



Northern Lights 2016

A FRMAC Laboratory Analysis Perspective

FRMAC Laboratory Analysis Working Group
SAND2017-XXXXX



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Overview



- FRMAC Lab Analysis Mission Overview
- NL16 Metrics
- NL16 Successes
- NL16 Lessons Learned
 - Analytical Challenges
 - Operational Challenges
 - Data Reporting Challenges
 - Communications Challenges

Federal Radiological Monitoring and Assessment Center (FRMAC)



- **Multi-Agency** response effort conducted in two phases
 - Partners include: DOE, DoD, EPA, FDA, CDC, USDA
- Consequence Management Response Team (CMRT)
 - Phase I
 - Phase II
- Consequence Management Home Team (CMHT)
 - Off-location assets at the national laboratories



MISSION: Assist federal, state, tribal, and local authorities by providing timely, high-quality predictions, measurements, analyses and assessments to promote efficient and effective emergency response for protection of the public and the environment from the consequences of nuclear or radiological incidents.

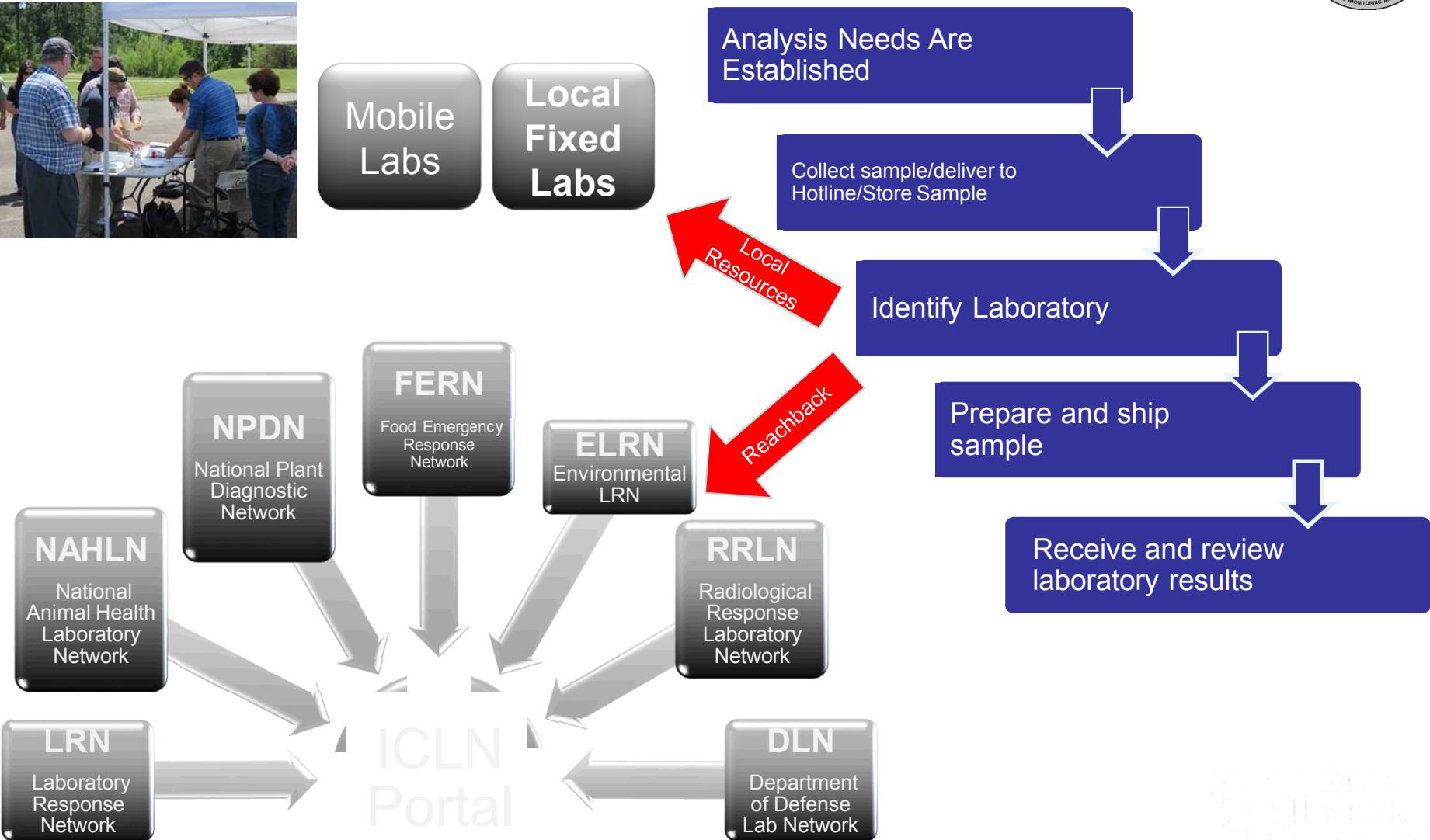
Federal Radiological Monitoring and Assessment Center (FRMAC)



