



# Aliso Canyon Radiation Community Sampling

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# Objectives

- Why is Public Health Sampling?
- What are the Average U.S. Doses and Sources of Radiation?
- What is Naturally Occurring Radioactive Material (NORM)?
- Aliso Canyon TENORM (Technically Enhanced NORM)
- What does Sampling look like?
- How are Sampling Locations chosen?
- Community Input on Additional Sampling Locations



## Why is Public Health Sampling?

- Public Health is conducting additional sampling in the community as a response to requests from the community impacted by the Aliso Canyon blowout.
- Prior Results of sampling and radiation monitoring conducted at the facility.
- Results from the on-site sludge analyzed was not a community health concern.
- Hazardous radiation levels are not expected given the prior results of sampling conducted at the Aliso Canyon facility.

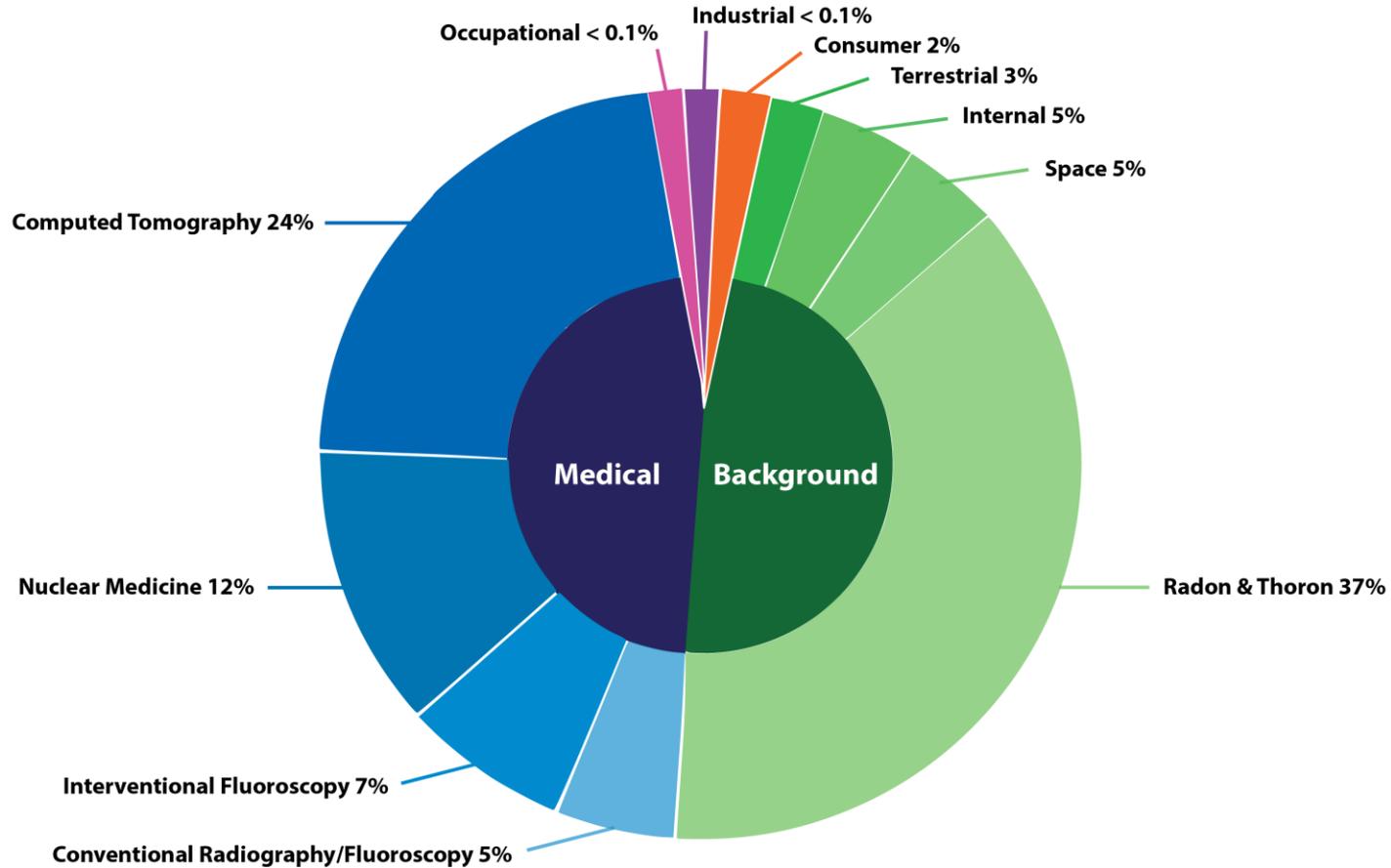


# What are the Average U.S. Doses and Sources of Radiation?

- Everyone is exposed to radiation every day
- From natural sources such as
  - Minerals in the ground
  - Man-made sources like medical X-rays
- According to the National Council on Radiation Protection and Measurements (NCRP), the average annual radiation dose per person in the U.S. is 620 millirem.



