- Distances up to 100 m
- Up to 100 R/hr fields
- 2 1/2’ h x 4’l x 2’w

SURVEILLANCE AND MEASUREMENT SYSTEM (SAMS)



- Hand-held portable NaI detector
- Real time identification and quantification of isotopes
- Operates in high background environments
- Accurately identifies mixed isotopes
- Neutron Detector Option

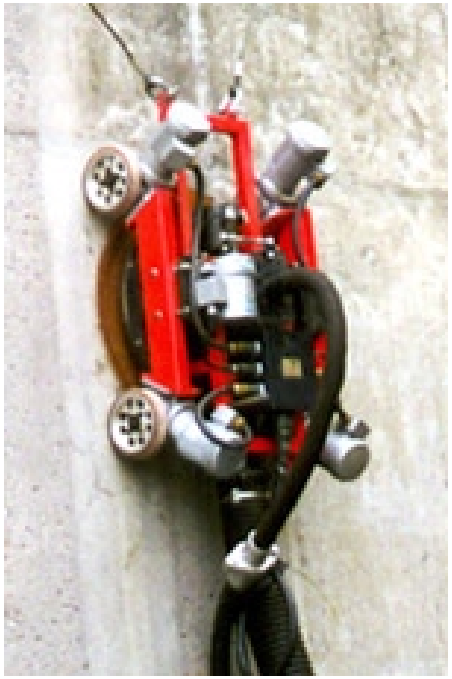
EN-VAC ROBOT BLASTING SYSTEM/INTEGRATED VERTICLE AND OVERHEAD DECONTAMINATION SYSTEM (IVODS)

En-Vac

- Concrete and metal decontamination
- Metal Grit blast
- 4 wheels independently controlled
- Recycled Grit
- Vacuum collection system and surface attachment

IVODS

- Similar deployment methodology with concrete shaver
- Sensor enhancements



OUTLOOK TO FUTURE

- Gamma Locator Device
- Surveillance and Monitoring System (SAMS)
- Integrated Vertical and Overhead Decontamination System (IVODS)
- Electro-chemical Decontamination
- Koolatron PortaFreeze and Battery Pack

http://id.inel.gov/lsddp