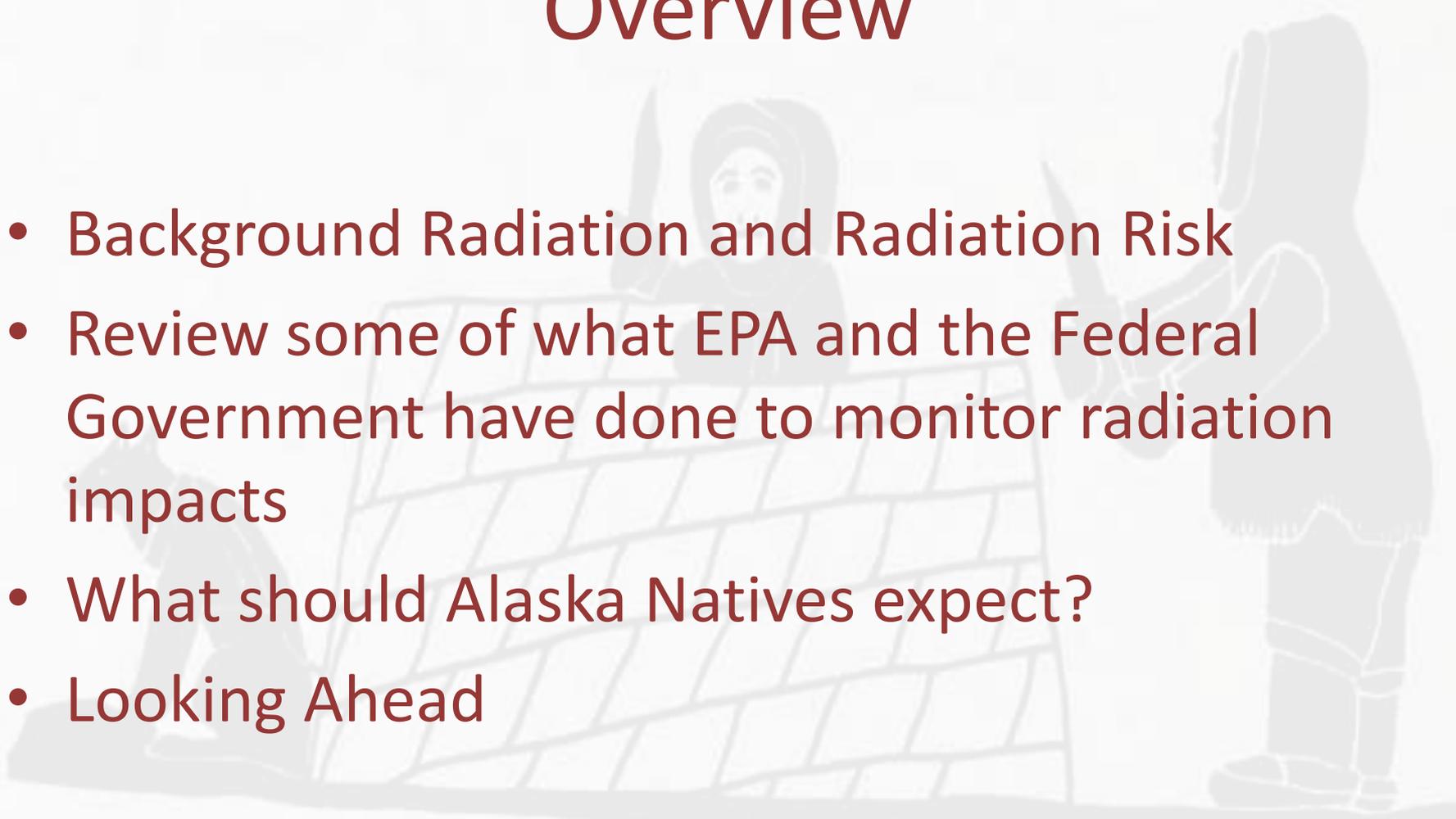


Radiation Impacts on Alaska Native Populations

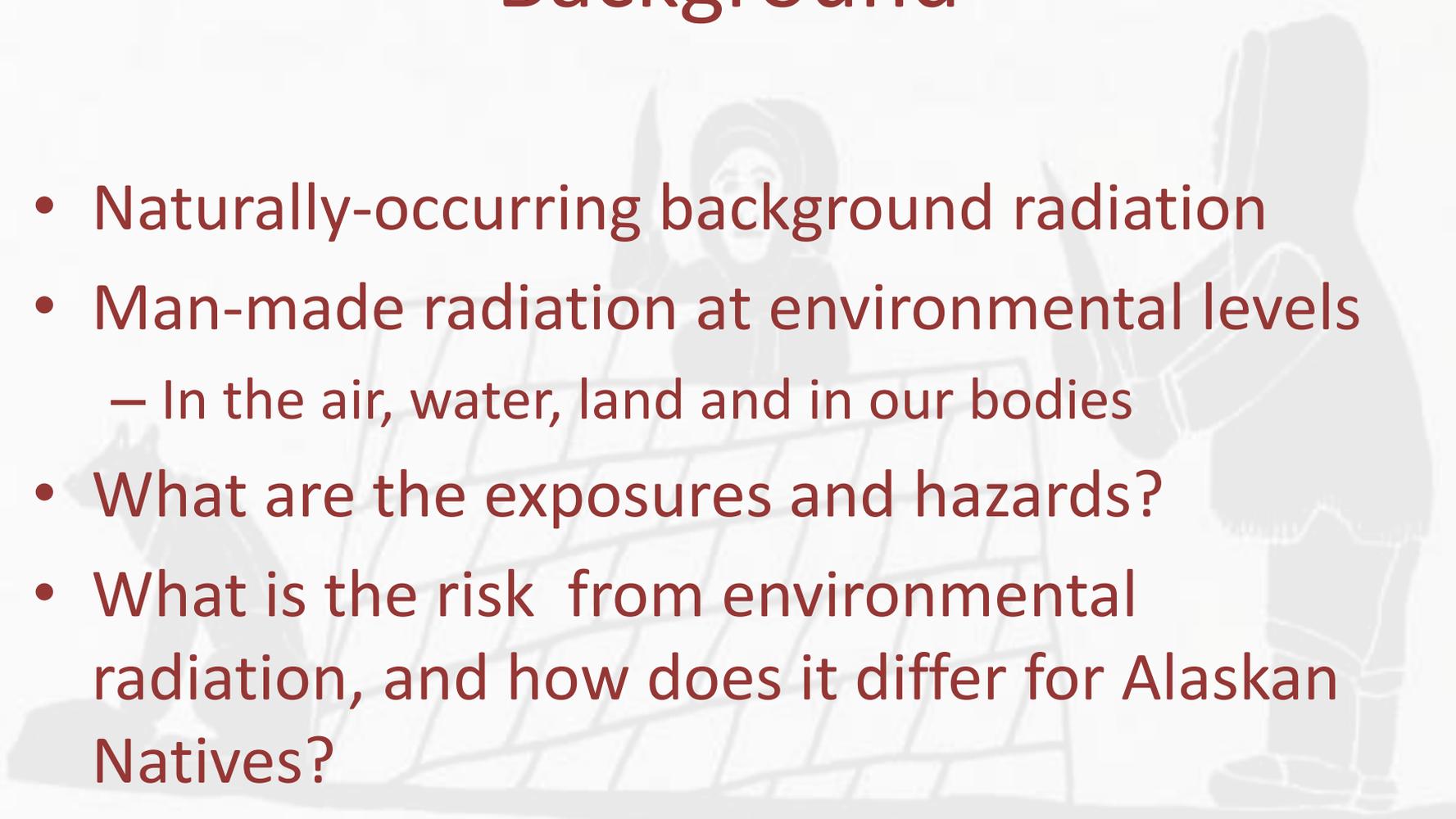
Jed Harrison
Office of Radiation and Indoor Air
Alaska Tribal Conference on
Environmental Management (ATCEM)
November 12 – 15, 2013



Overview

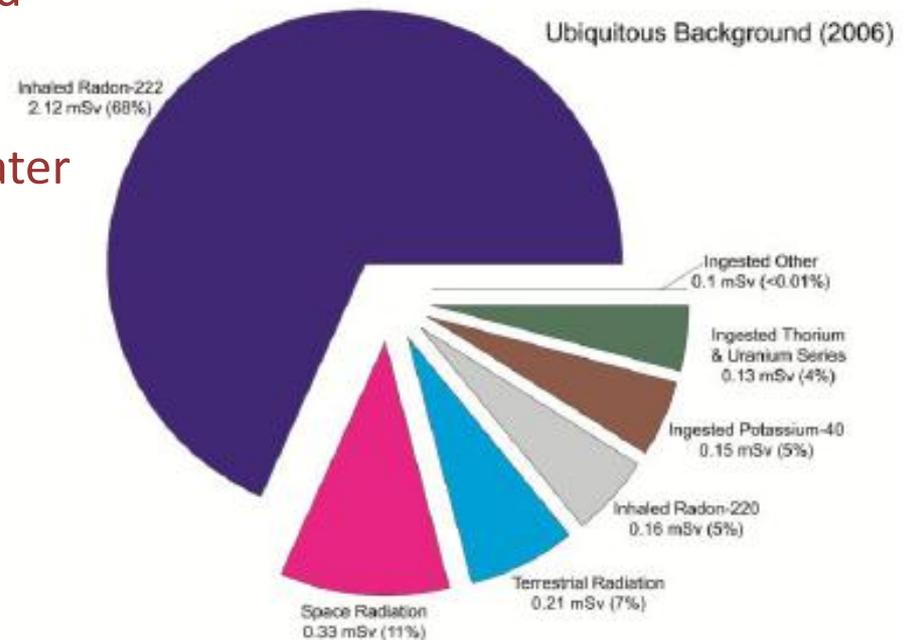
- Background Radiation and Radiation Risk
 - Review some of what EPA and the Federal Government have done to monitor radiation impacts
 - What should Alaska Natives expect?
 - Looking Ahead
- 

Background

- Naturally-occurring background radiation
 - Man-made radiation at environmental levels
 - In the air, water, land and in our bodies
 - What are the exposures and hazards?
 - What is the risk from environmental radiation, and how does it differ for Alaskan Natives?
- 

What is Background Radiation?

