



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

Annual Site Environmental Monitoring Report

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DOE-Idaho

October 26, 2017

Annual Site Environmental Report

Presentation Overview

- Requirements
- Content and contributors
- Environmental monitoring overview
- Calendar year 2016 environmental monitoring activities & results
- Report availability, contacts, and feedback

Annual Site Environmental Report

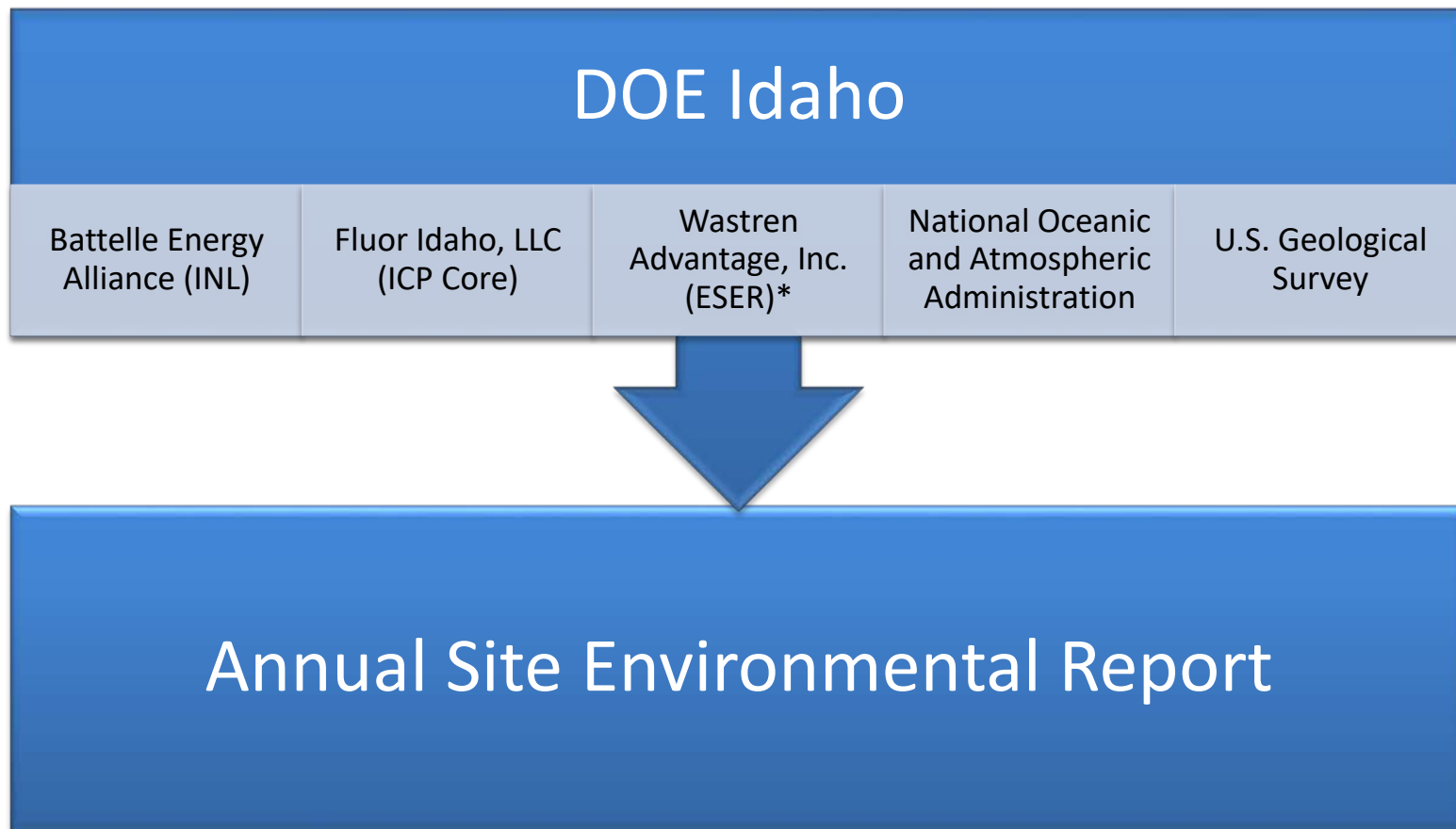
DOE ASER Requirements

Required by DOE Order 231.1B, “*Environment, Safety, and Health Reporting*”

- DOE Field Elements issue by October 1 annually for preceding calendar year
- Types and quantities of radioactive materials emitted or discharged to the environment
- Environmental monitoring
- Dose to public from exposure to radiation sources
- Environmental Occurrences and Responses
- Description of Significant Environmental Programs and Efforts
- Compliance with Environmental Standards and Requirements
- Property Clearance Activities