## Sources of Radiation Exposure

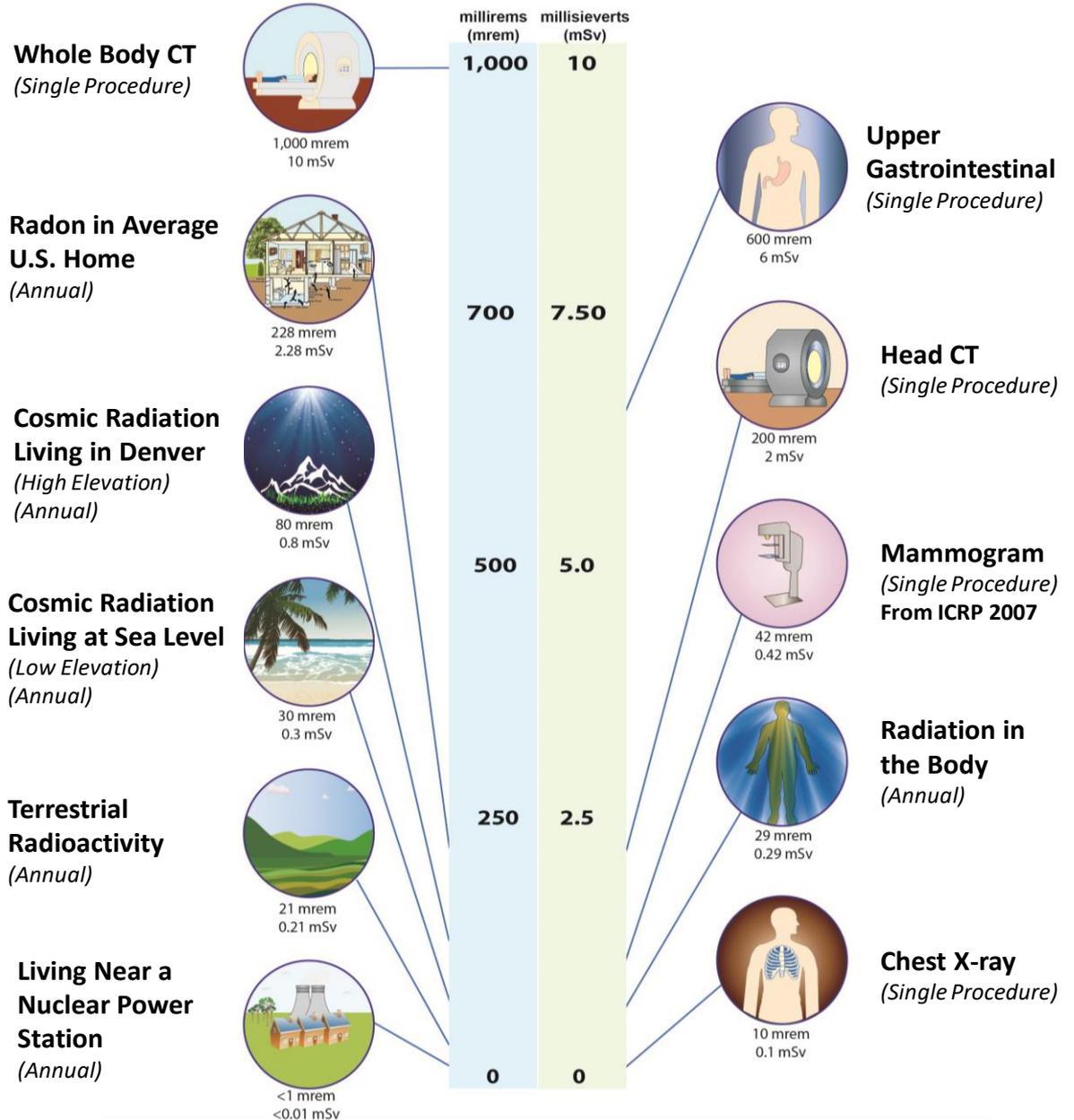


**Average Annual Radiation Dose**

Sources	Radon & Thoron	Computed Tomography	Nuclear Medicine	Interventional Fluoroscopy	Space	Conventional Radiography/Fluoroscopy	Internal	Terrestrial	Consumer	Occupational	Industrial
<b>Units</b>											
mrem (United States)	228 mrem	147 mrem	77 mrem	43 mrem	33 mrem	33 mrem	29 mrem	21 mrem	13 mrem	0.5 mrem	0.3 mrem
mSv (International)	2.28 mSv	1.47 mSv	0.77 mSv	0.43 mSv	0.33 mSv	0.33mSv	0.29 mSv	0.21 mSv	0.13 mSv	0.005 mSv	0.003 mSv

(Source: National Council on Radiation Protection & Measurements, Report No. 160)