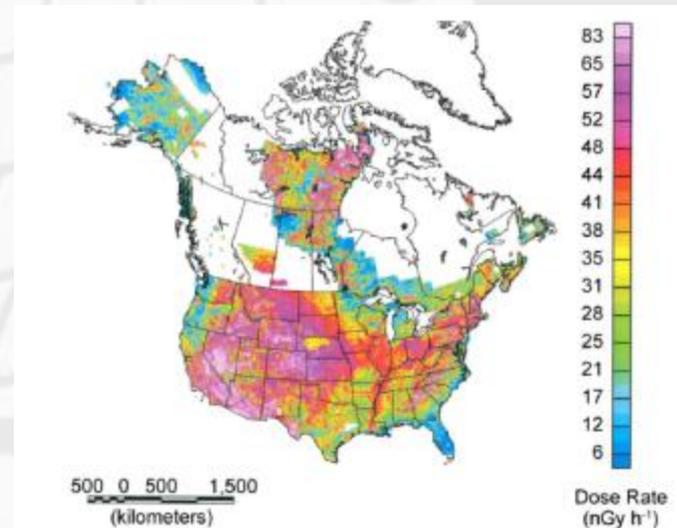
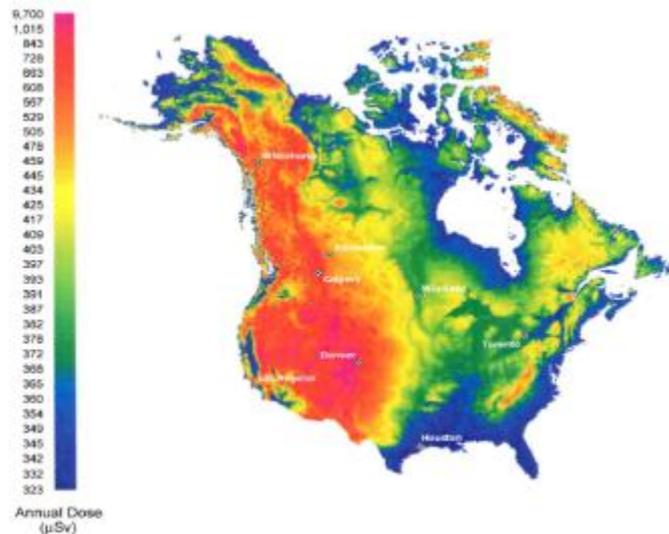
- **Radiation that surrounds us from ubiquitous sources:**
 - Cosmic rays from space
 - Terrestrial radiation from rocks and soils
 - Radon from rocks and soils
 - Trace elements in our food and water
 - Ubiquitous man-made radiation (fallout)
- **Exposure Varies depending on:**
 - Location
 - Diet
 - Water source
 - Building construction