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Contributing Organizations



Naval Reactors Facility data are published in
Naval Reactors Facility Environmental Monitoring Report

*ESER = Environmental
Surveillance, Education,
and Research Program

INL Site Environmental Report

Calendar Year 2016

CHAPTER 1
INL Site
Description

CHAPTER 2
Environmental
Compliance
Summary

CHAPTER 3
Environmental
Management
System

CHAPTERS 4-9
Environmental
Monitoring
Programs
Dose to the
Public

CHAPTER 10
Environmental
Research

CHAPTER 11
Quality
Assurance

Helpful
Information
Appendices
Supplements

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Calendar Year 2016

What's New in 2016

- Eliminated duplicative Environmental Programs content between Chapters 2 and 3 and elevated Environmental Management System to a stand-alone Chapter 3
- Relocated liquid effluent data tables to Appendix C
- Added a section on Environmental Education Outreach in Chapter 1
- Integrated presentation of ambient air monitoring

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Calendar Year 2016

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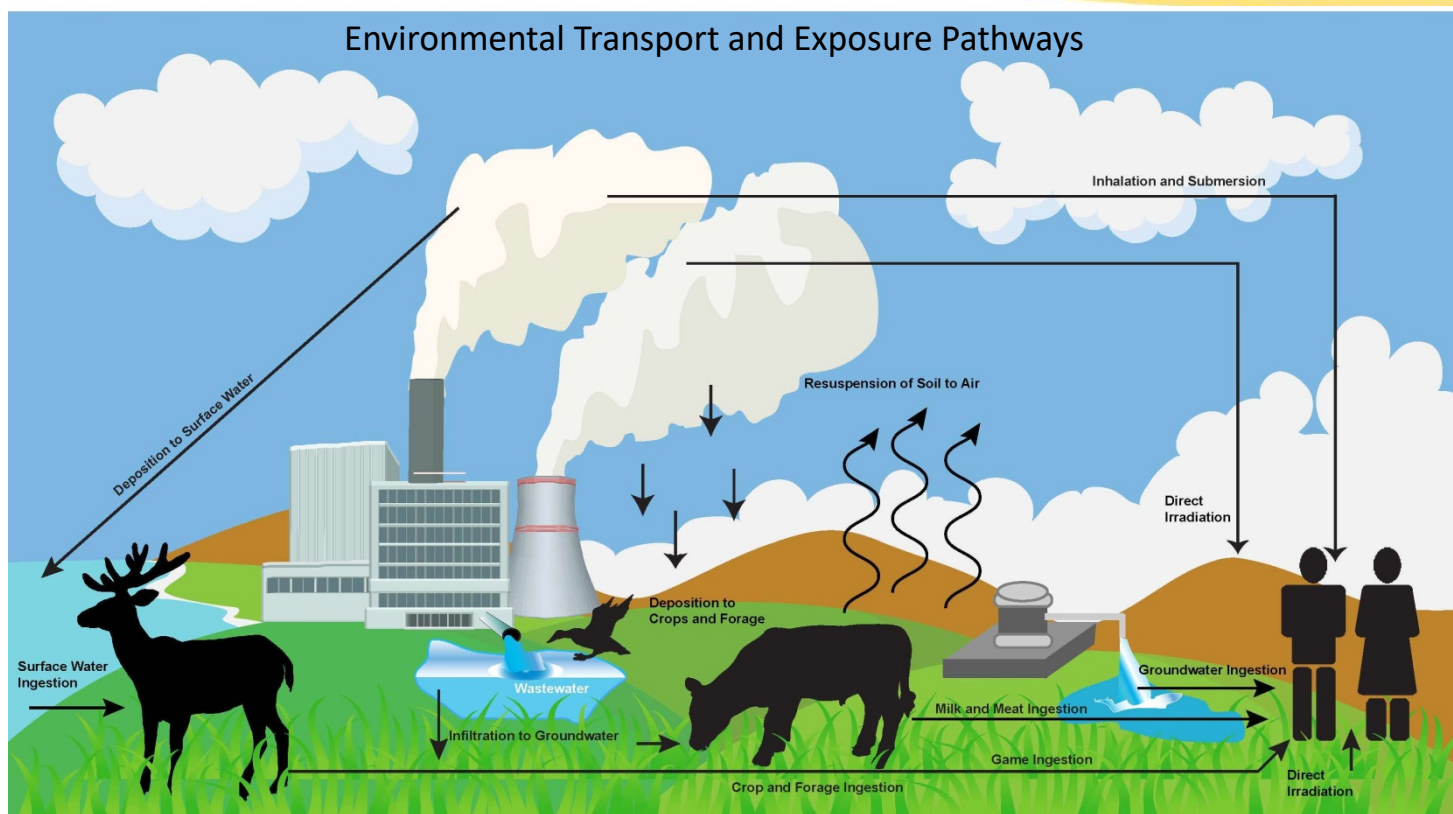
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Environmental Monitoring Overview

