

Radioxenon Spiked Air for Field Testing

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A trusted test sample is vital to working with measurement systems regarding diagnostics and quality control.

In the laboratory setting, diagnostic and quality measurements have been essential to troubleshooting and performance demonstration, respectively. The ability to make these types of measurements is just as powerful and necessary in the field. The measurement of radioactive xenon by the International Monitoring System (IMS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO PrepCom) could benefit from the ability to make diagnostic and quality control measurements at established monitoring stations

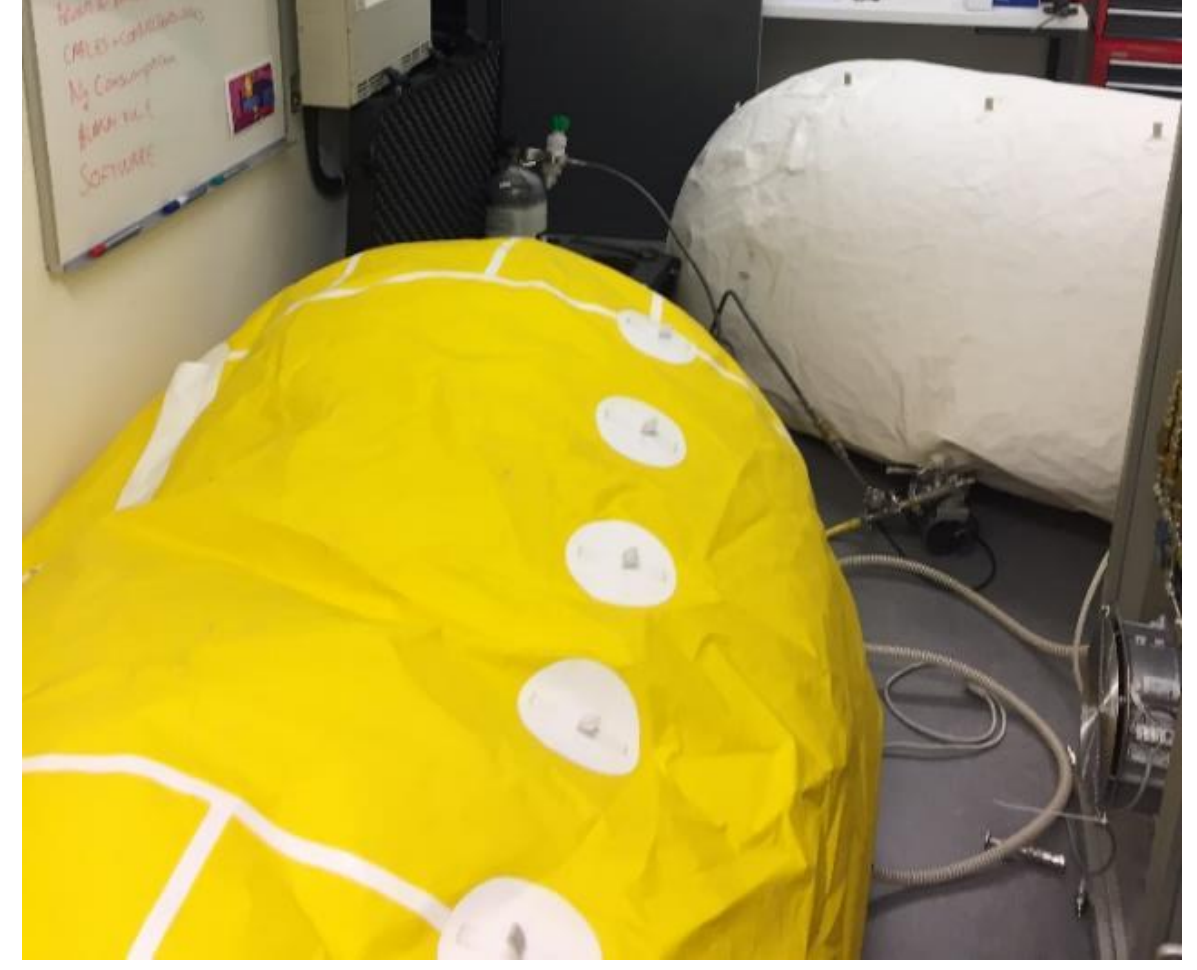
Samples Received



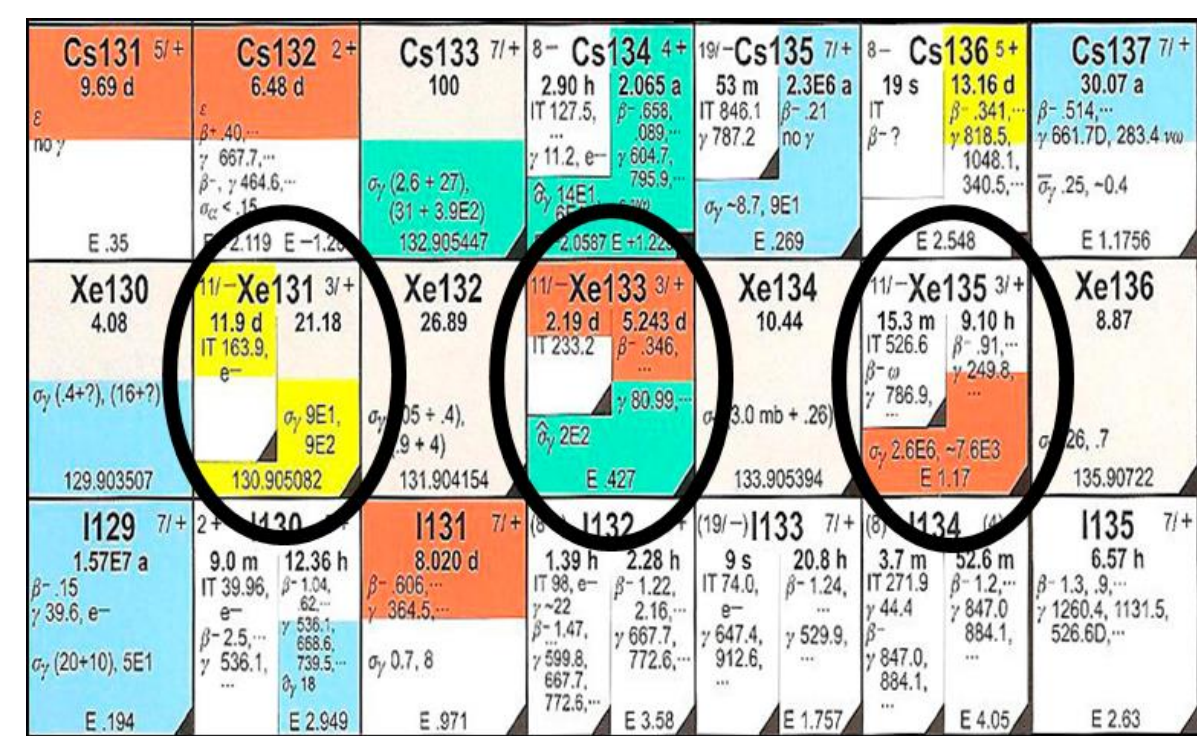
Sample Staging



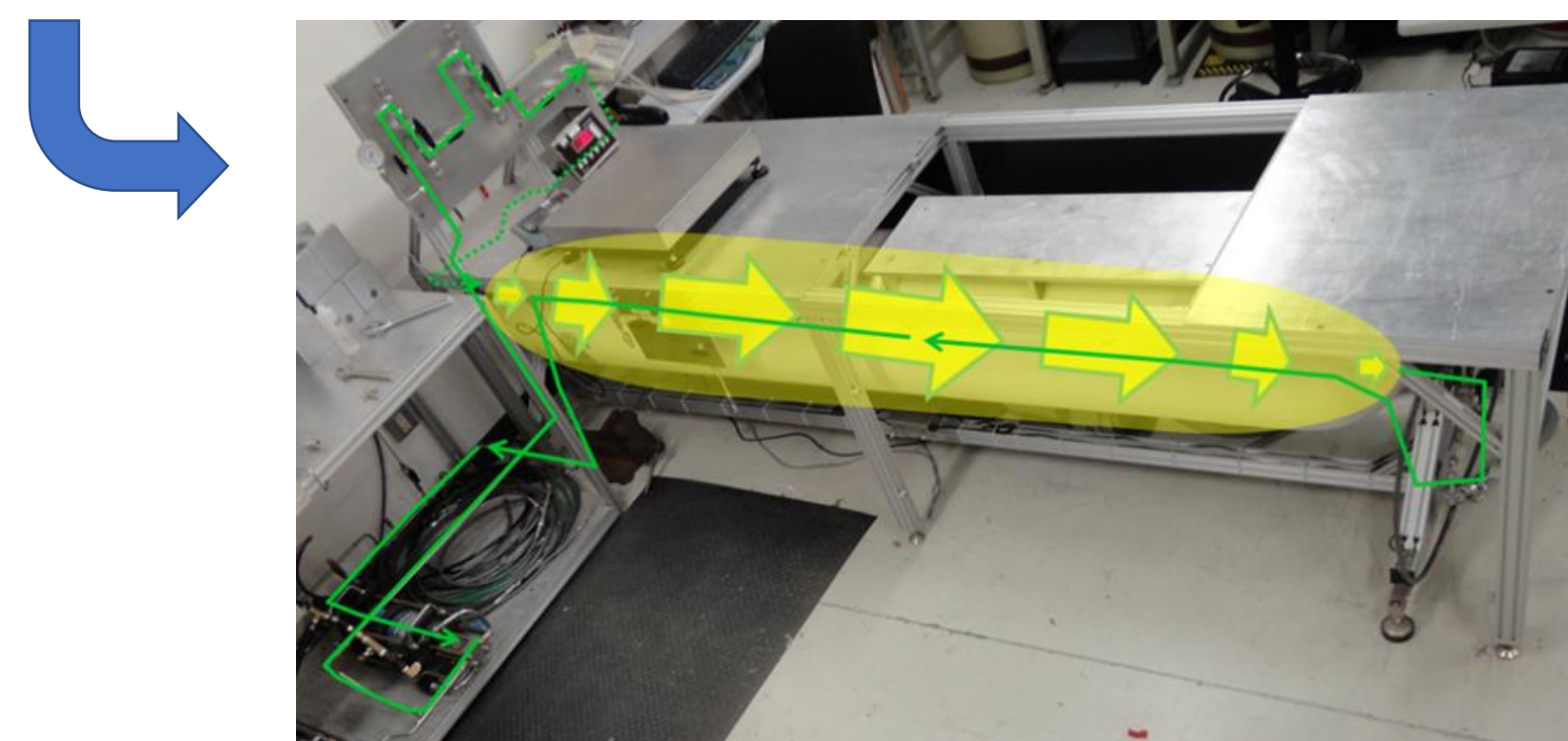
Transfer to Atmospheric Pressure



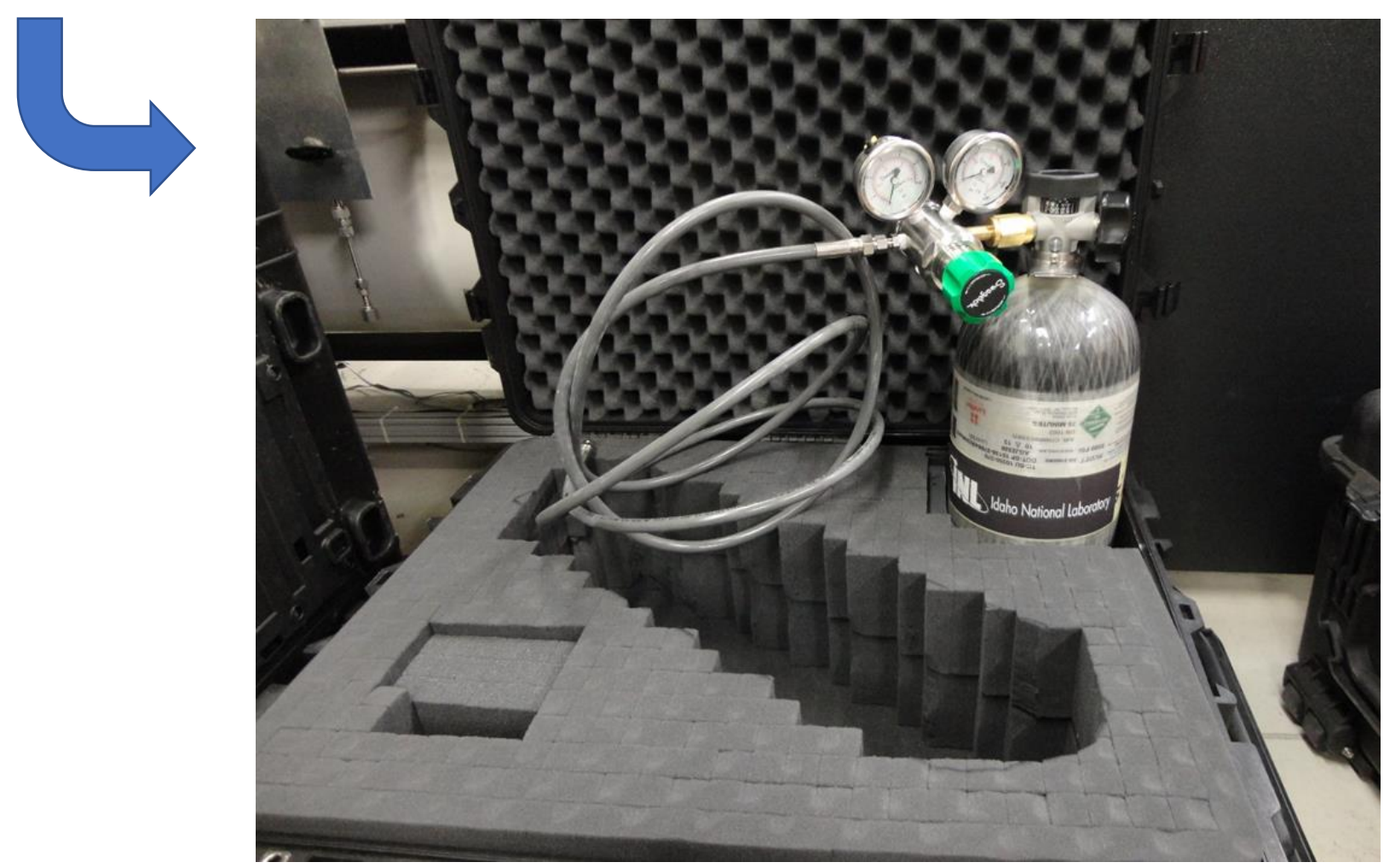
Sample Processing and Assay



Xenon Isotope Isolated



Xenon Mixed with Air



Samples Filled for Shipment

Challenge: Test and diagnose fielded equipment in place with a well characterized test material

Benefit: The measurement of radioactive xenon by the International Monitoring System (IMS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO PrepCom) could benefit from the ability to make diagnostic and quality control measurements at established monitoring stations.

Solution: Idaho National Laboratory (INL) partnered with the Swedish Defence Research Agency (FOI) have demonstrated the measurement of an air sample spiked with radioactive xenon prepared by INL transported to FOI and measured by FOI.

Results:

INL Preparation Measurement:
 $3.99 \pm 0.05 (1\sigma) \text{ mBq } ^{133}\text{Xe}/\text{m}^3$

FOI Measurement:
 $4.0 \pm 0.5 (1\sigma) \text{ mBq } ^{133}\text{Xe}/\text{m}^3$

INL Preparation Measurement:
 $60.13 \pm 0.94 (1\sigma) \text{ mBq } ^{133}\text{Xe}/\text{m}^3$
 $88.8 \pm 3.0 (1\sigma) \text{ mBq } ^{131\text{m}}\text{Xe}/\text{m}^3$

FOI Measurement:
 $61.3 \pm 5.1 (1\sigma) \text{ mBq } ^{133}\text{Xe}/\text{m}^3$
 $81.7 \pm 4.6 (1\sigma) \text{ mBq } ^{131\text{m}}\text{Xe}/\text{m}^3$

Two separate iterations have shown consistent results between the prepared activity concentration and the measurement made thousands of kilometers away.

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Disclaimer: The views expressed here do not necessarily reflect the views of the Swedish Government or the Swedish Defence Research Agency
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