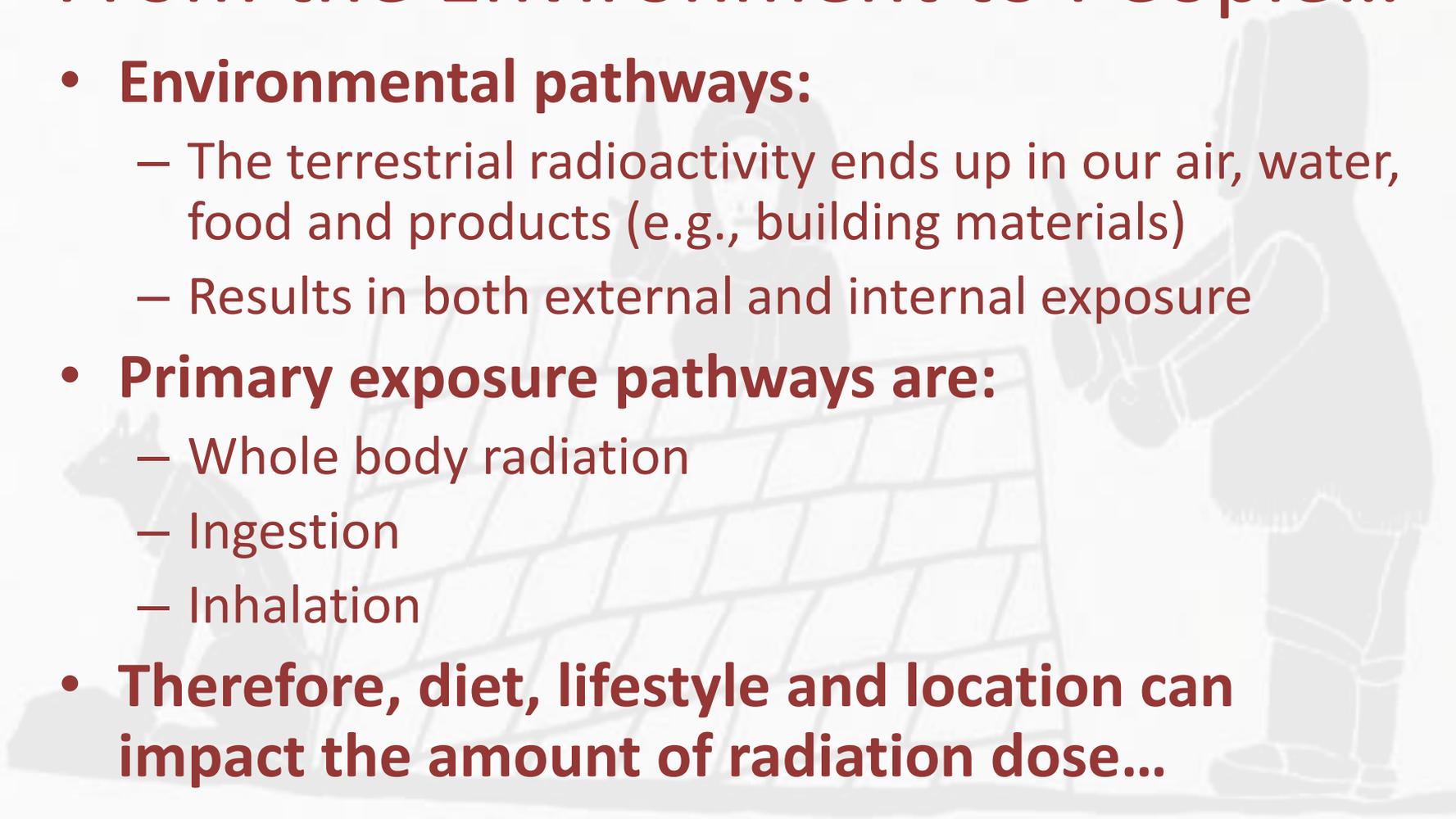
Cosmic & Terrestrial Background

- Cosmic rays originating from deep space
- Solar –from our Sun
- Elevation and latitude affect shielding
- Mostly Uranium and Thorium decay series
 - Includes Radium, Polonium isotopes
- Potassium K40
- Contained in rocks and soils
- Radon is the largest contributor to dose

Source: NASA



From the Environment to People...

- **Environmental pathways:**
 - The terrestrial radioactivity ends up in our air, water, food and products (e.g., building materials)
 - Results in both external and internal exposure
 - **Primary exposure pathways are:**
 - Whole body radiation
 - Ingestion
 - Inhalation
 - **Therefore, diet, lifestyle and location can impact the amount of radiation dose...**
- 