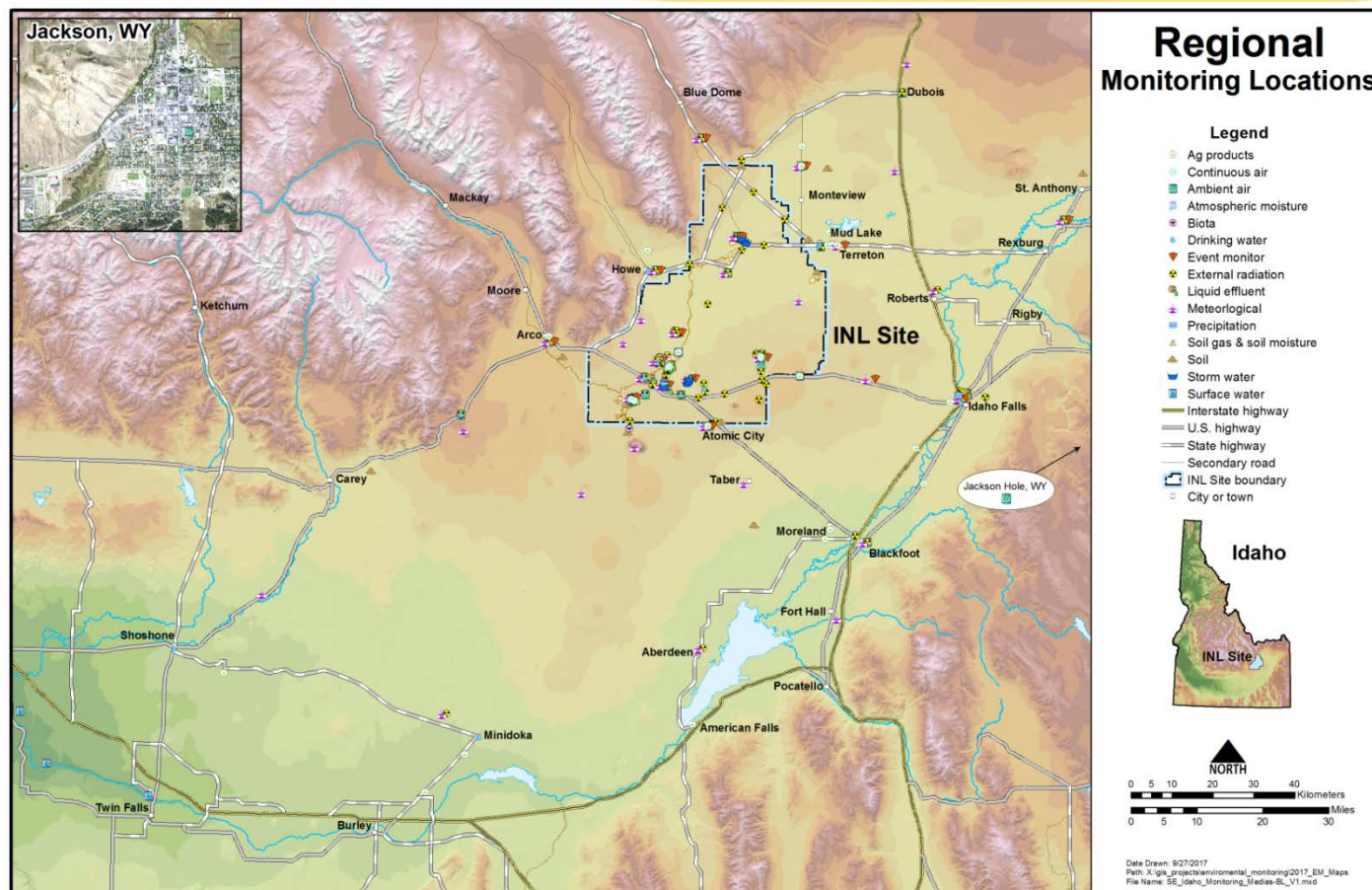


- Comply with applicable local, state, & federal regulations, and DOE requirements.
- Evaluate public health and environmental impacts from DOE operations.