- Mission: to assist with predictions, measurements, analysis and assessments related to radiological incidents
- Divisions of FRMAC
 - Sampling and Monitoring
 - Assessment
 - Health & Safety
 - Support
 - Liaison
 - Laboratory Analysis



Laboratory Analysis Division Responsibilities



Northern Lights 2016 – Laboratory Participation

- 6 DOE/NAMP Labs
 - SRS, SNL, INL, ORISE, WIPP, LLNL
- EPA NAREL (ERLN)
- Food Emergency Response Network (FERN) through the ICLN
 - WEAC, MD DoH, NY DoH, TX DoH, WA PHL, WI PHL
- State of Minnesota Public Health Lab
- FRMAC Fly-Away Lab (onsite mobile lab during exercise)



Exercise Metrics



| Laboratory | Gamma Analyses | Sr-89/90 Analyses | # completed |
|----------------------------------|----------------|-------------------|-----------------|
| Idaho National Laboratory | 20 | 6 | 20 |
| Savannah River Nuclear Solutions | 20 | 6 | 26 |
| ORISE/AEAV | 20 | 6 | 26 |
| Sandia National Laboratories | 20 | | 20 |
| WIPP | 20 | | 20 |
| <i>LLNL Radiochemistry group</i> | 0 | 2 | 2 |
| MN State Public Health lab | 38 | 10 | 48 |
| EPA NAREL | 20 | 4 | 24 |
| Texas DoH | 3 | | 3 (qualitative) |
| Washington PHL | 3 | | 3 |
| Maryland DoH | 3 | | 3 (qualitative) |
| WEAC | 3 | | 3 |
| Wisconsin PHL | 3 | | 3 (qualitative) |
| New York DoH | 3 | | 3 |



NL16 Successes

- Incorporation of 14 off-site labs and the ICLN into a CM exercise of this magnitude
- Design and delivery from a commercial vendor of 210 test samples (75 spiked with fresh fission products) in 4 matrices; water, soil, air filter and vegetation
- Completion of non-routine and complex radiochemical analyses by all participating labs
 - Successfully redirected samples in 2 days cross country
 - One DOE lab completed analyses even in the face of Hurricane Matthew that shut their lab down for several days
 - Utilized ICLN portal and the new FRMAC Gamma Spectroscopist position to facilitate the interpretation of complex gamma data
- Successful utilization of the ICLN portal by FRMAC CM Home Team Lab Manager for coordination of off-site analyses and communication with the various laboratory networks

NL16 Lessons Learned



Analytical Challenges

- The most likely nuclear emergency scenarios may involve very complex source terms
- Sr-89/90 analysis methods did not meet exercise DQOs
- Requested Lc (critical level) values may be too low for the laboratory to achieve
- Many Labs have limited experience with fresh fission product samples that have complex gamma spectra
- Some labs lack sufficient gamma spec geometries and don't have modeling capabilities to provide quantitative results



NL16 Lessons Learned

Operational Challenges for Labs

- Volatile species of radionuclides are present in realistic sample media. Labs may need special equipment and permits to handle discharge during sample processing
- Some situations require extended shift work (or even 24 hour ops.)
- Some labs' standard operating procedures (SOPs) are not flexible enough to meet the Data Quality Objectives (DQOs) of an emergency response
- Labs can plan for the DQOs in Lab Analysis Manual
 - Google: FRMAC Laboratory Analysis Manual, PDF is the first link
- USDA permits may be required to process some types of samples

NL16 Lessons Learned



Data Reporting Challenges

- Need flexibility to report data for non-detected radionuclides
- It is unclear what a Level I and Level IV data package actually looks like
- It is unclear what records must be uploaded to the Web Portal
- FRMAC Web Portal has bugs to work out
- Labs cannot practice on the Web Portal prior to a drill/exercise

NL16 Lessons Learned



Communication Challenges

- More practice is needed in how FRMAC Lab Management communicates with off-site labs and how they interface with the ICLN
- Off-site labs sometimes feel “out-of-the-loop”
 - ICLN Coordinators need more practice keeping laboratories in the loop
- There is little experience with what an EPA-led FRMAC looks like compared to a DOE-led FRMAC



Be Flexible !!

How Do I Get Involved or Prepare?



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Questions, Comments, and Feedback