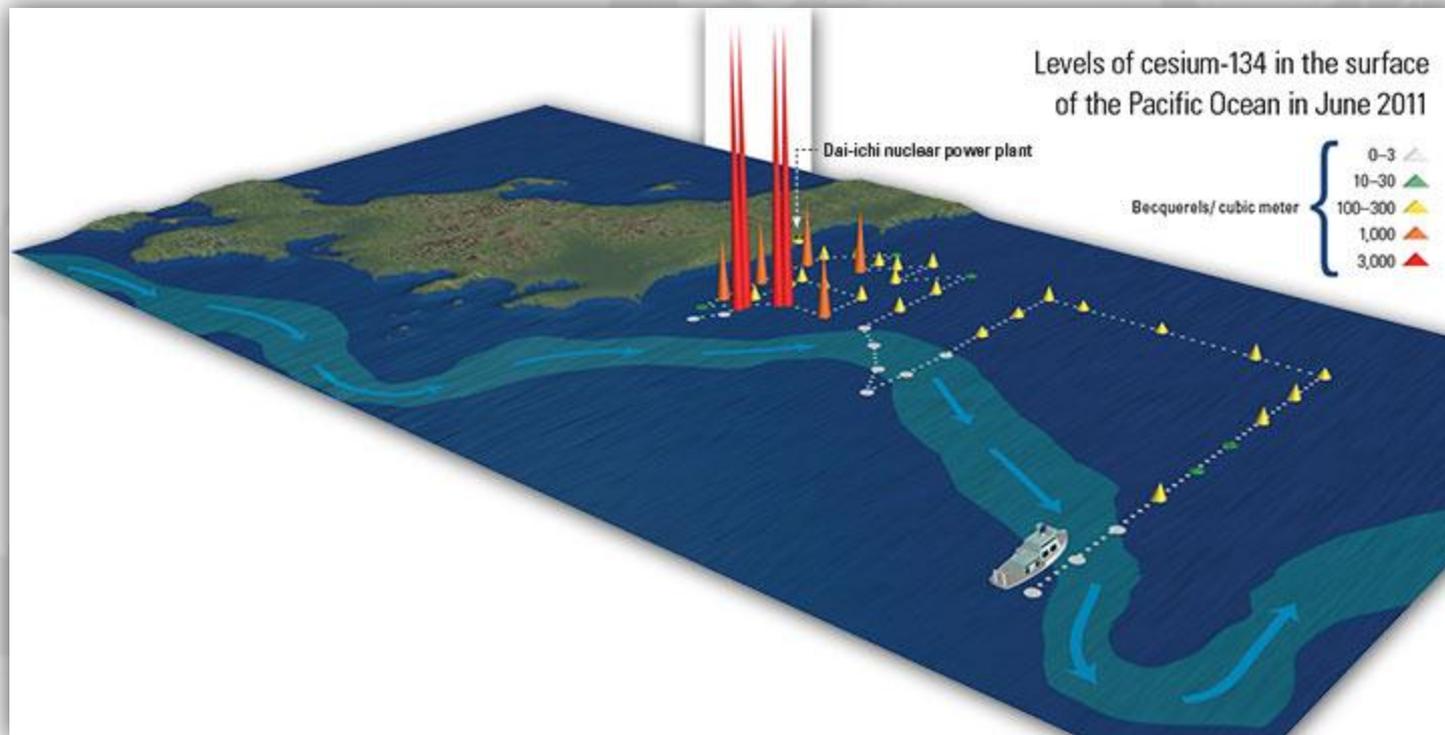
Fukushima and the Ocean



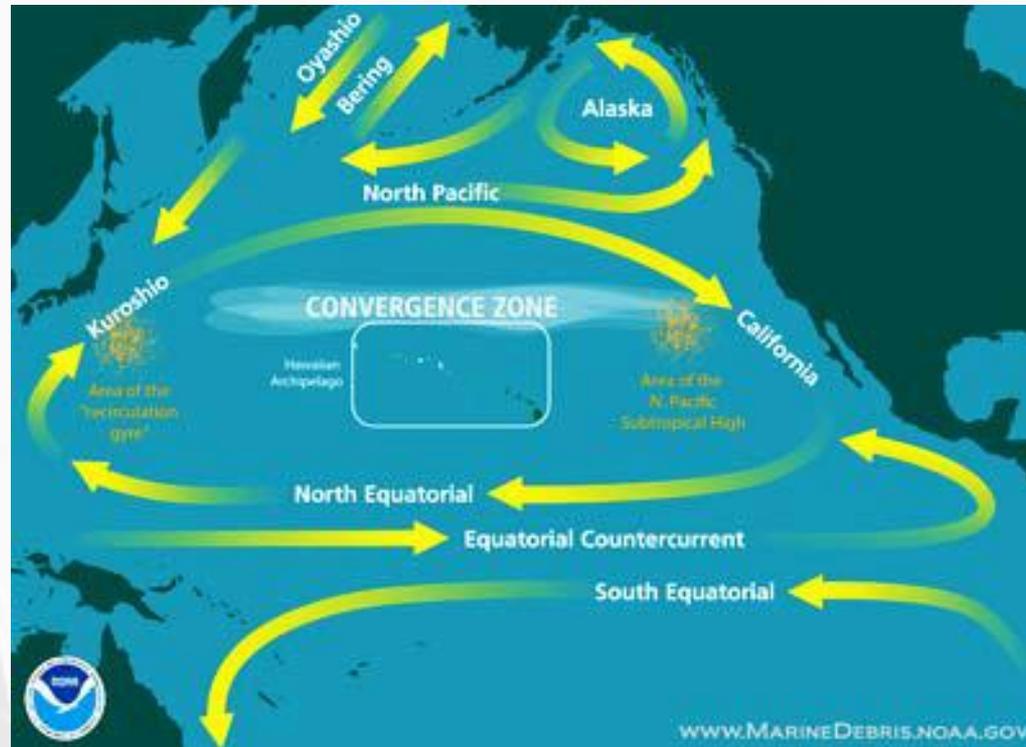
- The disaster at the Fukushima nuclear power complex has released large amounts of radioactive contamination, primarily into the ocean.
- Where did the radiation go?
- What impacts should Alaska Natives expect?