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Environmental Monitoring Overview

- INL Site Monitoring Program covers 9,000 square miles in southeast Idaho and Jackson, Wyo.
- Thousands of environmental samples are collected and analyzed each year to monitor radioactive & chemical constituents.
- Monitoring results are compared to:
 - Permit limits
 - Regulatory standards
 - Historical results
 - Background levels



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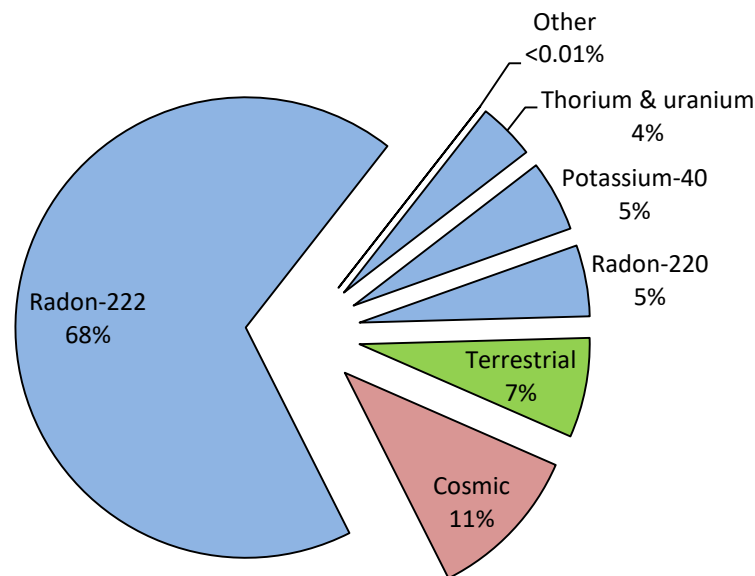
Sources of Radiation

Natural Radiation Sources

- From outer space – “Cosmic”
 - From the earth – “Terrestrial” - Soil/Rock
 - From the body – “Internal” - Ingested/Inhaled
 - Radon
 - Food & Water (potassium-40, thorium, uranium)
- Estimated southeast Idaho dose: 360 millirem/year

Manmade Radiation Sources

- Medical Procedures
 - Consumer Products
 - Industrial
 - Occupational
 - Global Fallout (weapons tests, accidents)
- Estimated U.S. dose: 310 millirem/year



Background radiation: Radiation that occurs naturally in the environment.

Background level: An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

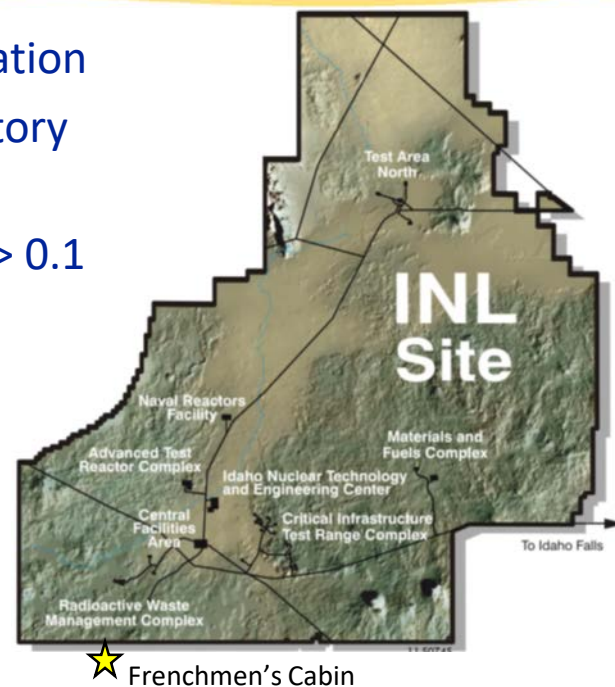
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Airborne Effluents

- Clean Air Act compliance
- State of Idaho and EPA regulate construction & operation
- Monitoring is performed according to permit/regulatory requirements
- Continuous emissions monitoring: potential to emit > 0.1 millirem dose/year
- Periodic confirmatory measurements
- Data reported annually to EPA
- Calculate public dose

2016 Results:

- Radiological airborne releases decreased
- Air pathway public dose = 0.0143 millirem/year (EPA standard is 10 millirem/year)
- Maximally Exposed Individual south of INL Site at Frenchmen's Cabin