# Relative Radiation Doses



# What is Naturally Occurring Radioactive Material (NORM)?

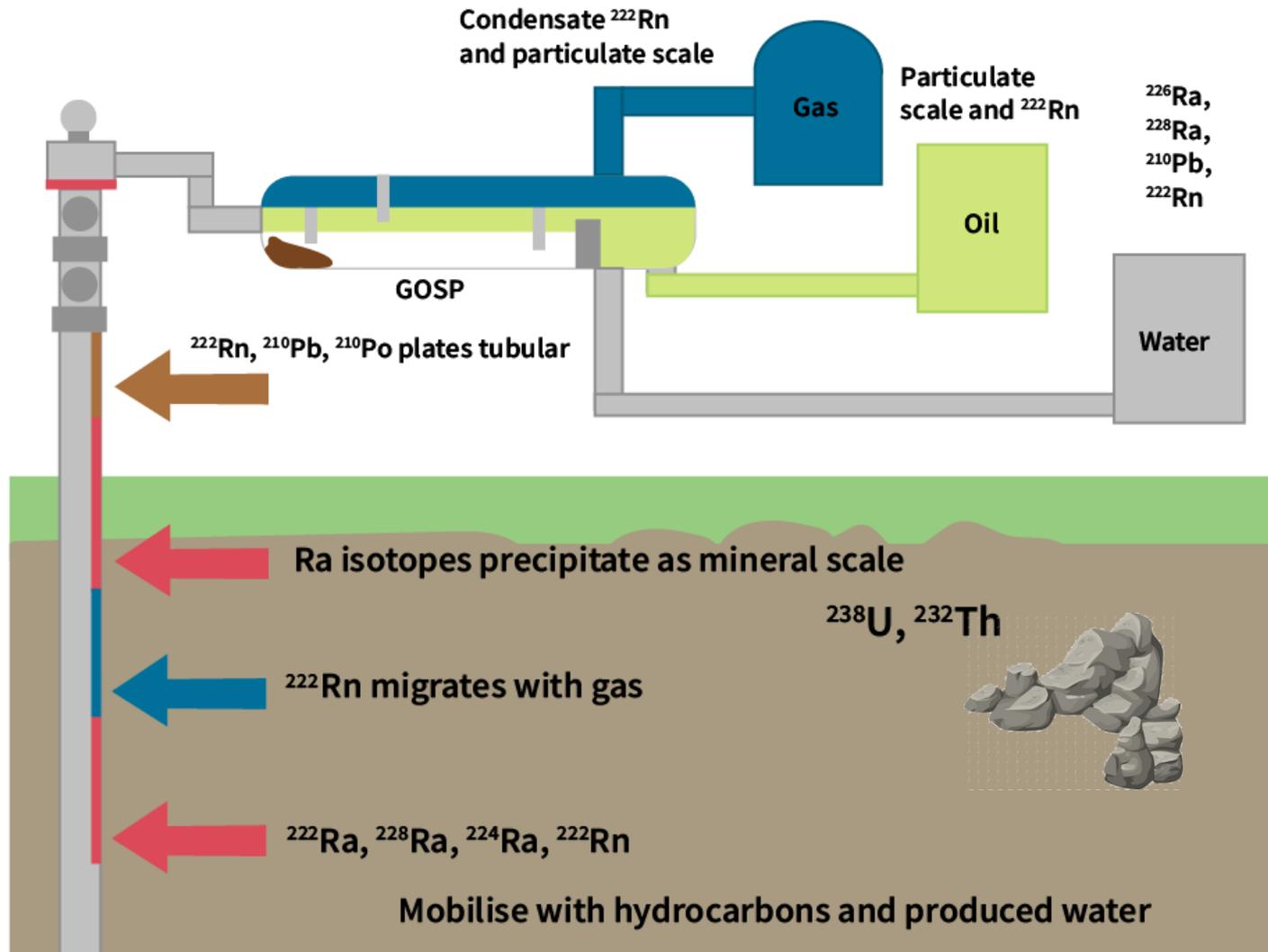
## **NORM**

- Radioactivity naturally in:
  - Soils
  - Rocks
- Presence since the formation of the earth
- Undisturbed as a result of human activities
- Contributes to background radiation levels

## **TENORM (Technically Enhanced)**

- Naturally occurring radioactivity
- Due to human activity:
  - Concentrated
  - Mechanical Processes
  - Gas Extraction (ie. Aliso Canyon)

# Radionuclides Associated with Oil and Gas Extraction



<https://www.bvna.com/insight/naturally-occurring-radioactive-materials-norm>

GOSP = Gas Oil Separation Plant

# How Radioactive is Aliso Canyon Dirt?

- TENORM in Aliso Canyon Dirt is 3 pCi/g.
- Natural Radioactivity of a Brazil Nut is about 1 to 7 pCi/g.



- 1 gram of Brazil Nuts = 1 gram of Aliso Canyon Dirt
- 1 Tuna Can size of Aliso Canyon Dirt Ingested = 1 Chest X-ray