Dilution and Marine Radiation Levels

- Results provided by Woods Hole and others show major dilution away from Fukushima



Ocean Currents



Note that the currents generally head due east before circling up to Alaska

Radiation in a Traditional Diet

Location/Diet	Food Source				Totals
	Fish	Mammals	Birds/Eggs Dose, $\mu\text{Sv}/\text{yr}$	Invertebrates	
Barrow	13	54	22	0	90
Barrow 1960s Diet	55	77	356	0	488
Canadian Diet	92	361	0	0	453
Emmonak	198	40	0	0	238
Diomedede 1960s Diet	15	301	1,014	145	1,474
Kivalina	116	205	22	1	344
Pt. Lay	12	268	131	0	411
Kotzebue 1960s	8	91	568	0	667
Pt. Hope 1960s	93	166	919	0	1,177

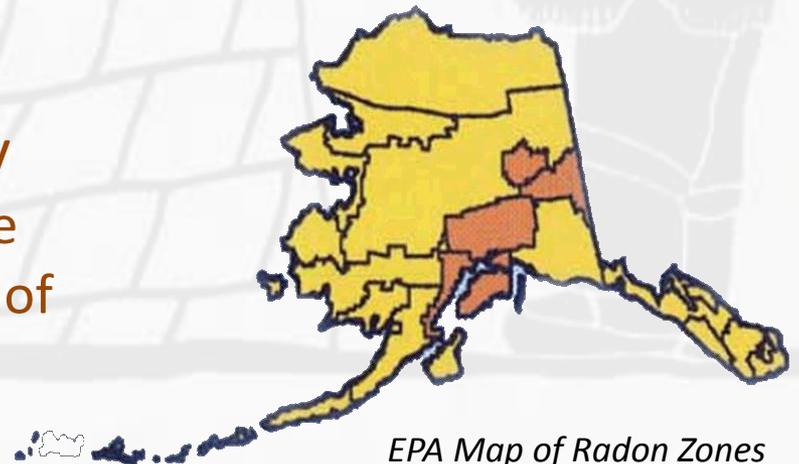


- Background Po-210 in the ocean contributes most of the radiation dose in seafood, not man-made radioactivity

Pre Fukushima

- Previous studies by DOE and others evaluated radiation doses to Native Alaskans that included:
 - Natural background
 - Impacts from testing, accidents, disposal
- Focus on traditional diet
 - Varies widely among Native communities

Annual background ~ 250 mrem/y
Lower than many other areas since
radon does not readily diffuse out of
frozen soil



EPA Map of Radon Zones

Post-Fukushima

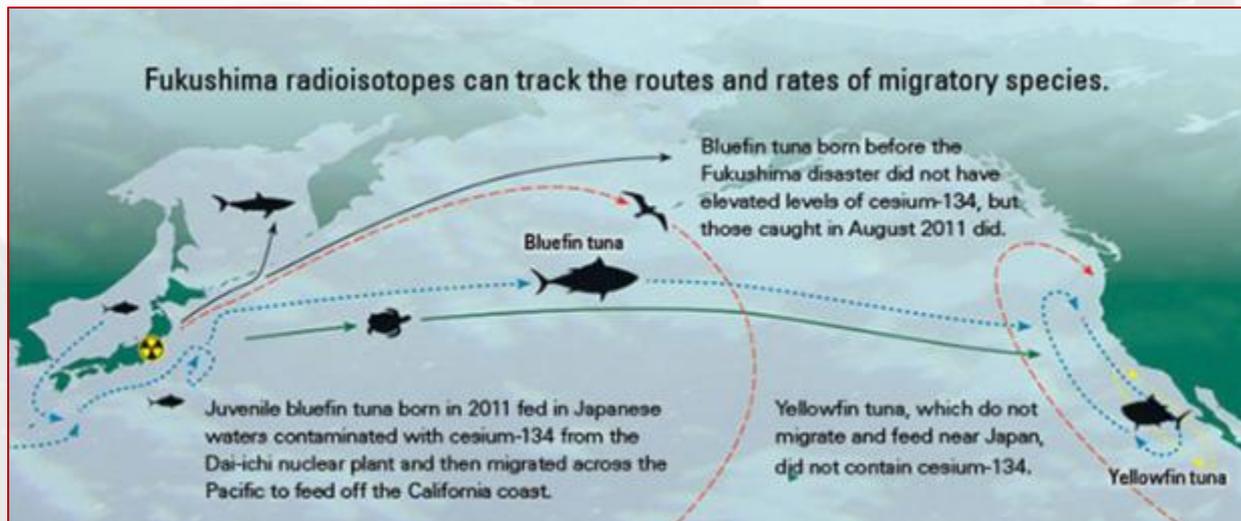
- EPA, NOAA, FDA, DOE, Alaska and NGOs conducted monitoring and modeling



RADNET
Tracking Environmental Radiation Nation

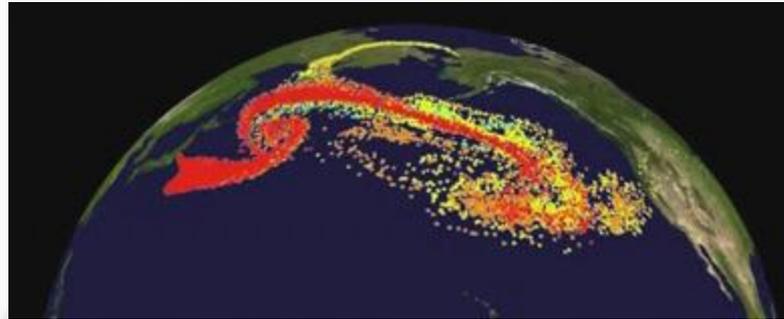
Radiation in Fish

- Bluefin Tuna are a migratory species that frequent both Japan and the west coast of the U.S.
- Cesium-134 and 137 both found in tuna at barely detectable levels