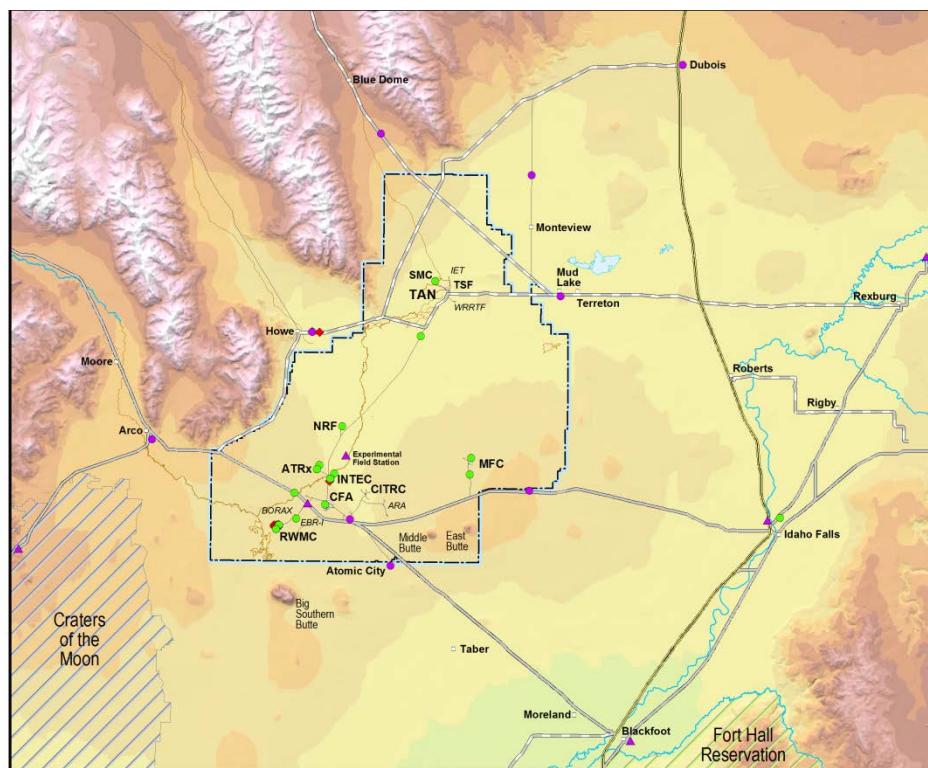


INTEC CPP-659 Stack

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Ambient Air

- DOE Order 458.1, "Radiation Protection of the Public and the Environment"
- Particulates and radioiodine gas sampled at 36 locations
- Atmospheric moisture (7) & precipitation (3) sampled for tritium
- 2016 Results:
 - Americium-241, plutonium-239/240, and tritium detected
 - Measured concentrations were below DOE standards and consistent with historical measurements



Ambient Air Monitoring Locations



Ambient Air Sampler

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Water

Liquid Effluents

- State of Idaho water rules
- Permit-regulated discharges to land surface
- Sampled for biological, chemical, physical, and radiological constituents
- 2016 results:
 - Monitoring performed as required
 - All results were within permit limits



Drinking Water

- Regulated by the State under Safe Drinking Water Act
- 12 drinking water systems & 8 offsite locations
- Sampled for biological, chemical, and radiological constituents
- 2016 results:
 - Monitoring results were below Safe Drinking Water Act standards
 - Central Facilities Area worker dose from drinking water consumption was 0.149 millirem < 4 millirem EPA Standard



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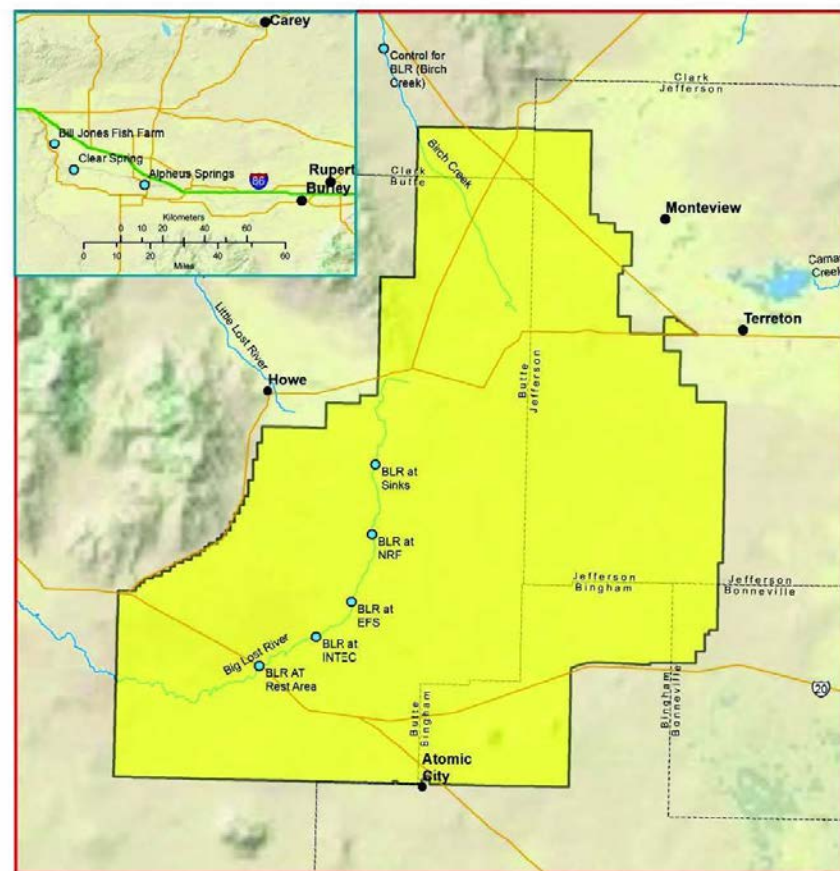
Water - Continued