1.10 CFR 20 Appendix B

2. Aliso Canyon Table 2 Po and Pb Isotope Final Report

# Conversion from pCi/g to rem via INGESTION

## Data Given

- 10 CFR Appendix B

10 CFR 20 App B	5 rem Equivalent
	Ingestion
Pb-210	0.6 uCi
Po-210	3.0 uCi

- Aliso Canyon Dirt measured at 3 pCi/g

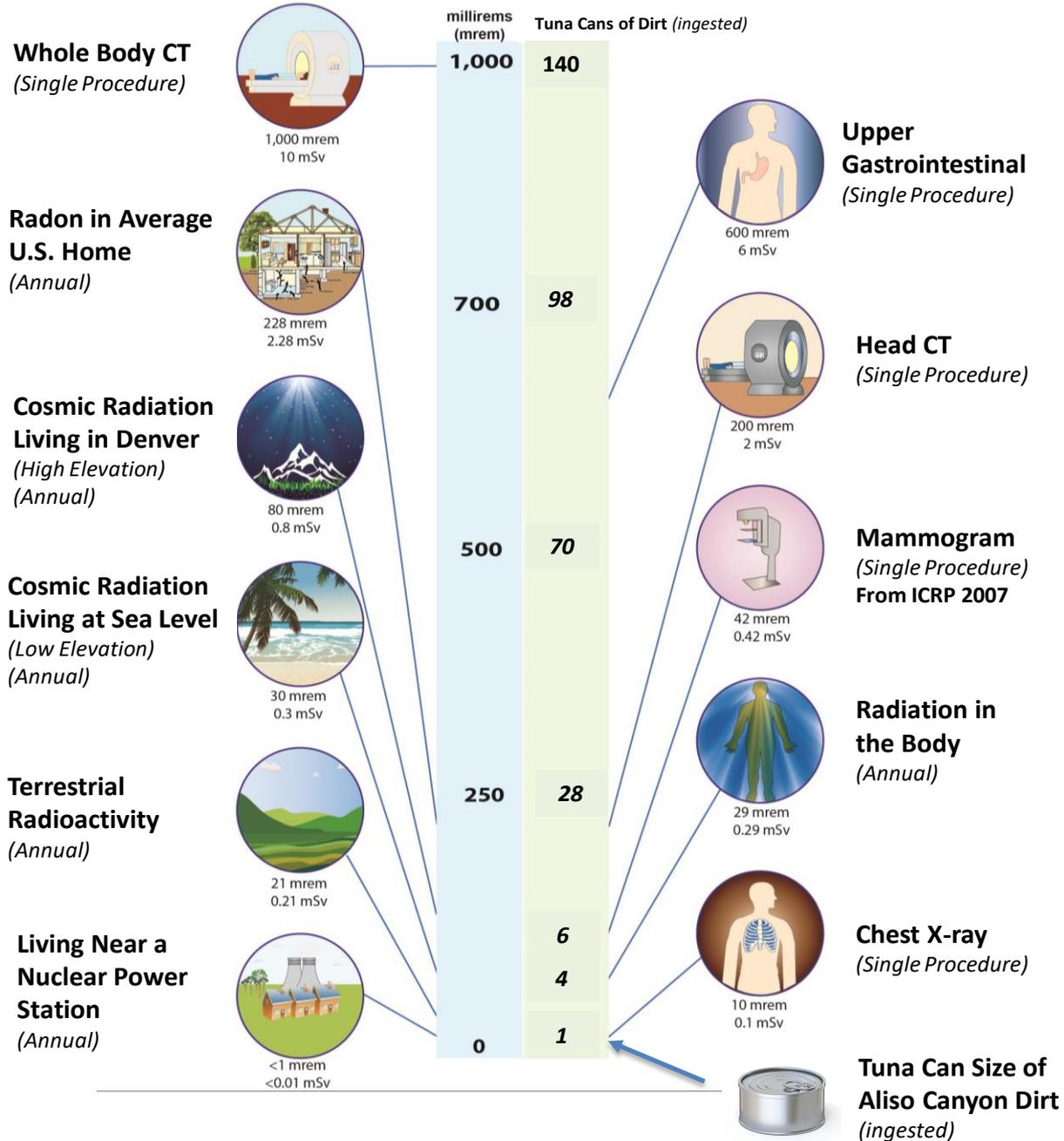
Note: Aliso Canyon Table 2 Po and Pb Isotope Final Report

- Tuna Can Size of Dirt is about ~300g
- 3 pCi/g = 0.000003 uCi/g  
(Conversion from pico to micro)
- Chest X-ray is between 3 and 10 mrem

## Calculation

- $(0.6 \text{ uCi}) / (0.000003 \text{ uCi/g}) = 200,000 \text{ grams of Aliso Canyon Dirt} = 5 \text{ rem.}$
- $200,000 \text{ g} / 300 \text{ g per Tuna Can} = 667 \text{ Tuna Can Size of Dirt} = 5 \text{ rem}$
- $667 \text{ Tuna Can Size of Dirt} / 1000 = 0.667 \text{ Tuna Can Size of Dirt} = 5 \text{ mrem}$
- **Therefore 1 Tuna Can Size of Dirt = 1 Chest X-ray**