Yellowfin, (like and other species that do not migrate to Japanese waters) did not show similar levels of contamination

Airborne Radioactivity from Fukushima



NOAA

- RadNet Monitoring results all well below levels of concern – Air, Drinking Water, Milk
 - I-131 decayed away quickly
 - Cs-137 primary contaminant
- Limited data on deposition and uptake by plants or animals at this time

RadNet Deployable Monitors: Fukushima Response

Nome



Guam



Nome



Saipan



Juneau

Summary of monitoring results www.epa.gov/japan2011/rert/radnet-data-map.html

Tracking Fukushima Debris Field

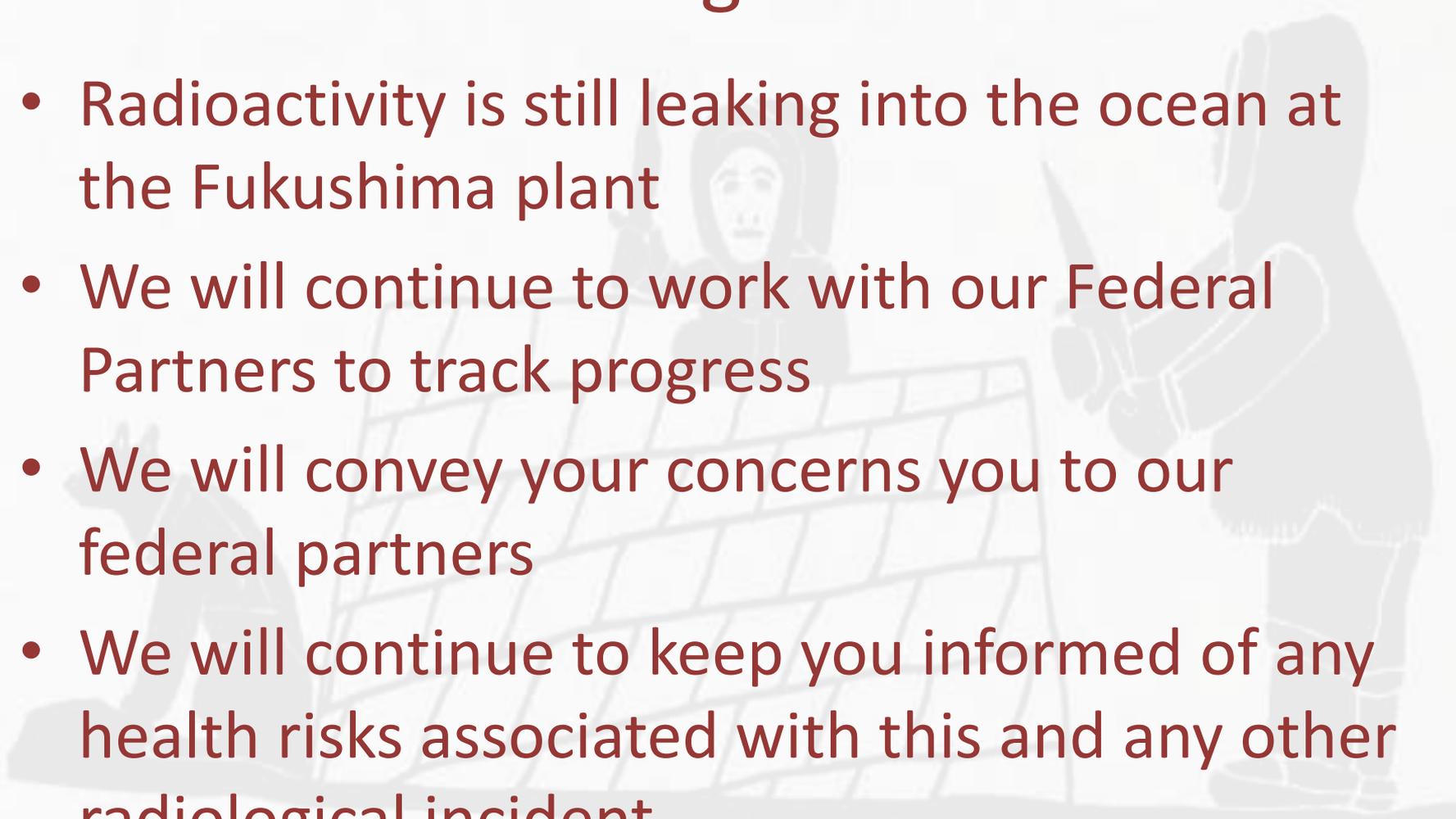


Note that the currents generally head due east before circling up to Alaska

What Does This Mean For You?