Surface Water

- DOE Order 458.1
- Big Lost River (BLR), 3 downgradient springs sampled for radioactive constituents
- 2016 results:
 - No BLR samples collected
 - Gross alpha and beta radioactivity, tritium detected in offsite samples
 - Measured concentrations were below Safe Drinking Water Act standards and consistent with background levels

Surface Water Runoff

- DOE Order 435.1, *Radioactive Waste Management*
- Surface water runoff sampled at the Subsurface Disposal Area for radioactive constituents
- 2016 results:
 - Americium-241, plutonium-239/240, strontium-90 detected
 - Measured concentrations below DOE standards and similar to prior years



Surface Water Sampling Locations

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Water - Continued

CERCLA Groundwater Monitoring

- Groundwater monitoring at Waste Area Groups summarized in the ASER (except WAG 8, Naval Reactors)
- WAG-specific monitoring plans and reports in the CERCLA Administrative Record (<https://ar.icp.doe.gov/>)

USGS Groundwater Monitoring

- Groundwater monitoring and hydrogeologic studies are summarized in the ASER
- Reports available at <http://id.water.usgs.gov/INL/>



CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; ASER = Annual Site Environmental Report; WAG = Waste Area Group; USGS = U.S. Geological Survey

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Agricultural Products



- DOE Order 458.1
- Alfalfa, grains, lettuce, milk and potatoes
- Sampled for radioactive constituents
- 2016 Results:
 - Strontium-90 detected in all products
 - Tritium detected in milk samples
 - Measured concentrations below Federal standards and consistent with historical measurements



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Soil and Direct Radiation

Soil sampling performed to evaluate long-term buildup of INL Site-related radionuclides

- *Strontium-90, cesium-137 concentrations continuing to decrease*
- *Plutonium-239/240 concentrations show no trends*
- *Americium-241 measured near detection limit*
- *Results are consistent with background levels*



Deploying an environmental dosimeter



Soil sample collection

Direct radiation measures external radiation exposure with environmental dosimeters

- *Measured average dose was 117 millirem in 2016*
- *Comparable to natural background radiation*

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Wildlife



Sampling a pronghorn

Road-killed pronghorn, elk, deer

Thyroid and muscle tissue collected & analyzed for radioactive constituents

- *No human-made radionuclides detected in 2016*

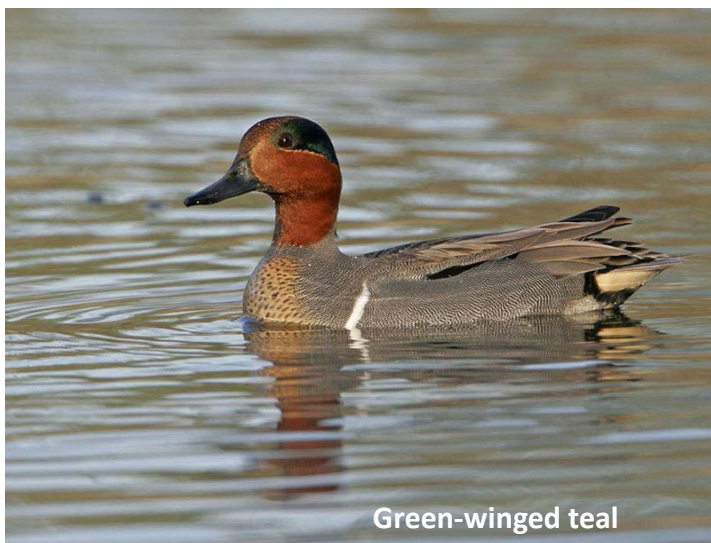
Waterfowl from wastewater ponds

Birds are divided into edible tissue, external portion, all remaining tissue & analyzed for radioactive constituents

- *No samples collected in 2016*

Biota Dose Assessment

- DOE Order 458.1
- Evaluates effects of radiation on terrestrial and aquatic animals
- *No harmful effects caused by INL Site-related radioactivity*