# Relative Radiation Doses





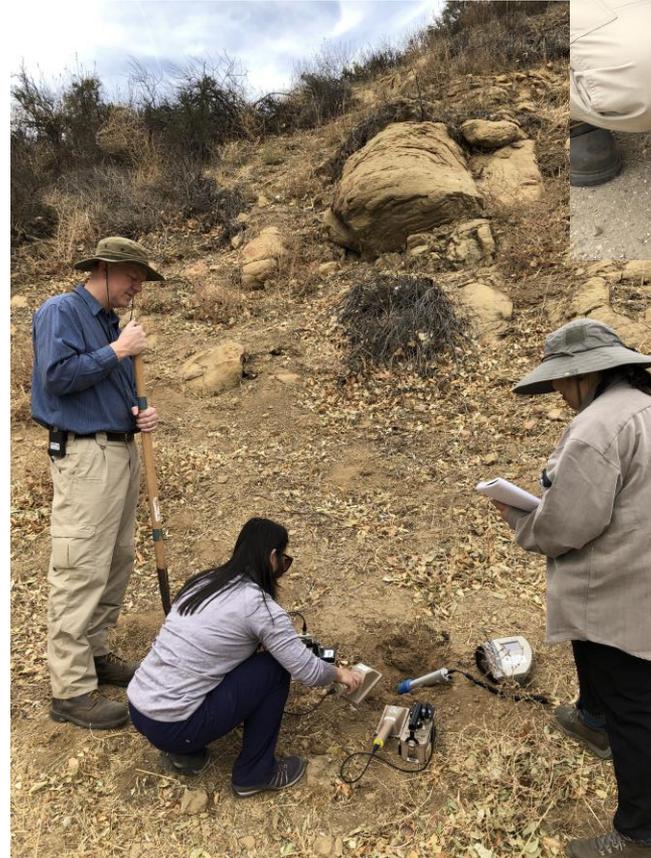
Coming Soon!  
**Community Sampling**



# What does Sampling look like?

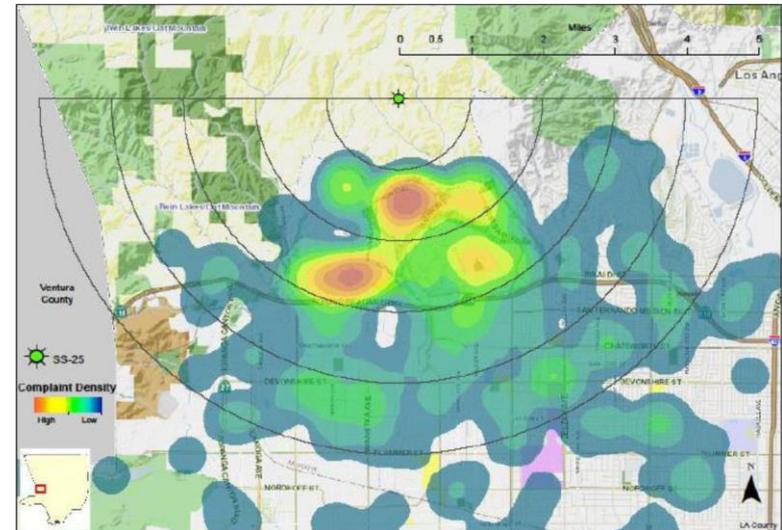
## Instrumentation and Gear

- Team of 4 to 6 people
- Using a shovel
- Ziplock Bags
- Radiation instrumentation
  - Alpha Probe
  - Beta Probe
  - Gamma Probe
  - Nuclide Identification