- Airborne deposition to Alaska lands from airborne plume occurred in weeks after incident; below any levels of concern; and declined with time
- Marine concentrations dilute to near background levels once a few km away from discharge point; releases to ocean continue
- Levels of radioactivity in seafood is thousands of times below FDA action levels
- Traditional diet including large quantities of fish and game should not be avoided
- *FDA: No evidence to show a threat to public health and safety in the U.S. from fish caught off the U.S. West Coast*

Looking Ahead

- Radioactivity is still leaking into the ocean at the Fukushima plant
 - We will continue to work with our Federal Partners to track progress
 - We will convey your concerns you to our federal partners
 - We will continue to keep you informed of any health risks associated with this and any other radiological incident.
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Thank You!

Questions and Concerns?

Jed Harrison
Tribal Advisor
Office of Radiation & Indoor Air (ORIA)
US EPA

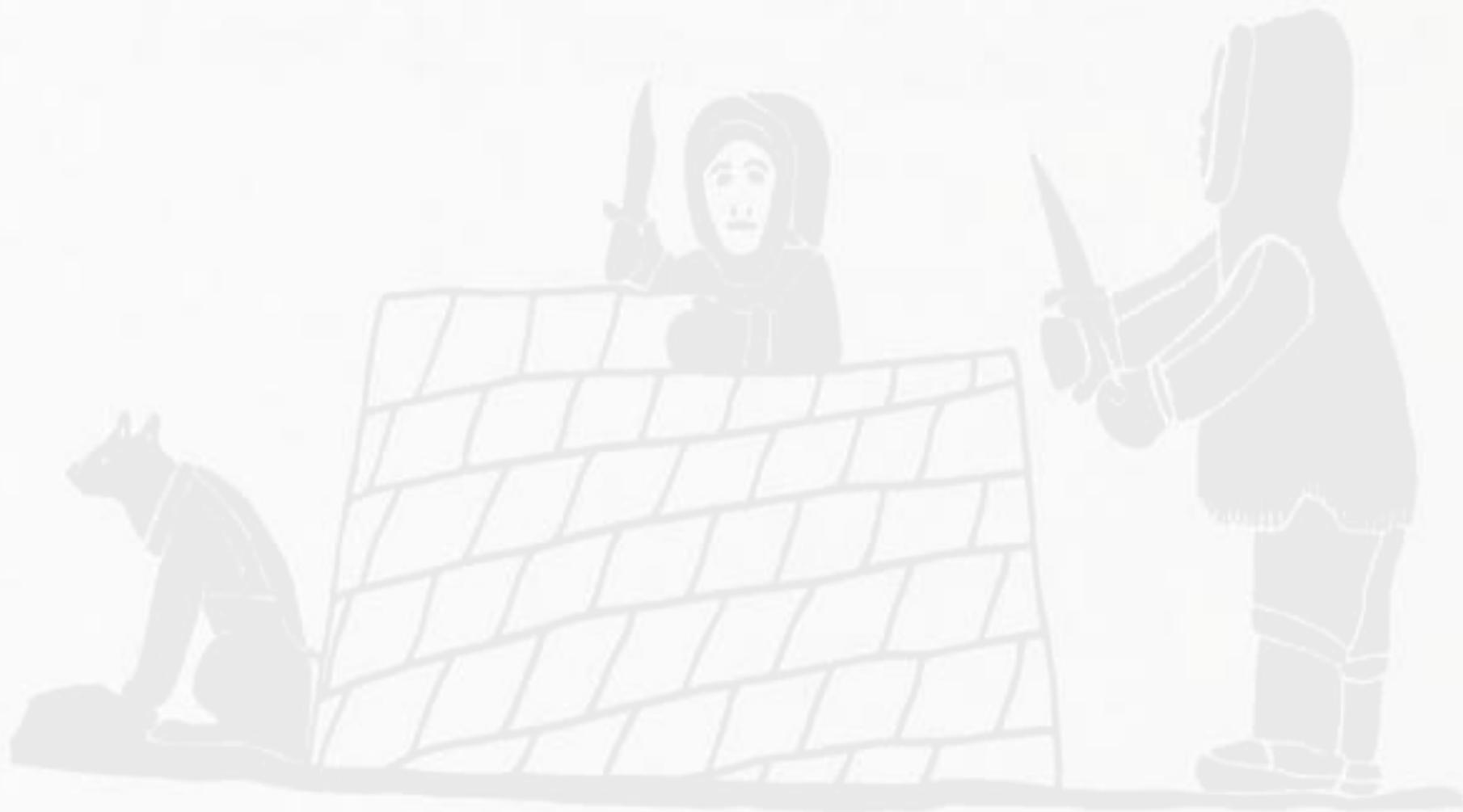
harrison.jed@epa.gov

7902 784 8218

Calculate your estimated annual radiation dose:

<http://www.epa.gov/radiation/understand/calculate.html>

FAQs on Japan Nuclear Emergency www.epa.gov/japan2011/japan-faqs.html



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 - Personal e-mail communication: Clyde Pearce, Chief, Radiological Control Program, Alaska. 11/01/2013
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