Green-winged teal

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Ecological Monitoring



Bats

White-nose syndrome
found in Seattle



Rabbits

520 rabbits counted—
highest since 1981



Bald Eagles/Raptors

369 raptors counted—
highest since 2001



Raven Nests

Surveys show numbers
continue to increase



Greater sage-grouse

Male lek attendance
increased



Breeding Birds

Great egret, Eurasian collared
dove recorded 1st time

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Accessing Reports

INL Site Annual Environmental Reports

1997-Present: Available on the web at
<http://www.idahoer.com/publications.htm>

All Reports: INL Research Library at
<https://www.inl.gov/about-inl/general-information/research-library/>

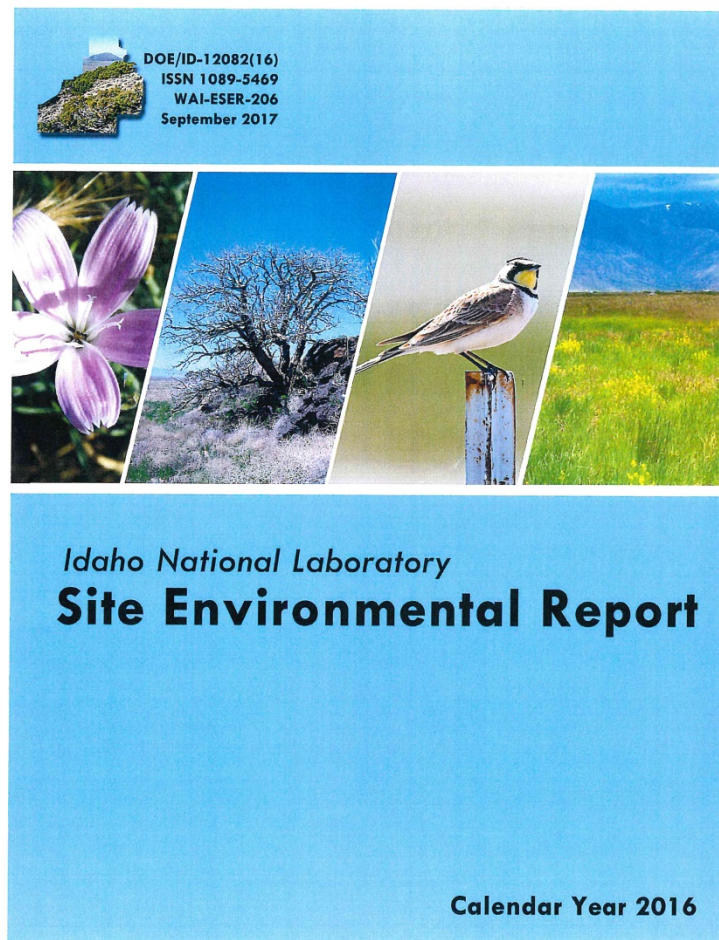
Hardcopies or other information:

Contact Betsy Holmes

(208)526-9855; holmesbs@id.doe.gov

Other DOE Site Environmental Reports

<http://energy.gov/ehss/policy-guidance-reports/environment-policy-guidance-reports/annual-site-environmental-reports>



INL Site Environmental Report *Feedback*

Feedback is Welcomed and Appreciated

http://www.idaho.eser.com/Annuals/2016/index.htm

2016 ASER Report

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Home Surveillance Ecological Support Education Publications

**Idaho National Laboratory Site
Environmental Surveillance, Education, and Research Program**

Quick Links


- [ESER Home](#)
- [Environmental Report 2016](#)
- [Environmental Data Supplemental Maps](#)
- [Technical Reports](#)
- [Supplements to the ASER](#)
- [Links](#)


Annual Site Environmental Report for 2016



To our readers

[Can ESER Make This Report More Useful to You?](#)
Your comments are appreciated.

 If you have a question about the INL Annual Site Environmental Report, please email us.
marilyn.case@wastrenadvantage.com



The Idaho National Laboratory Site Environmental Report for Calendar Year 2016 is an overview of environmental management activities conducted on and in the vicinity of the Idaho National Laboratory (INL) Site from January 1 through December 31, 2016. This report includes:

- Effluent monitoring and environmental surveillance of air, water, soil, vegetation, biota, and agricultural products for radioactivity. The results are compared with historical data, background measurements, and/or applicable standards and requirements in order to verify that the INL Site does not adversely impact the environment or the health of humans or biota.
- A summary of environmental management systems in place to protect air, water, land, and other natural and cultural resources impacted by INL Site operations.