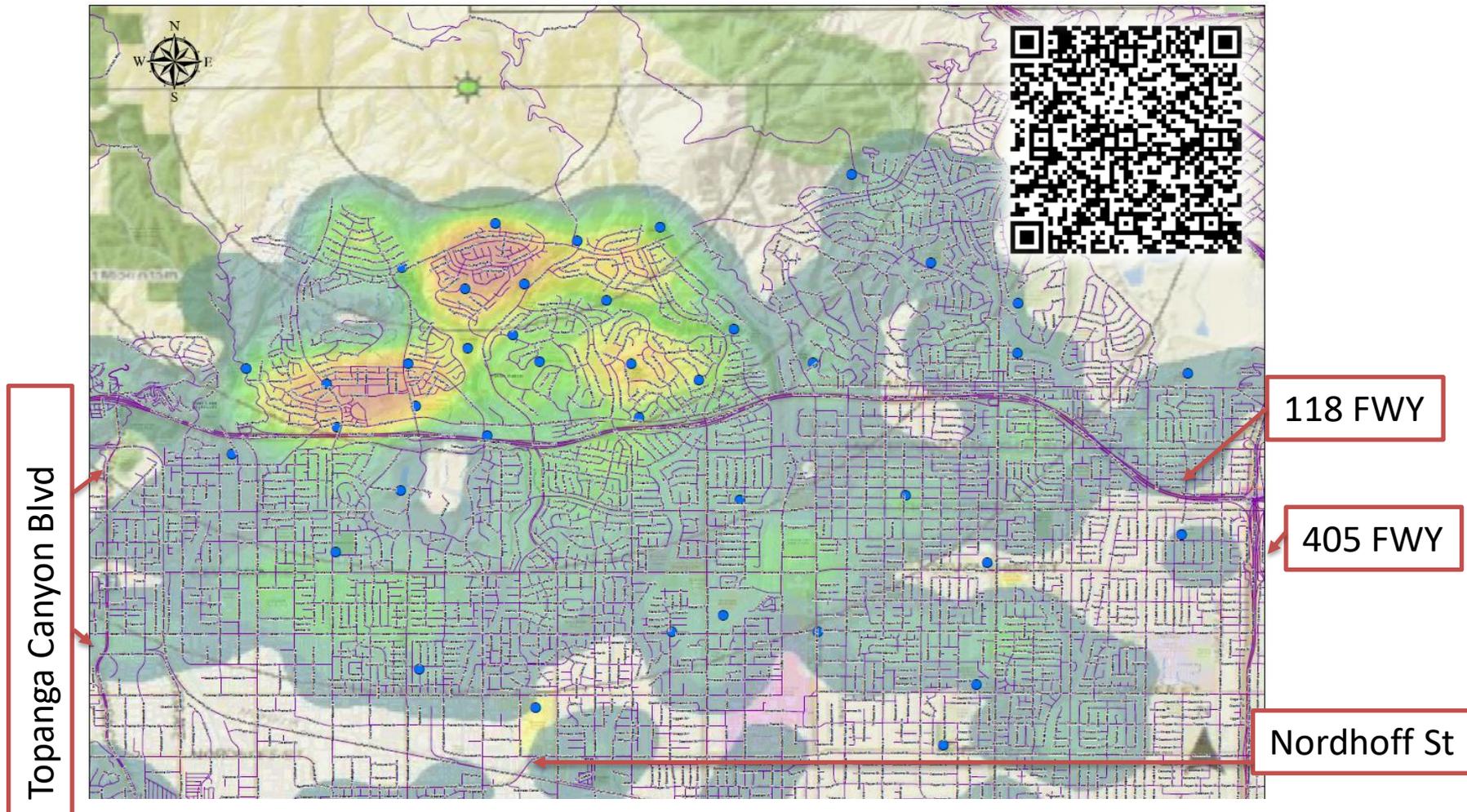


## How are Sampling Locations chosen?

- Most symptoms reports received by Public Health during and following the blowout came from within a 3-mile radius of the well head.
- Collecting samples from areas in which people reported the most symptoms during the blowout would provide the best chance of finding elevated levels of radiation if they exist.
- Samples will be collected in public areas or easements.



# 40 Sampling Locations already identified





## 50 Sampling Locations

- 40 of the 50 Sampling Locations have been identified, based on symptom reports during the blowout.
- An additional 10 Sampling Locations will be identified through Community input.
- Samples will be analyzed by a CDPH-State laboratory
- The results will be available on the Health Study website.



## Community Sampling Plan: Feedback Form

Public Health previously tested materials in waste bins from the Aliso Canyon blowout and well-control operations. The levels found were very low and within naturally existing background levels. These low levels of radiation do not pose an immediate health risk. Prior results are available on the [Health Study website](#).

In response to requests from the community, Public Health is doing additional testing. We are asking for your feedback on where to take samples from. Your input is important and will help us create the final sampling plan.

[Sign in to Google](#) to save your progress. [Learn more](#)

\* Required



Link to Survey:

<https://forms.gle/wJ1CpgcRMZ1wNuJg6>



Link to Survey:

<https://forms.gle/wJ1CpgcRMZ1wNuJg6>

QR Code to  
Survey and Map



Thank you for your participation

**Questions**

**[DPHRadiation@ph.lacounty.gov](mailto:DPHRadiation@ph.lacounty.gov)**

Link to MAP:

<http://publichealth.lacounty.gov/eh/docs/healthresearch/AlisoCanyonStudyAreaPhase2Sites5.pdf>