INL Site Environmental Report

Summary

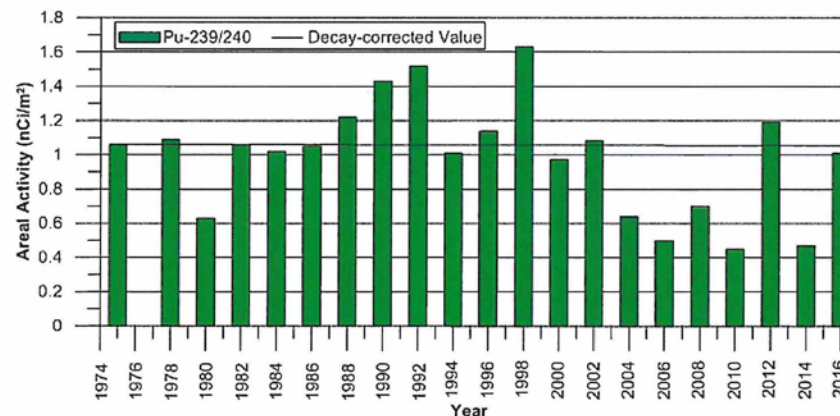
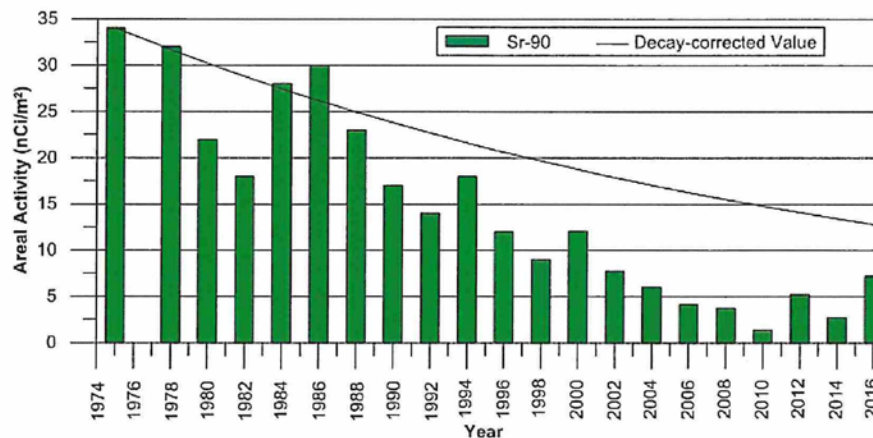
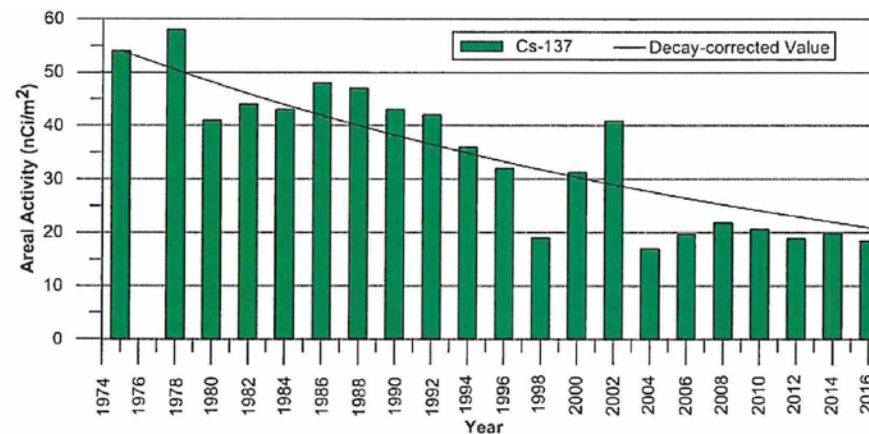
- Monitoring is conducted in compliance with applicable requirements and demonstrates the INL Site is operating within established limits
- Results confirm INL Site operations are protective of the environment and human health
- Annual Site Environmental Report is an important resource for documenting INL Site environmental performance and sharing information with the public

QUESTIONS?

Additional Slides

INL Site Environmental Report

1975-2016 Soil Measurements



Radiological Environmental Concentrations

DOE-STD-1196-2011

Derived Concentration Technical Standard

<http://energy.gov/ehss/downloads/doe-std-1196-2011>

Biota Dose

DOE-STD-1153-2002

Graded Approach to Evaluating Radiation Doses to Aquatic and Terrestrial Biota

<http://energy.gov/ehss/downloads/doe-std-1153-2002>

Radiological Monitoring and Surveillance

DOE-HDBK-1216-2015

Environmental Radiological Effluent Monitoring and Environmental Surveillance

<http://energy.gov/ehss/downloads/doe-hdbk-1216-2015>